

Introduction of Discourse Analysis in Transportation: A Framework for Understanding Policy and Practice in Urban Mobility

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Abstract:

1 In recent decades, the discourse approach for analyzing specific genres and professional discourse communities has gained significant traction. The globalization of knowledge and the synergy between disciplines have opened up new avenues for interdisciplinary studies. Analyzing specialized discourses reveals the distinctive features and dominant concepts within professional fields. This paper aims to examine the characteristics of discourse as applied in transportation. While discourse analysis has been widely employed in various disciplines, particularly in the humanities and social sciences, its application in transport and urban planning remains limited. However, we argue that it is a crucial tool for understanding and potentially transforming the diverse pathways that cities and regions adopt. The relationships between humans and the world are mediated by different systems of meaning and knowledge structures, shaped by factors such as power, predisposition, and the values ascribed to political, contextual, theoretical, methodological, and empirical considerations.

Keywords: transportation; discourse; interdisciplinary studies, Foucault

1- Introduction

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Transportation is an interdisciplinary science (Graells-Garrido and Peña-Araya 2020, Hodgson et al. 2012, Aloui et al. 2021) that encompasses various models and theories reflecting the complex relationship between human behavior, technology, and infrastructure. To fully understand this field, integrating perspectives from other disciplines, such as philosophy, is crucial. Discourse analysis offers a valuable approach to exploring how transportation knowledge is produced, shared, and applied. Since the 1960s, discourse analysis has grown as a key methodological tool, particularly through the work of scholars like Michel Foucault (Foucault 2013) and Pierre Bourdieu (Bourdieu 2018). This approach enables scholars to investigate not only language use but also the social and political dynamics that shape knowledge and power structures (Foucault 2003, 2005). Discourse analysis examines various forms of communication, from publications to speeches, situating them within their broader social context. It is especially useful in addressing environmental discourses, revealing alternative pathways to deal with issues such as climate change. By analyzing mainstream narratives, discourse analysis uncovers hidden assumptions and agendas, often driven by powerful actors or institutions. In the context of transport and urban development, discourse analysis is crucial given the diverse perspectives on transportation systems and infrastructure projects. While transport planning is typically shaped by a dominant narrative, usually that of government or private operators, it often neglects the broader range of societal views and controversies. Since transport projects are inherently political, discourse analysis helps expose the normative beliefs and values that influence decision-making (Fairclough and Fairclough 2013). By considering diverse viewpoints and recognizing power dynamics, planners can adopt more inclusive strategies that reflect societal complexities. Challenging the mainstream acceptance of practices like motorization, which were shaped by industry and cultural influences, is critical for addressing contemporary issues such as climate change and social equity. Discourse analysis thus offers a means to critique existing practices and foster more equitable approaches in transportation planning.

2-Meaning of the term Discourse

The term Discourse (with capital "D") refers to a structured way of speaking or writing about a specific topic, shaped by social, cultural, or institutional contexts. It involves the use of language to communicate ideas, beliefs, and values within a framework of meaning. Discourse goes beyond individual words or sentences to include broader communication patterns that influence how we perceive and interpret the world. Michel Foucault views discourse as a "way of speaking" within the broader societal structure (Hickman and Hannigan 2023, Foucault 2013), while scholars like Hajer and Versteeg (Hajer and Versteeg 2005) define it as an ensemble of ideas and practices that give meaning to social and physical phenomena. Similarly, Dryzek (2022) emphasizes that discourse helps frame how we understand these phenomena. In transportation, discourse refers to the ways language, communication, and ideas shape how transportation systems, policies, and projects are discussed and implemented. It encompasses the narratives, debates, and assumptions about transportation planning, urban mobility, infrastructure, and their social, political, and environmental implications. Dominant discourses in transportation reflect the prevailing narratives, often influenced by powerful actors like governments or industries, while competing discourses may challenge these views. Discourse analysis is particularly effective in controversial areas, where

multiple realities exist, and can reveal the underlying power dynamics, values, and beliefs shaping human perceptions and actions. This is critical for addressing issues such as environmental sustainability in transport, as discourses can define which solutions are deemed acceptable and achievable. Through discourse analysis, we can clarify areas of contention and explore alternative approaches to transport and urban development.

3-Paradigms in transportation

A paradigm refers to a fundamental framework or set of beliefs, ideas, and practices that define how a particular domain or field is understood and studied. It is a larger, more comprehensive concept that encompasses theories, methodologies, and standards that guide research or practice within a given discipline. Paradigms are often discussed in scientific, philosophical, and academic contexts (Kuhn 1997). A paradigm shift occurs when a dominant framework is replaced by a new one, changing how people think about and approach a subject (Kitchin 2014). Discourse plays a critical role in shaping paradigms. The way ideas are discussed and framed in discourse can challenge existing paradigms and drive paradigm shifts. For instance, a growing discourse on climate change and sustainability may disrupt traditional transportation paradigms that prioritize efficiency over environmental and social concerns. Similarly, the dominant paradigm in a field dictates what kinds of discourse are deemed important or legitimate. In a car-centric paradigm, for instance, discussions around walkability or public transit may be marginalized or given less attention. Thus, paradigms and discourse are closely intertwined, with each influencing the other over time. As discourse evolves, it can lead to shifts in paradigms, and paradigms, in turn, shape which discourses are prioritized in a field.

4- Current grand narrative in transportation

Grand narratives (or meta-narratives) are overarching, large-scale theories or stories that explain historical events, social dynamics, or cultural practices in a universal or totalizing way. These narratives attempt to provide a comprehensive explanation of how the world works, offering a unified, all-encompassing framework that seeks to make sense of complex phenomena. Grand narratives are often used to legitimize certain ideologies, power structures, or ways of understanding the world. Philosopher Jean-François Lyotard, in his 1979 book *The Postmodern Condition* (Lyotard 1984), criticized grand narratives as a hallmark of modernity, arguing that they claim to provide ultimate truths and universal principles (e.g., the progress of history, the triumph of science, or the inevitability of democracy or capitalism). Lyotard's postmodern critique challenges these large, singular explanations, suggesting that they oversimplify reality and overlook the diversity of human experiences, perspectives, and local contexts. In postmodern thought, grand narratives are seen as oppressive because they silence smaller, alternative, or marginalized voices and perspectives. In transportation, grand narratives refer to dominant, overarching stories or frameworks that shape how transportation systems, policies, and infrastructure are understood, developed, and justified over time. These narratives often present a singular vision of progress or success, guiding the decisions of planners, policymakers, and engineers, while shaping public perception about transportation and mobility. Some examples of grand narratives in transportation include:

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1. The car-centric development narrative promotes personal automobile use as the most efficient and desirable mode of transportation, shaping urban planning around highways, road expansion, and parking. This narrative views the car as a symbol of freedom, individualism, and modernity, and it led to a strong prioritization of car infrastructure over alternatives like public transit, cycling, or pedestrian-friendly development, particularly throughout the 20th century. However, while recent studies highlight the benefits of decreasing the share of travel by car (Hrelja and Rye 2023) for environmental sustainability, congestion reduction, and improving urban livability (Bozovic 2021)—the reality of car sales does not always align with these findings. Over the past century, car sales have continued to grow, particularly in developing economies where car ownership is increasingly seen as a status symbol and a sign of economic progress. This trend highlights a disconnection between policy goals aimed at reducing car dependency and actual consumer behavior driven by cultural, economic, and historical forces.
2. Technological Solutionism: This narrative revolves around the belief that technological innovations will solve most transportation problems (Shah et al. 2021). It includes ideas like smart cities, autonomous vehicles, electric cars, and high-tech infrastructure, all of which are framed as essential to modernizing transport and achieving sustainability (Vergragt and Brown 2007, Nederveen, Konings, and Stoop 2003). This narrative assumes that technology will drive progress and efficiency, often overlooking social, economic, or environmental complexities. While technology has the potential to address some issues in the long term, it cannot be viewed as a silver bullet for immediate challenges. For instance, while electric cars may reduce emissions on the road, they still require large amounts of electricity, much of which is currently generated from fossil fuels, especially in developed countries. Without a parallel shift to clean energy production, such as solar, wind, or other renewable sources, the overall environmental benefits of electric vehicles and high-tech solutions are diminished. In fact, in some cases, the growing demand for electricity to power these new technologies may actually increase fossil fuel consumption, as seen in countries with high energy demands (Raufi and Maniat 2024). Increased in the world and this consumption is more in developed countries.
3. Economic Growth and Infrastructure Expansion: Another grand narrative in transportation is the belief that building more roads, bridges, airports, and rail systems is a primary driver of economic growth. This narrative frames transportation infrastructure as the backbone of a prosperous society, pushing for constant expansion to stimulate business, reduce travel times, and increase productivity. It often sidelines concerns about environmental degradation or social equity in favor of growth-focused goals.
4. Sustainability and Climate Change: The sustainability and climate change grand narrative has emerged as a counter-narrative to traditional, car-centric and fossil-fuel-dependent transportation systems. It advocates for reducing the environmental impact of transportation by shifting towards more sustainable mobility solutions, such as public transit, cycling, walking, and electric vehicles (EVs). This narrative emphasizes the need to rethink urban planning and adopt low-carbon transport strategies to reduce carbon emissions, combat climate change, and promote green infrastructure. However, this narrative is not without its challenges. One significant concern is the risk of greenwashing, where sustainability efforts may be more superficial or market-driven than

truly environmentally beneficial. For example, While EVs are seen as key to reducing tailpipe emissions, their production is often energy-intensive and reliant on fossil-fuel-powered grids. The mining of rare metals for EV batteries, such as lithium, cobalt, and nickel, contributes to environmental degradation and resource depletion, raising concerns about the true sustainability of this transition(Luong, Tran, and Ton-That 2022, Chen et al. 2023, Yang, Huang, and Lin 2022). During the production phase, EVs may generate more CO2 emissions than conventional cars due to the energy required to manufacture batteries(Mikayilov 2021, Hawkins et al. 2013). This means that in the short term, electric vehicles might actually contribute to increased emissions before the long-term benefits of lower emissions during operation are realized.

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5. Transit-Oriented Development (TOD):TOD is indeed a significant narrative in urban planning that emphasizes creating dense, walkable communities centered around public transit systems(Ibraeva et al. 2020). The central idea is to reduce reliance on personal vehicles by maximizing the accessibility of residential, commercial, and recreational spaces within easy walking distance (typically 400-800 meters) of public transport hubs like train stations or bus routes(Dittmar and Ohland 2012). The goal of TOD is to integrate urban development with public transit to reduce car dependency(Bian, Qiao, and Yeh 2023), cut down on traffic congestion(Farnes et al. 2024), improve air quality, and create more sustainable(Fang et al. 2023), livable cities. TOD encourages higher density development around transit corridors, which can enhance the efficiency and use of public transportation, while also fostering vibrant, mixed-use neighborhoods. One of the main criticisms leveled against TOD is that it can lead to gentrification in low-income neighborhoods(Maniat, Hayati, et al. 2023). When new transit lines and stations are built, property values around them often rise, attracting higher-income residents and displacing lower-income households who can no longer afford to live in those areas(Maniat, Hayati, et al. 2023, Maniat, Elmie, et al. 2023). This displacement disrupts the social fabric of these communities and exacerbates income inequality. During the COVID-19 pandemic, another critical perspective emerged, questioning the necessity of physical travel for many activities(Kichloo et al. 2020). As remote work, telemedicine(Abdel-Wahab et al. 2020), and online education(Oliveira et al. 2021) became widespread(Maniat et al. 2024), it became clear that many tasks traditionally requiring movement could be accomplished without leaving home. This realization prompted a reevaluation of the traditional objectives of transit-oriented planning and raised questions about whether TOD should continue to focus solely on facilitating physical travel. TOD developments sometimes prioritize high-end real estate or commercial projects, which may cater more to affluent populations. This raises concerns about whether TOD benefits are equitably distributed, especially in terms of access to affordable housing and essential services for low- and middle-income residents.

4- Future grand narrative in transportation

Three key narratives that could shape the future of transportation, each representing significant shifts in how we think about mobility, ownership, and the need for physical travel. Let's break down these narratives:

1-Personalized Door-to-Door Transportation

The future of transportation is increasingly moving towards Personalized Door-to-Door Transportation, which aims to provide tailored mobility solutions that cater to individual needs, thereby reducing or even eliminating the reliance on traditional public transportation systems like buses, subways, or trains. This shift reflects a broader trend known as mass customization, which moves away from a one-size-fits-all approach toward more individualized services, much like how manufacturing has evolved from mass production to customized products (Duray 2002, Wang et al. 2017, Tien 2011). In the traditional public transportation model, passengers rely on predefined routes and schedules that require multiple modes of transport (e.g., bus to train) to get from a general origin to a general destination. However, in the personalized model, passengers can select their specific origin and destination, and use a single, seamless mode of transportation that caters directly to their travel preferences. This evolution from Origin-Destination (O-D) mass production to O-D mass customization redefines the transportation experience, emphasizing convenience, efficiency, and flexibility for the traveler.

Mass Transit vs. Mass Customization: Public transportation, often referred to as "mass transit," operates on the principle of moving large numbers of people between common origins and destinations. In contrast, mass customization reflects a shift toward individual needs, where each person has a unique origin and destination. This trend is visible in transportation services like ridesharing (Uber, Lyft) and micro-mobility solutions (scooters, bikes) that provide more flexible, personalized travel options compared to fixed-route transit systems.

Why TOD might struggle: While Transit-Oriented Development (TOD) promotes dense urban living with easy access to public transit, the trend towards personalized transportation may challenge this model. With advancements in autonomous vehicles and mobility-as-a-service (MaaS) platforms, the need for centralized public transit hubs might diminish, especially in less dense areas.

2-The Decline of Private Car Ownership

private car ownership may decrease, driven by technological advancements like autonomous vehicles (AVs) and car-sharing services, both of which could promote a shift away from the traditional model of personal car ownership. This shift represents a potential transformation in economic and political thinking, moving from a capitalist model focused on private ownership to a more socialist-influenced model where mobility is shared and commoditized as a service.

Autonomous Vehicles and Shared Mobility: Although the growth of self-driving cars and car-sharing has been slower than expected (Zomarev and Rozhenko 2020), these technologies still have the potential to reshape mobility (Novikova 2017). Autonomous vehicles could provide on-demand transport without the need for individuals to own cars, while shared mobility services could reduce the total number of cars on the road, promoting a more efficient use of resources.

Challenges to Private Ownership: This vision ties into broader debates about capitalism vs. socialism where private ownership of vehicles could decline in favor of shared or communal ownership, effectively reducing the environmental and economic costs of personal cars. However, current trends show a growing number of cars in production, suggesting that private ownership is still dominant.

3. The Decrease in Physical Movement Due to Technology

The COVID-19 pandemic has accelerated the shift toward remote work and the use of communication technologies to reduce the need for physical travel. This marks a shift from travel-based models to activity-based models, where transportation planning focuses more on the activities people need to perform rather than the travel itself.

Remote Work and Activity-Based Models: During the pandemic, it became evident that many tasks could be done without physical movement, leading to a decreased reliance on traditional transport models. Activity-based models of transportation, which account for the need to perform specific tasks rather than just travel, gained prominence, as they could better predict patterns during periods of reduced mobility.

Future of Work and Transport: As remote work continues to rise, the need for daily commuting may decline, reducing the demand for certain types of public transportation. This could lead to a rethinking of transport policies and infrastructure investment, shifting resources towards digital infrastructure and local mobility options, rather than long-distance commuting systems.

In combining these ideas, we can envision a future where the Main Narrative, The Evolution of Personalized, Shared, and Digital Transportation (PSD) becomes the dominant model for urban mobility. The PSD framework signals a fundamental shift in how transportation systems are designed and utilized, moving away from mass transit and private car ownership toward a more individualized, shared, and digitally integrated mobility ecosystem. Personalization, shared mobility, and digitalization are at the heart of this transformation. Personalized, door-to-door mobility services allow people to travel according to their specific origins and destinations, reducing the reliance on fixed-route public transportation systems. Shared mobility, facilitated by autonomous vehicles and ride-hailing platforms, removes the need for private car ownership while maximizing the efficiency of transportation networks. Meanwhile, digitalization enables smarter, data-driven infrastructure that adapts to real-time demand, making transportation more efficient and sustainable. In this evolving landscape, traditional models will be challenged and potentially replaced by these emerging trends. Mass transit systems may find themselves less relevant as mobility-as-a-service (MaaS) platforms become more widely adopted, offering on-demand services that cater to individual needs. Similarly, private car ownership will decline as autonomous and shared vehicles become the norm, disrupting the automotive industry's existing production and ownership models. Ultimately, the PSD framework represents a future of flexible, sustainable, and digitally connected transportation, where mobility is tailored to individual preferences, shared among communities, and integrated into a seamless, technology-driven system. This shift will require rethinking urban planning, transportation policies, and infrastructure investments to meet the demands of this new, more agile mobility landscape.

5-Understanding policy in transportation

Transport policies operate at the intersection of philosophy and civil engineering, through combining narratives of problems and their solutions with political ambitions. These narratives can change, however. New ideas from academia on sustainable transport planning, and integrating social and urban problems with transport issues, influence the way transport planners develop policies. Transport planning should therefore not only be approached from a cognitive or 'conceptual' perspective. Prime example of this evolving policy

landscape is the global transition towards electric vehicles (EVs), driven by environmental concerns and advancements in technology. Historically, the world has relied heavily on fossil fuels for transportation, but recent shifts towards electrification reflect new narratives emphasizing sustainability. Initially, Tesla emerged as a frontrunner in electric vehicle production (Yu et al. 2011), followed by European manufacturers. However, in recent years, particularly from 2021 onward, China has rapidly scaled up its EV production, surpassing other countries in output (CICC Research 2024, Khaleel et al. 2024). This surge in Chinese electric vehicle production has triggered significant geopolitical and economic reactions. For instance, on October 4, 2024, the European Union (EU) announced the imposition of tariffs of up to 45% on Chinese electric vehicles. This policy move reflects a growing concern over market competition and the dominance of Chinese manufacturers in the global EV market, illustrating how transport policy can also be shaped by trade dynamics and economic protectionism. While promoting sustainability through electric vehicles, these policies are also entangled in broader economic considerations, highlighting the complex interplay between transportation technology, market forces, and global political agendas.

6-Conclusion

The exploration of discourse analysis in transportation provides a critical framework for understanding the evolving landscape of urban mobility. As traditional paradigms and grand narratives—such as car-centric development and economic expansion face challenges from new narratives emphasizing personalization, shared mobility, and sustainability, a transformative shift is underway. The emergence of personalized door-to-door solutions signifies a departure from the reliance on fixed-route public transit systems, while technological advancements threaten the conventional model of private car ownership. Moreover, the COVID-19 pandemic has accelerated a rethinking of transportation policies, underscoring the importance of digital infrastructure and remote work, which diminishes the need for physical travel. Discourse analysis serves as a vital tool in this context, revealing the underlying power dynamics and values that shape transportation planning and policy-making. By critically examining these narratives and their implications, we can foster more inclusive, equitable, and sustainable transportation systems that reflect the diverse needs of society. The evolution of personalized, shared, and digital transportation (PSD) points toward a future where mobility is not only more adaptable to individual preferences but also more integrated into the social fabric of urban environments. Embracing this shift will require collaboration across disciplines, innovative policy approaches, and a commitment to addressing environmental and social equity challenges. Ultimately, the PSD framework offers a pathway toward a more flexible, sustainable, and digitally connected transportation future, aligning with contemporary values and aspirations for urban mobility.

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