

The Power of Connectivity

Exploring the Role of Mobility Infrastructure

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INTRODUCTION

We have previously defined some key concepts around mobility, including the way we think about it here at OSB. We explained how the detailed mobility network we exist in today is made up of highly interconnected actors, known as nodes. In a way, this web of interconnected nodes and pathways represents the world of mobility. But how does mobility actually happen inside that world? That's a question of mobility infrastructure.

RECAP OF THE MOBILITY ECOSYSTEM

As previously mentioned, mobility is more than just a single individual or entity moving from Point A to Point B. It is an entire interconnected ecosystem of “actors, systems, and resources to move people, goods, and information” Beyond the act of physically moving, OSB’s definition of mobility further encompasses the movement of actors through social circles and strata, as well as rising and falling in economic classes. We noted some of the many influences connectivity in the ecosystem can have on an actor’s mobility, like having friends in a higher income bracket being a key indicator of upward economic mobility, but how does this mobility actually take place? Understanding this requires defining the infrastructure underlying the mobility ecosystem.

WHAT IS MOBILITY INFRASTRUCTURE?

The innovators at OSB are working every day to improve mobility infrastructure, but what does that mean? This definition provided to us by the [Max Planck Institute for Social Anthropology](#) provides a valuable starting point in understanding:

“In facilitating and constraining the movements of people, things, information, and energy, overlapping sociotechnical systems—such as transport and communication networks, the logistics industry, and governmental regulations—constitute a ‘mobility infrastructure’. Mobility, in turn, functions as an infrastructure for other social activities. The mobility of traders is the basis for the development of marketplaces, for example. And the existence of exit routes is critical for managing conflicts—from domestic violence to ethnic strife. As such, mobility infrastructure forms a central nexus between mobility and socioeconomic changes.”

There is plenty to unpack in that definition. Mobility, depending on how you define it, can be an abstract concept. Social and economic mobility go beyond the basic definition of physical movement and into how and why movement is allowed to occur. For example, social and economic mobility is the reason for a cross-country move. Put into context, this physical move is supported by other physical pieces of the mobility infrastructure that allow cross-country driving. This includes the car, roads, and state and local licensing agencies responsible for licensing the drivers and the car, maintaining the roads, laws establishing speed limits, etc. These services are further supported by less physical elements, like governmental infrastructure at several levels collecting taxes, employing construction and enforcement workforces, passing

ordinances, and so on.

When thinking about social and economic mobility, the same analogy applies. Whereas system mobility might ultimately be reflected in various demographic changes of those moving cross-country for opportunity, those changes themselves are not the infrastructure. Infrastructure, in this case, would be the programs, regulations, and policies that promote or hinder social and economic mobility. These may include the websites a job was posted on, the systems and services that allow them to apply and be considered, the institutes that allow them to gain the credentials and connections to qualify for the opportunity, and any laws or regulations that guide hiring policies and practices, to name a few.

THE IMPORTANCE OF UNDERSTANDING SYSTEM DYNAMICS

Defining the infrastructure underpinning mobility across sectors gives us insight into the mobility network's structure, dynamics, and interdependencies. Studying the interplay between the network's structure and function allows a better understanding of how the network works. This knowledge can then inform decisions about the most efficient and effective ways to manage and navigate the network.

This understanding can help optimize the mobility system, reduce congestion, and increase network efficiency. It can also be used to identify potential risks and vulnerabilities and develop strategies to mitigate them. For example, analysis might reveal that the entire network is held together by one node that interacts with everyone else. In physical mobility, this might be a main street that connects a whole town. In social or economic mobility, this could be a key program that everyone in the network uses or a person who is very central within their social network.

Mitigation strategies in the examples above would include considering or creating alternate routes around that main street in the case of physical mobility. Examining social or economic mobility in an organization, if it was found that one person is holding the network together, it may be worthwhile to figure out if some of the workload could be spread more evenly across the network, or think about how that person might be replaced should they exit the network for any reason.

APPLYING NETWORK THEORY TO ANALYZE MOBILITY

INFRASTRUCTURE

If we were to visualize mobility infrastructure graphically as a network, it would be composed of actors (nodes) and connections or links (edges). The infrastructure surrounding mobility would be represented by all the paths (edges) between the nodes, as well as the nodes themselves. These nodes (actors) can represent people, physical locations, such as public parks, bus stops, and other points of interest, or larger groups or organizations. In an example of the infrastructure supporting social and economic mobility, these nodes could include friends, hiring managers, institutions, business centers, natural resource centers, cities, states,

and even entire countries. The specifics of who and what these actors are depends on your network and the ecosystem under analysis.

The paths, also known as connections or edges, between all of the nodes are also key elements of the infrastructure. In physical infrastructure, the paths between these nodes could be roads, pedestrian pathways, bike trails, and other transportation methods that connect the nodes and allow people to access different parts of a city. In social and economic ecosystems, these can be represented by relationships between individuals, organizations, and institutions. They can also represent the various flows of goods, services, and information between the entities.

Just as we can map mobility infrastructure as a network, we can also apply network theory to the analysis of mobility infrastructure. The size of the network and the distance between nodes can provide a clue as to the mobility of the network. In fact, one of the oldest measures of a network is called closeness. Closeness, as you might surmise from the name, is the distance between two nodes in the network. This is quantified by how many nodes you must pass through to get from node A to node B. If node A has a direct connection to node B, they are considered very close. However, if node C is only reached by going through several other nodes (for example if a potential applicant for a position is only connected to the CEO of a company through the hiring manager and several middle managers), then nodes A and C are not considered to have high closeness. While seemingly an abstract concept, when measured in real life it has predicted everything from the GDP of cities to potential customer leads in sales, to genetic markers that best predict disease. ([Chen & Evans](#), 2022)

Network theory can also do a whole lot more, including helping us examine the emergent properties of an evolving network. Remember, none of the ecosystems we've discussed are static and predictable. Every person, organization, and pathway is dynamic, constantly moving and changing inside the ecosystem. These constant interactions and shifts can create situations or patterns that aren't the work of any one node or even the relationship between nodes. Instead, they emerge from the interactions that are happening between actors within the context of the mobility infrastructure surrounding them.

ORANGE SPARKLE BALL ON MAPPING MOBILITY INFRASTRUCTURE

At OSB, the core of our work is focused on mobility infrastructure, regardless of whether it's public or private sector work. We'll explore both sectors (and the unique environments of each sector) individually later in this blog series. For now, we'll provide an overview of how we're impacting the mobility infrastructure.

Our theory of change underpinning all of our work is intrinsically tied to harnessing the mobility infrastructure to accelerate and elevate everything we do. We believe that we can advance mobility by mapping, improving, and changing the mobility infrastructure. We work with governments, businesses, and other organizations that make up the infrastructure to develop creative solutions that have a lasting impact. We also collaborate with communities to

ensure equity and accessibility of the framework around us. Finally, we strive to provide a sustainable, safe, and reliable mobility infrastructure. In doing all this, we help generate mobility by creating innovative solutions that are accessible to all. We are committed to improving the lives of people around the world.

Physical Mobility Infrastructure: We do plenty of work in the world of physical mobility that most people are familiar with. That means getting people and goods from A to B in the physical world. Chief among our work in that space revolves around autonomous vehicles and mobility. Across the country, in both the private and public sectors, we work to pilot new autonomous technologies.

Social Mobility Infrastructure: Our work increasingly touches on social mobility in key ways and draws on network theory. We have been working with our partners to map their internal and external networks to identify gaps and opportunities. We have a history of working at the local, state, and federal governments to help improve programs that people use to climb the social ladder. We're also fans of the work our partners at the [Center for Public Partnerships and Research \(CPPR\)](#) are doing to develop a closed-loop referral system that helps service providers in a community to make, receive, track, and respond to referrals.

We have a unique ability to map and work within ecosystems. Putting this in terms of network theory and mobility infrastructure, we are identifying actors on the edge of the network, or edge players, in the ecosystem that are doing unique and interesting things. We find and source new and unusual nodes; identifying the really critical players in your ecosystem that may go overlooked is our specialty. We are also, as generalists experienced in working across multiple sectors, great at seeing how individual actions taken by an individual or organization can affect other actors in the network. Finally, we spend a lot of time thinking about the most effective way to make and manipulate mobility infrastructure to make change and we incorporate that into every project we approach. Our emphasis on innovation allows us to evolve with the needs of every project and, with mobility at the heart of innovation, we ensure that everything we do drives initiatives forward.

CONCLUSION

We've talked a lot about mobility infrastructure. We've expounded on network theory in greater detail and talked about how developing and understanding mobility infrastructure can create change. But what are some of the challenges in getting to the edge of a network or, more broadly, an ecosystem? And what challenge does this pose to public and private sector organizations?

WORKS CITED

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