CREATING A BALANCED TRANSIT HUB
Delivering City Value and Prosperity with Mobility-Oriented Developments
North American Edition
Common aspects to consider for development of transit hubs:
- The need to maximize stakeholder alignment and involvement.
- The generation of sufficient funding and return on investment.
- The provision of more efficient and affordable transport.
- Capitalizing on a transit-hub placemaking.
- Preparedness for new technologies and improving passenger experience.

Every city is dependent on mobility. Mobility enables people, goods and ideas to move in, out and within our cities, whether on its roads, on rail or in the air. And as urban centers continue to increase in size and density, mobility is becoming a more pressing issue for city leaders and residents. In today’s cities, journey times are increasing and transportation infrastructure is under greater pressure. There have been many discussions around alleviating stress on our roads through alternative modes of transportation such as rail, bus, bikes and more. These modes are and have been leading to transit-oriented developments, essentially transit hubs that are integrated into the area, being walkable, safe and vibrant.

With many cities and developers integrating restaurants, leisure activities and communal workplaces into or near airports and train stations, transit hubs are becoming a travel destination in and of themselves. Cities are seeing how these hubs can generate a ripple effect that encourages investment, provide new revenue streams and improve the overall quality of life in the surrounding neighborhood.

Typically, during development of a transit hub, each party is most concerned about the part of the development they have direct influence over or receive direct benefit from. Yet this approach limits the overall impact of a hub development and makes it more difficult to fully integrate the hub into the surrounding area.

There are several common practices which compromise on design potential. For example, to attract investment and generate an early return, many transit-oriented masterplans focus on high-end residential elements while neglecting other components that add broader social, economic and environmental value to the development. Equally, by focusing solely on road and rail connection plans, opportunities are missed to encourage the use of more sustainable transit options like shared vehicles, bicycles or trams.

In these cases, development of the area around the hub is conducted piecemeal, rather than in tandem with its development. The result is a transit-served development, rather than a transit-oriented development.

Train stations, bus stations or airports often do not realize their full design potential; the various parts do not come together to form a cohesive whole and developments can fail to maximize their potential. Transit-oriented developments must be undertaken with a care for the area in which they are built, ensuring they are developed through a balanced approach to achieve greater longevity and economic vitality for the city.
Transit-related developments are traditionally designed to do the following:
• Induce ridership
• Reduce driving
• Increase walking and biking
• Add convenience
• Increase density
• Encourage overall transit use

However, Mobility-Oriented Developments look at the bigger picture:
• Sustains ridership
• Discourages driving
• Anticipates new forms of mobility
• Makes walking and biking safer
• Offers wide range of mixed-use facilities
• Offers diverse placemaking that promotes enjoyment of the area
• Supports transit usage

MODe: EVOLVING TRANSIT-ORIENTED DEVELOPMENT

Arcadis’ integrated approach to such transit developments is called Mobility-Oriented Development, or MODe. With the MODe approach, we focus on how a station hub balances and integrates four key elements that bring the greatest value to transit-hubs: connectivity, urban environment, social placemaking and economic development. By quantifying these elements we created a rigorous framework for comparing transit hubs and measuring the balance among the four key elements. This allows us to see their untapped potential.

MODe is an evolution of transit-related planning and execution, ensuring transit hubs are balanced. It helps make them maximally efficient in their main task—transporting people and goods—while generating greater prosperity for both citizens and investors through multi-use residential and commercial services at the station hub. MODe serves both public and private stakeholders. By attracting additional private investments, MODe can maximize the return on investment in both the transit hub and the surrounding areas. This in turn helps to accelerate social and economic development in the area.

This report is an expanded version of the inaugural issue, Our Mobile Future: Delivering City Value and Prosperity Through Mobility-Oriented Developments, released in 2015.
It’s exciting to see the private development that was sparked and continues to grow as a result of the redevelopment of Denver Union Station. The Union Station area is truly a major destination in the metro area with its vast options for entertainment and business that can easily be reached with our world-class transit facility and services.

Dave Genova, Denver Regional Transportation District General Manager and CEO

The purpose of the Arcadis MODe Benchmark is not to create a hierarchy of transit hubs but instead to indicate areas of opportunity to create a more balanced hub based on a sampling of transit stations. As the world continues to become more reliant on its urban centers, we hope that city leaders, economic developers and transit agencies see this as a valuable tool to assess their progress and align priorities for an improved quality of life.

The benchmark has been constructed using indicators that measure the quality of the key elements that bring value to a development. In this way, a transit hub can be compared before and after its redevelopment, increases understanding of how sustainable multi-modal urban environments can be created and measures the main factors that optimize them for broader social benefit.

These considerations are important factors for creating a balanced transit hub. By looking at the leading practices among transportation professionals and city planners as well as missed opportunities observed at 31 transit hubs around the world, we can gain valuable insights into approaches that will allow us to optimize multi-modal transit hub designs.

Here are some ways in which the MODe Benchmark reveals the potential of existing or future developments:

- Showcases the ability to investigate how far investment in a transit hub contributes to the success and added value of the multi-modal urban environment, including higher property values, public spaces and increased revenue for local businesses,
- Helps discover where there is room for improvement,
- Quantifies qualitative measures,
- Compares the global performance of multi-modal urban environments according to a range of key values for transit hubs.
The MODe Benchmark measures four key indicators, each built from several specific variables. Each variable has its own set of values to measure the score of the development and compare it to others. The MODe Benchmark reveals that station hubs are most attractive for working, living and investing when they are most balanced among the following key indicators:

1 **Transit-hub Connectivity**
Describes the quality of the transit hub in relation to the variety and quantity of transit modalities, its proximity to other important locations and facilities, and its provision of comfort to the traveler.

2 **Urban Environment**
Assesses the urban form of the environment and how sustainable it is. Urban form is determined by variables such as an area’s density and whether a development is mixed-use.

3 **Social Placemaking**
Weighs variables that contribute to a vibrant and multimodal urban environment. These include the quality of the public space and the variety of public facilities within the transit zone. It also looks at the resilience of a transit hub to climate change impacts, security vulnerabilities as well as traffic and passenger safety and security.

4 **Economic Development**
Evaluates the prosperity, economic activity and property value of the urban environment within the transit zone, relative to national averages.
KEY FINDINGS
PER INDICATOR

TRANSIT-HUB CONNECTIVITY
Measures proximity, transit quality, hub facilities
Washington, D.C.’s Union Station and Rotterdam Central Station are leading the highest scoring stations in connectivity. These stations stand out by offering many transfer possibilities in a highly concentrated area. In addition, these stations offer a complete set of facilities to the traveler, which contributes to higher scores.

URBAN ENVIRONMENT
Measures environmental sustainability and urban form
Madrid’s Principe Pio tops the urban environment indicator due to its high quality urban form and public space. Along with stations like Union Station in Washington, D.C., and Rotterdam’s Central Station, Madrid’s station also scores high in environmental sustainability for attributes like energy efficiency, climate adaptation measures and green environment.

SOCIAL PLACEMAKING
Measures public amenities, safety and security
It’s not surprising that stations located in dense urban areas score high with the presence of public amenities. Regarding safety and security, it is interesting to see stations in North America and Europe scoring the highest, followed by Hong Kong.

ECONOMIC DEVELOPMENT
Measures property value, business employment, and prosperity
The economic development indicator sees New York’s Grand Central and Union Station in Washington, D.C., leading the way, with high scores across prosperity and property values. High scores in economic development reflect the importance of transit hubs within the city, and highlights differences of these cities with the national average. Most striking is the significant variance among business employment. The Washington, D.C., Union Station scores extremely high due to a high concentration of federal government offices surrounding the station. With most other U.S. locations, we see high employment, yet some stations show a relatively moderate score which may indicate an unleveraged potential in bringing more jobs to the surrounding area.

NEW YORK’S GRAND CENTRAL STATION
New York Grand Central Station has the highest total benchmark score among the 27 stations studied, achieving the greatest overall balance among the four key elements. The high number and types of transit connections to businesses and amenities in a relatively dense area contribute to its high benchmark. Grand Central Station is followed by Union Station in Washington, D.C., for similar reasons. These multi-modal stations are high-functioning compared to most other U.S. stations, generating and serving as an economic pathway through their regions.

HIGH PERFORMING SUB INDICATORS
Hub facilities
Easy purchase of tickets, information desk, restroom facilities, safe waiting areas, car parking, ease of navigation through the station, public art.

Urban form
Presence of office/residential/recreation nearby, public green space, attractive architectural features, well maintained, popular, available shopping.

Public amenities
Easy access to sporting events, hotels, restaurants, nightlife, cultural events and education.

OCCUPORTUNITIES FOR IMPROVEMENT
Transit quality
Connecting to high speed rail, trams or ferry systems can increase efficiencies and convenience and reducing the number and length of transfers across all types of transit modes can improve the quality and experience for riders.

Environmental sustainability
Implementing more stormwater management measures would ensure a more sustainable future.
HONG KONG

Hong Kong University Station scores high on connectivity, mainly for the number of bus lines connecting with the metro station in a relatively small area and because of the linkage to a large number of urban centers within 60 minutes travel time. Hong Kong’s corporatized public company Mass Transit Railway, MTR, uses the profits from real estate developments surrounding their rail stations to pay for future rail extensions.

WIMBLEDON STATION

Wimbledon is a thriving, charming neighborhood and home to many residents and businesses, creating a strong demand for access to nearby central London. Wimbledon Station, located in the area’s center, is a key interchange between National Rail services, London Trams and London Underground District line services.

The current rail station, existing Centre Court Shopping center and surrounding areas are planned for redevelopment to accommodate the new rail and the increased traffic.

HIGH PERFORMING SUB INDICATORS

Hub facilities
Offers ease of ticket purchasing, information desks, wayfinding, restroom facilities, safe waiting areas, easy navigation through the station, and public art.

Urban form
Enjoys low crime rate, is clean and well lit, with low levels of congestion on platforms during peak hours.

OPPORTUNITIES FOR IMPROVEMENT

Public amenities
While there are restaurants nearby, better access to sporting events, cinemas, cultural amenities and healthcare would create more attractive amenities for residents and visitors.

Environmental sustainability
More stormwater management measures during rain events.

HIGH PERFORMING SUB INDICATORS

Hub facilities
Offers ease of ticket purchasing, information desks, wayfinding, restroom facilities, safe waiting areas, easy navigation through the station, and public art.

Safety and security
Station is clean and well lit, with low levels of congestion on platforms during peak hours.

OPPORTUNITIES FOR IMPROVEMENT

Transit quality
Additional station capacity can increase usage by thousands of passengers during peak hours and reduce journey times.

Business employment
Integrated mixed-use development will also support local businesses and fuel economic growth, by adding more jobs and housing to the area.
In Mobility-Oriented Development

Strategy and policy makers as well as private investors must decide not just how, but where to invest. On the one hand, a growing urban population requires structured public initiatives. Policymakers need to think not only about the present factors involved in the creation of new metro lines, rapid bus corridors and networks of bicycle lanes, for example, but they also need to anticipate future transit-related developments. A strategy is needed that takes into account, for instance, the change in traffic flows that would be triggered by ride-sharing around stations and airports as well as how fewer parking spaces and available real estate might free up the physical and legal path for a Hyperloop-type project in the future. Metropolitan public authorities, working in tandem with the private sector, need to co-create bold, flexible, integrated, investible and versatile strategies to fund these complex projects. Cities that take a balanced MODe approach will generate investments from both public and private sectors and stand to benefit from the best-in-class practices around the globe, which ensures an improved quality of life for their residents.

How Mobility As A Service (MaaS) Can Integrate With Transit Hubs

MaaS is a way of integrating transportation modes (e.g., public transport, autonomous vehicles, parking, shared cars, bikes, taxi) into one digitized system. This enables a seamless exchange between different modalities to encourage a more streamlined passenger experience for usage of public transit.

Investment in Mobility-Oriented Development

New mobility increasingly important in planning for the future

At its core, MODe is about making sure current plans for transit (re) development are robust while accommodating future mobility technologies and changes in the use and organization of multimodal systems. It is likely that autonomous vehicles (AVs) and intelligent systems will continue to significantly change or disrupt the use of traditional transportation systems within city centers. To some cultures, the promise of AVs can leapfrog traditional transit as a network of preferred modes of transportation.

Changes in public transit approaches can also shape, as much as respond to, a city’s future, by massively altering the sense of a city’s physical and social geography. The Grand Plans Express rail project in France, for instance, contains plans for a larger metro transit ring and radial lines. With this development, a bigger area of the city will become part of the city center, bringing additional economic and urban development and providing direct connections between areas which have traditionally been viewed as suburbs.

MODe: Six Key Actions

1. New mobility increasingly important in planning for the future

Integrated planning leads to better outcomes

When developing a transit hub, it is essential to create a holistic and compact transit hub, ensuring greater ease of use and comfort to the traveler. At the newly redeveloped Rotterdam Central Station and London’s King’s Cross/ St. Pancras Station, urban and regional connections were brought closer together, making transfer between them significantly easier. In Rotterdam, this was combined with a high-quality pedestrian route to the city center and easy access to bike parking. In contrast, the separation of taxi, bus and private vehicles at hubs in China has hindered safety and exacerbated traffic. This represents a major missed opportunity for vibrant mixed-use development. Indeed, integrated planning can only be achieved by full involvement of all key stakeholders. It seems obvious, but in practice it is rarely achieved. While the interests of stakeholders can be very different, they share a desire to reap the benefits of a successfully developed plan. An integrated approach benefits everyone, providing a shared vision, transparency and a clear strategy, all of which are crucial for aligning stakeholders and gaining public acceptance for a project. To align stakeholder interests, a careful planning process is required, in which all aspects of the development are carefully mapped out and coordinated. Given the complexities of infrastructure projects on the scale, a clear, phased plan is needed so that all stakeholders can see the incremental steps required to achieve the larger vision.
Developers and investors need a clear framework

A clear framework for development is crucial for ensuring that plans are realized on time and within budget. The transit agency or station owner plays an important role in setting these parameters, but local authorities are also crucial: they provide the glue between the public space and public transit pieces of the puzzle. Their successful coordination contributes hugely to achieving the end vision.

Hubs with high-speed connections are more attractive for investors

High-speed and long-distance connections to other cities or international airports contribute to a higher level of facilities, an improved built environment and therefore, more commercial activities and revenues.

Transit-hub development is often the catalyst for wider development

In many cases, station redevelopment is the catalyst for other urban and economic development. The increasing need for transit capacity and new facilities or to replace aging infrastructure leads to new aspirations and possibilities. When this happens, the additional value for the surrounding city starts to become clear and the urban development processes can begin. Good examples are the areas around London’s King’s Cross/St. Pancras, the Grand Paris stations, Denver Union Station and the planned Malaysia high-speed rail stations.

Commute from the hub, not to the hub

Mixed-use hubs where residents can work, live, learn and play help reduce the strain on urban transit systems. A balanced, mixed-use development around a station will give people the option to work near their homes and use transit to connect the other parts of their lives. For instance, Sydney has made the commitment to becoming a ‘30-minute city,’ whereby any part of a city can be reached from any other within 30 minutes.

CONCLUSION: A BALANCED TRANSIT HUB GAINS A COMPETITIVE EDGE

Cities are in part defined by their distinct urban transportation systems and the transit hubs that service them. As rapid urbanization, aging infrastructure, population growth and climate change continue to challenge the world’s cities, those cities that make bold moves in advancing and diversifying their urban mobility systems and evolving their transit hubs will gain a competitive edge.

From this report, clearly many of the world’s developed and emerging cities still have important steps to take to become balanced in their approach to improving their transit hubs. However, cities have a great opportunity to transform their transit hubs into areas that will generate jobs, attract new businesses and secure investment. This in turn will ensure a greater quality of life for residents. Our Mobility-Oriented Development approach can help transform how we think about existing transit infrastructure and raise our aspirations for what urban mobility and its transit hubs can achieve economically, environmentally and socially.
The Index originates from Arcadis’ original approach to transit-related developments known as Mobility-Oriented Development (MODe). Incorporating insights and feedback from the 2015 report, Arcadis refined the benchmark process and updated the number and type of transit-stations. The 2017-2018 benchmark provides a broader view of the world and captures changes in mobility-oriented developments. As a result, it would be inaccurate to compare benchmark rankings to the first report. Criteria used to select which transit hubs to feature in this report include factors such as heightened interest by local governments to improve mobility, or conversely, a lack of awareness in mobility-oriented developments, reputation of the transit-hub, iconic structures and well-known stations throughout the world. MODe is a result of global collaboration between Arcadis and CallisonRTKL (a Design Consultancy of Arcadis). We worked closely to develop the benchmark and made improvements to the analysis based on our years of combined experience. Even though most indicators of MODe are based on theoretical concepts and scientific literature, the benchmark itself is not scientific. MODe contains both quantitative and qualitative measures. Qualitative measures are quantified where possible by adapting proven theoretical frameworks. In cases where data was not available, we made use of the expert judgement of our specialists and consultants in urban and transportation planning, economy and sustainability. For the quantitative parameters, which mainly included socio-economic and real estate data, we made use of the available sets of data.

METHODOLOGY

SOURCES
We have examined the following types of data sources, not limited to:
• International databases (GDP, average income & property prices)
• Statistical year books of cities and municipalities
• Transportation schemes
• Google Maps
• Site observation
Depending on the indicator, the maximum score is based on two different aspects:
• Maximum points that can be achieved with a normative checklist.
• Calibration of the maximum score based on the case with the highest performance.

About Arcadis
Arcade is the leading global design and consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are 27,000 people, active in over 70 countries that generate $3.5 billion in revenues.

About CallisonRTKL
For more than five decades, Callison and RTKL have created some of the world’s most memorable and successful environments for developers, retailers, investors, institutions and public entities. In 2015, our two practices came together under the Arcadis umbrella, expanding our sphere of influence and the depth and breadth of our resources. Our team of nearly 2,000 professionals throughout the world is committed to advancing our clients’ businesses and enhancing quality of life www.callisonrtkl.com

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