

## The New Urban Acupuncture: Intermodal Nodes between Theory and Practice

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### 1 ABSTRACT

The intermodal nodes, as important interchange areas of contemporary cities, represent one of the most vibrant and challenging elements of the current urban transformations. Frequently considered as initiators or generators of further urban and regional connectivity, accessibility and development, they are excellent experimental polygons for new planning strategies. Thus, the intermodal areas, originally perceived as marginal zones and used as the basic transportation support, upgrade their mono-functional background introducing the globally recognizable set of activities.

The main idea of this process is to create an improved urban system, based upon latest technologies and proclaimed imperatives of urban efficiency, competitiveness and sustainability. Therefore, the purpose of this paper is to present and analyze context, content and implications of intermodality and the transformations caused by this concept. Obviously, the structural, social and economic interchange have been achieved in numerous cases, but a total integration, real sustainability and an acceptable mode of applied technology still have to be confirmed in the future.

### 2 INTRODUCTION

The urban world of the 21<sup>st</sup> century is composed of numerous nodes, streams and webs, which create a new landscape of globalization and impose different logic of space and time perception. Therefore, the urban infrastructure is updated, its networks are continuously multiplied and various spaces of (inter)connections are folded in trendy architectural envelopes.

Following the general idea of higher efficiency, the global movement of flows shapes a different configuration which, nowadays, connects new urban focuses: airport/highway/railway – parking place/subway station – office/apartment buildings. Evidently, the introduction of new urban/global infrastructure systems is a necessity, but their harmonization with the inherited urban context has to fulfill the needs of all consumers. The higher urban connectivity, which could be attained by numerous traffic and information systems, enables the communication on every spatial level and scale. As a result, the systems of public transportation, systems of business/tourist flows and systems for information interchange (telecommunication networks) open the numerous possibilities for urban integration.

Usually, the first step of the global initiation is creation of new city gates (airports, railway buildings) and establishment of economic and information contact zones. They become the main connection points between different kinds of communication and transform themselves into the complex mega-structures, as the most vital organs of global cities. Their organization and form transmit numerous messages, glorifying the power of modern technologies, expressing the national dignity, reflecting the importance of a city in the world hierarchy or representing the symbols of a new urban regeneration. However, all these nodes function on several scales – integrating various activities, actors and spaces, and promoting the concept of intermodality.

### 3 THE IDEA AND ROLE OF INTERMODALITY

The idea of intermodality derives its logic from the complex traffic systems and represents one of the main pivots of the contemporary planning practice. Generating an impressive architectural program, it directs design and organization of sensitive urban areas playing an important role in modern cities. However, this term is frequently related to the traffic nodes – terminals, even though it could be embedded and/or applied in various categories of urban systems and on different levels and scales of design process.

In general, intermodality is a characteristic of a transport system which combines/uses at least two different transportation modes. These modes should be integrated, increasing the passenger mobility in a door-to-door transport chain. One of the main goals of modern intermodal passenger transport is to boost use of public transportation and to reduce the reliance on the private cars. At the same time, it should respond to numerous

(and often contradictory) demands in order to enable social and economic development, environmental protection, efficiency, safety and security, accessibility and – the freedom of mobility for any citizen.

Unfortunately, even though the concept of intermodality reflects numerous interactions, which exist in a dynamic contemporary urban system, it sometimes collides with environmental requirements or only declaratively accepts demands and recommendations given by local communities, experts or authorities. However, the basic principles of intermodality could be used as an active tool for urban planning and design, which could synchronize an inherited city space, multiplied needs and scales, as well as the latest technological achievements.

#### **4 THEMES AND CHALLENGES**

On our way to the improved passenger transport, there are numerous obstacles. According to the Eurostat data (EU-27, 2006) 72.7% of Europeans prefer to use their cars for everyday activities and in the new member states these figures look even more discouraging. Furthermore, various modes of transport (especially private car travel) represent the major consumers of non-renewable energy, which has a negative impact both on local and global level. Therefore, the concept of intermodal transportation was proposed by the European Commission as an alternative to the previous condition and as a possibility for a seamless travel which comprises all modes of transport, new technologies, a reliable knowledge base and well-balanced management. In spite of obvious benefits, which include all-inclusive, cheaper, comfortable, greener and safer travels, it is still necessary to coordinate local, regional and global level. As a result, it would be possible to unify standardization, regulation, ticketing schemes, booking and services across Europe and to emphasize qualities of intermodal networking.

The European Union initiated a number of programs and projects focused on various aspects of intermodal passengers travel in Europe. Obviously, this concept has been prioritized and documents such as the White Paper of the European Commission (“European transport policy for 2010: time to decide”, 2001) or studies (for ex. “Towards passenger intermodality in the EU”, 2004) certainly support and alleviate its implementation. Additionally, it is important to emphasize programs – for example, the funding program Marco Polo (2007-2013), which should encourage shifting of freight transport from the roads to rail, sea and inland waterways, or comprehensive projects like KITE – “A Knowledge Base for Intermodal Passenger Travel in Europe” (2007-2009), which should provide all relevant existing (and future) information and data about passengers intermodality.

One of the very interesting projects is LINK – The European Forum on Intermodal Passenger Travel, also funded by the European Commission (2007), within the 6th Framework Program. The main aim of the Forum is to provide “a platform for exchange, knowledge transfer and the promotion of intermodal solutions” but it also brings together all stakeholders and enables communication between main actors – authorities, associations, operators, users and industry representatives. In addition, the LINK forum presents various case studies, a virtual library and an intermodality glossary which further stimulates knowledge/practice exchange and promotes the idea of intermodal travel.

All these initiatives cover a wide range of themes dealing with different scales and spatial levels, modes of transport, aspects and methodology/tools but it is still early to estimate the real effect of all these impulses. However, one fact cannot be denied – the contemporary city space is changing and the guidelines outlined by the main principles of intermodality will represent a backbone of future urban transformations. Consequently, the intermodal nodes and their networks will become the unavoidable acupuncture points and meridians on a modern urban tissue – influencing our mode and quality of life.

#### **5 INTERMODAL NODES – CHARACTERISTICS**

The contemporary intermodal nodes could be classified according to various criteria:

- importance for local, regional and global connectivity
- position in a metropolitan/urban networking
- spatial structure
- functional structure
- mode(s) of transportation

- applied technology
- level of planned/achieved sustainability
- level of integration

In general, intermodal nodes with their traffic networks, complementary activities and surrounding (service) zones could represent:

- local connectors (networking on a metropolitan scale, local service center)
- regional connectors (intersection of several regional transportation networks, inter-metropolitan links, service center on a regional level)
- global connectors (the main intermodal hub of major regional networks, interregional/global service center).

Considering the position and role in a metropolitan intermodal system, it is possible to distinguish two basic types of networking – with hierarchical structure (various levels of importance) or without it (all nodes/elements have equal importance), but frequently these two types are combined. Therefore, intermodal node could represent the main intermodal metropolitan unit, an integral unit of the main intermodal zone, a unit of intermodal network (the same level of importance) or a unit of a merged intermodal metropolitan system (various levels of importance) – Figure 1.

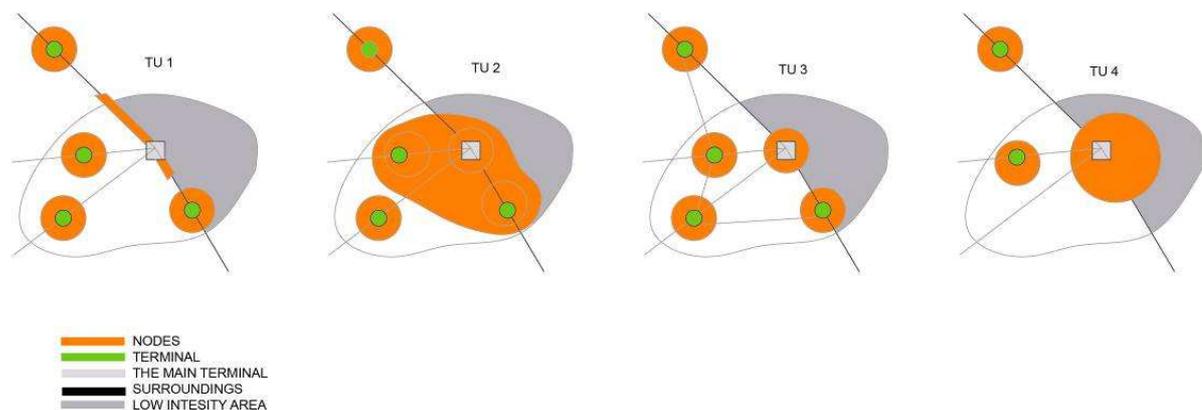


Fig.1. Intermodal nodes/units in the intermodal system of metropolitan networking.

The intermodal nodes have a specific spatial structure shaped by their elaborated program and numerous demands – functional, technological, environmental and socio-economic. The main areas are:

#### 1. Passenger area

- entrance zone
- corridors (linear, circular and mixed systems)
- leisure area /restaurants, shopping, etc./ – circular, linear and network
- platforms and technical support

#### 2. Border area – architectural envelope

This area directly and indirectly shapes the urban environment and its identity defining a level of its urban integration and directing its spatial perception (Fig. 2).

#### 3. Public area – interchange and intermodal spaces and processes

- transit areas (linear, circular, mixed)
- retention-crossing areas
- concentration points
- connectors

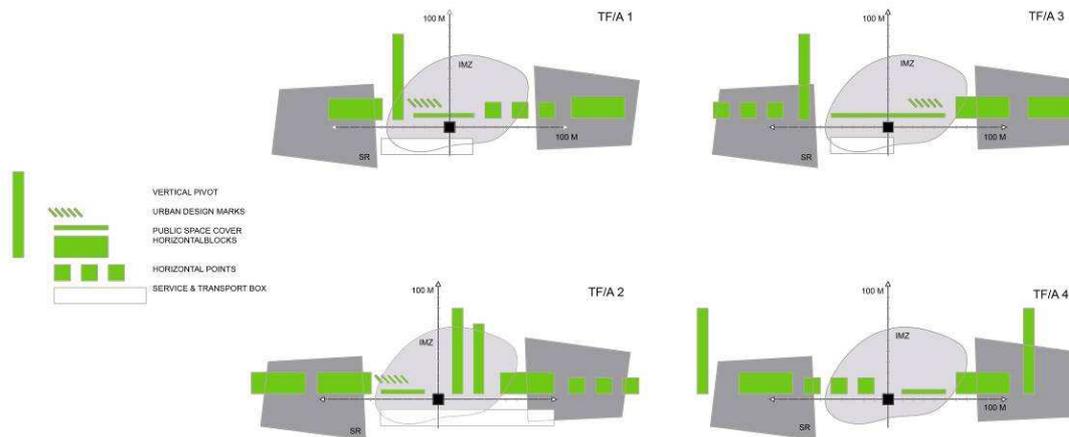


Fig. 2. Modes of spatial perception

The functional structure of intermodal nodes could also be quite diverse, but it usually comprises all the important urban activities stimulated by the globalization process (Fig. 3). However, their distribution could vary – influencing the layout, architectural composition, inter-/intra- urban connections, as well as directing the future urban transformation of a surrounding area.

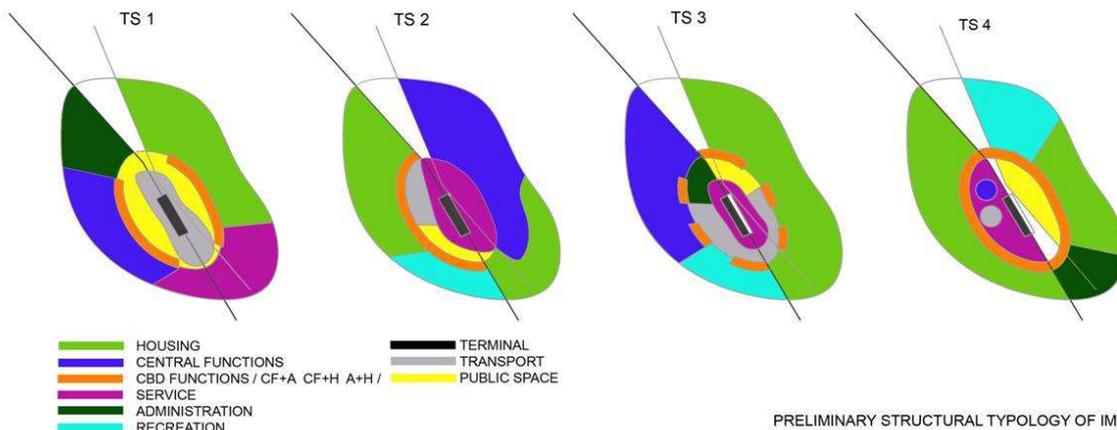


Fig. 3. The functional structure of intermodal nodes – variations.

Since all intermodal nodes combine different types and levels of transportation, it is also necessary to achieve a high level of coordination, efficiency and safety. Therefore, the advanced technological solutions have to be incorporated and applied on several levels, scales and issues:

- planning and design process (methodology and tools – impact analyses, models, scenarios, decision-making, evaluation, monitoring)
- awareness (how, where, when to travel)
- management
- accessibility/movement – people (all groups and categories), vehicles, goods
- e-services (payment, information, survey, GPS)
- new materials and structural systems
- recycling

Evidently, the modern technology has a crucial role in the concept of intermodality because it provides a necessary foundation and support for various activities – from the urban development, land use, taxation and regulation, to the intelligent transport systems and environmental protection.

The intermodal nodes, with their numerous effects on built environment, development/transformation and urban life, obviously represent hypersensitive centres whose excitation or inhibition could cause a number of side effects. For example, urban acupuncture could be conducted in three different ways – as a:

- re-integration (interpolation, controlled transformation, adjustment to the existing urban environment)
- new contextualisation (negation of previous urban condition, redefinition of inherited urban identity, modelling of new landmarks)
- regeneration (structural changes directed by globalization trends, (re)creation of selected themes, areas and focal points).

However, the results of these interventions, as well as their chain-reaction(s) cannot be completely controlled or foreseen. The concept of intermodality, positioned in a contemporary framework, still has to be fully developed and implemented.

## 6 FROM THEORY TO PRACTICE

The contemporary intermodal nodes integrate separate transport systems and complementary activities, but they also present a new image of our globalized society. The examples of Zentralbahnhof in Berlin, Euralille (Lille) and Sagrera station (Barcelona) clearly reveal this logic, as well as new demands related to attractiveness, spatial and functional comfort.

The main train station in Berlin, Zentralbahnhof represents one of the largest cross-modal train stations in Europe which connects national and international trains, city trains and subway lines. Its position in the centre of the city supports its role as the main mobility hub of Berlin, which connects east and west, north and south. Furthermore, the station is the main terminal of a specific mushroom railway system, which was introduced after 1989 in order to enable transport reunification of the city. The system is nowadays controlled from a central terminal and its supporting units which supervise regional and city lines.

The complex of the two-level terminal covers approximately 70 000 m<sup>2</sup> (15 000 m<sup>2</sup> for commercial and restaurant area) which consists of an arched supporting structure and two massive perpendicular structures. The intermodal zone is surrounded by a residential zone (west), university campus (south-east), port terminal (north) and commercial zone (west), which makes the whole area highly defragmented and heterogeneous. Therefore, it is questionable to what extent this multimodal and intermodal node really represents an urban ‘connector’. In spite of its transportation role, implemented technology, monumental scale, variety of spaces, activities and – symbolism, it still represents an urban division and an infrastructural necessity which is not integrated on all levels and scales.

Obviously, the urban acupuncture has stimulated regional and international flows, but it has definitely inhibited fragile networks which should have been established in the urban environment.



Fig. 4 – Berlin, Zentralbahnhof (2006) – an intermodal node which connects various transport networks but disconnects delicate links in urban fabric.

Euralille intermodal terminal was built in 1994, as an important connection node of the European transport networks (UK, The Netherlands, Belgium, France). Designed for the last generation of high-speed trains it also includes a new commercial district and represents an interesting intermodal and architectural area. Although a result of local interests and governmental decision, this collage of buildings designed by famous architects (Koolhaas, Nouvel, de Portzamparc, etc.) has provided a crossing-point for national, regional and

international lines, which consists of two terminals, commercial center, exhibition space and several public areas. Euralille terminal is organized as a three-level longitudinal platform, but it also follows the tradition of the nineteenth-century terminals. The intermodal ring has a questionable balance of closed and open spaces, while the whole complex has hard borders – towards the urban nucleus (north-east) and the commercial downtown (west), and the soft ones – residential zone and a park area (south). However, in spite of some weaknesses related to its spatial indetermination, Euralille has become an interesting example of a contemporary intermodal spatial area, with a noticeable vibrancy and a specific identity.

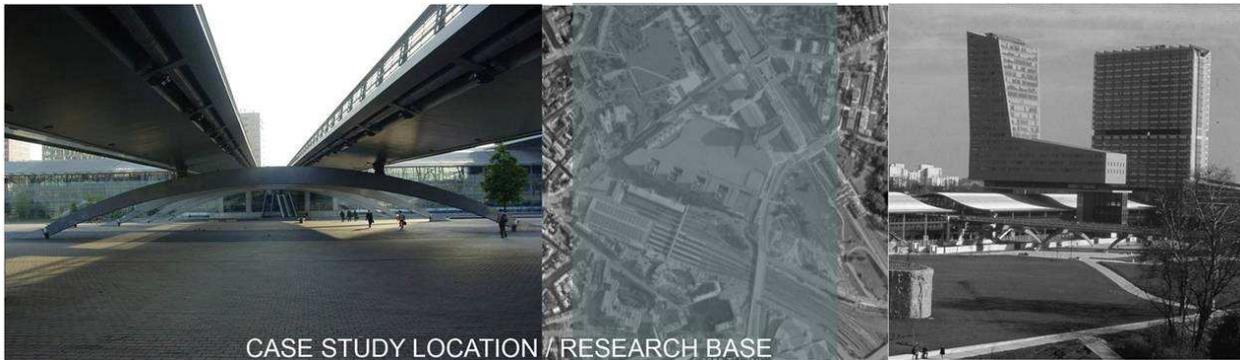


Fig. 5. Euralille, Lille (1994) – an intermodal node or a trendy architectural experiment?

Sagrera HST terminal in Barcelona, will be a new central terminal based upon the concept of intermodality. It should enable integration of high speed train system (AVE), existing and new city train lines (RENFE), buses and the Metro, which should all together increase a flow of passengers and transport efficiency. In fact, this node should connect the city to the development axis in Spain and in the rest of Europe. The station will have three subterranean levels and a street level in order to link different transportation modes i.e. levels of integration. However, this node should also connect neighborhoods of La Sagrera and La Verneda, as well as provide connections with the ring-road of Ronda del Mig and some access routes to the city.

The development impulse which this acupunctural multimodal node emits should also effect the transformation of the surrounding area, introducing a set of tertiary activities. Furthermore, a development of a 3.5 km long linear park above one of the main rail lines is planned, which should minimize negative environmental impacts.

Apparently, Sagrera HST station should achieve total connectivity and accessibility on all levels – from local, metropolitan to regional and international. However, we should wait for its completion in order to evaluate its real intermodal and urban qualities and its role in the further development and transformation of this area.



Fig. 6. Sagrera HST Station, Barcelona – a new node of local/metropolitan/regional connectivity. Success or failure?

## 7 CONCLUSION

The contemporary city generates numerous networks which should increase its total connectivity, facilitate multiscale accessibility and provide time and space contraction. Following the demands of globalization, the concept of intermodality, with its multiplying nodes and webs, represents just one of the tools which should

enable all these aims. Supported by the advanced technology which pervades all areas of our lives, intermodality is about to become one of the global imperatives but its real potential still has to be released and applied.

In the meantime, various planning experiments transform the urban tissue – exciting or inhibiting selected spatial fragments and creating a new landscape which is simultaneously connected and disconnected. Nowadays, everything should be characterized as ‘all-inclusive’, ‘comprehensive’, ‘smart’, ‘intelligent’, ‘friendly’ and preferably with prefixes ‘multi-’, ‘inter-’ or ‘intra-’. Unfortunately, reality frequently clashes with these idealized visions, leaving behind remains of unsuccessful decisions and exaggerated expectations. Therefore, we should be careful with the concept of intermodality, too.

After all, intermodality should not be considered just as an aim, but as an instrument which should improve – and not destroy, all urban values that we have had through centuries.

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