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The Dimensionality of Power in Sigurd Grava's Urban Transportation and Peter Adey's Geographies of Mobility

S. Sivaranjini
Ph. D Scholar, Pachaiyappa's college
Chennai-30
ranjinidinesh95@gmail.com

Abstract

This paper explores how the "Mobility Turn" of the 21st century established that the movement of bodies and goods is not a neutral physical act, but a deeply political phenomenon. Geographer Peter Adey significantly advanced this paradigm by introducing the "dimensionality of power," which examines how governance and social hierarchies are structured along horizontal, vertical, and aerial axes of mobility. This research paper applies Adey's dimensional framework to Sigurd Grava's foundational planning text, *Urban Transportation Systems: Choices for Communities*. By analyzing Grava's detailed inventory of transit modes through Adey's spatial lenses, this paper demonstrates how urban infrastructure physically engineers social stratification and dictates the distribution of power. Horizontal mobility is mapped through the contested politics of the street and the frictions of surface networks. Vertical mobility reflects subterranean relegation versus elevated privilege, while the aerial dimension exposes 'atmopolitics' and the exclusionary, surveilled cocoons of automated guideways and elite flight. Furthermore, the analysis integrates the concept of 'motility' as a crucial form of capital, illustrating how the unequal capacity for movement dictates modern socio-economic integration and exclusion.

Keywords: Social Stratification, Urban Infrastructure, Spatial Friction, Transit Planning, Atmopolitics

Introduction

In his extensive evaluation of transit options, Sigurd Grava recognizes that mobility is inherently tied to social equity and uneven distribution. Grava categorizes urban populations into five distinct cohorts, the affluent elite, the prosperous cohort, the middle class, the surviving cohort, and the disadvantaged class, noting that each cohort navigates urban spaces under vastly different economic and social barriers. This socioeconomic stratification maps perfectly onto Peter Adey's dimensionality of power. Adey argues that to truly understand the politics of mobility, we must look beyond the flat surface of the city and analyze movement as a three-dimensional volume. By examining Grava's evaluations of automobiles, subways, automated guideways, and paratransit, we can see exactly how Adey's horizontal, vertical, and aerial dimensions are operationalized in the built environment.

Horizontal Mobility

Horizontal mobility represents the traditional movement across the Earth's surface via roads, sidewalks, and railways. According to Adey, this dimension is characterized by a constant negotiation of boundaries, where according to the text and it states, "Horizontal mobility is often a struggle against the frictions of the landscape—borders, gates, and the physical constraints of the terrain that dictate who can pass and how quickly" (Adey 2010). In Grava's text, this horizontal friction is most violently expressed in the contest for street space between the private automobile, pedestrians, and cyclists. The dominance of the car has physically fractured the historical city, enabling a sprawling-built environment that privileges individualized speed while marginalizing those relying on human metabolic energy. Grava acutely observes this conflict over the horizontal plane, noting that according to the text and it states, "The critical issue in

most urban environments is the fact that we are facing a zero-sum game for space" (Grava 82). Therefore, any surface accommodations made for vulnerable horizontal actors, such as bicycles or pedestrians, must be forcefully wrested from the domain of the motorist.

Furthermore, Grava's analysis of paratransit and self-generated jitney services perfectly illustrates how marginalized groups navigate horizontal friction when formal state infrastructure fails them. In lower-income districts, informal shared taxis and vans organically emerge to establish flow and connectivity. Grava notes the structural exclusion that necessitates these grassroots solutions, where according to the text and it states, "There is the charge that poorer districts are neglected by regular service providers, and, therefore, deficiencies are corrected at the grass roots level, whenever possible" (Grava 240). This demonstrates Adey's concept of the horizontal plane as the ultimate "politics of the street," where the disadvantaged struggle to claim their right to basic mobility.

Vertical Mobility

Adey's second dimension of power, vertical mobility, argues that movement upward or downward through urban space fundamentally maps social status. The vertical axis is highly stratified: the elite claim the sweeping views from the top, while the marginalized and the massive infrastructures that support the city are relegated to the underground. To frame this, according to the text and it states, "Verticality is not just a dimension of space, but a dimension of power. The ability to move upwards, to look down from above, or to be relegated to the subterranean, reflects and reinforces social stratifications" (Adey 2010).

Grava's examination of Heavy Rail Transit (Metros and Subways) provides a direct application of this vertical dimension. Subways are engineered to run completely free of surface congestion by being buried underground, creating an artificial subterranean environment

designed for moving the surviving and working cohorts. While subways require monumental capital investments and drive high-density urban development, they are inherently spaces from which the most privileged classes often absent themselves.

This vertical hierarchy is further emphasized in Grava's discussion of intermodal terminals and underground pedestrian mezzanines. Intermodal terminals weave together heavy rail, local transit, and pedestrian flows in massive, multi-level structures. Because these subterranean and lower-level transit environments operate with long hours and provide public shelter, they frequently become a refuge for the homeless and socially marginalized. While the prosperous classes utilize private vehicles on the surface or above, the most disadvantaged groups are physically relegated to the lowest vertical strata of the transport network, cementing Adey's theory that power is structurally mapped along the vertical axis.

Aerial Mobility

Adey's final dimension, aerial mobility, pushes mobility studies into the sky. He views the aerial realm not just as a trajectory for flight, but as an exclusive volume characterized by intense governance, security, and elite detachment. Here, according to the text and it states, "The aerial is a space of 'atmopolitics,' where life is governed through the management of the air itself, and where the plane becomes a cocoon of surveillance and mobile citizenship" (Adey 2010).

In Grava's framework, the ultimate realization of elite aerial power belongs to the top tier of his social hierarchy. For this cohort, according to the text and it states, "The members live and play in their own enclaves and have their own means of mobility (limousines and private jets)" (Grava 3-4). By utilizing private aerial mobility, the affluent elite entirely transcend the friction of the horizontal street and the subterranean crowding of the working classes.

On a municipal scale, the desire for aerial escape manifests in technocratic fantasies like Automated Guideway Transit (AGT) and monorails. Grava describes how these systems frequently symbolize a society's desire to float sleek, individualized pods silently above the congested masses. Crucially aligning with Adey's concept of "atmopolitics" and surveillance, AGT systems operate in highly controlled, "closed" environments. Because they lack human drivers, these aerial and grade-separated systems rely heavily on absolute behavioral control and constant monitoring. Grava confirms this strict governance, noting that their safety record is maintained because platform barriers and "extensive surveillance programs by TV monitors and safety personnel are in place" (Grava 698). Thus, aerial and elevated transit modes in Grava's text serve exactly the function Adey theorizes: they operate as highly governed, heavily surveilled cocoons that elevate privileged citizens above the democratic friction of the street.

Conclusion

Sigurd Grava's *Urban Transportation Systems* transcends its role as a practical engineering manual when analyzed through Peter Adey's dimensionality of power. By mapping Grava's mobility modes against the horizontal, vertical, and aerial axes, it becomes evident that transportation infrastructure is never neutral. The friction of the asphalt, the subterranean relegation of mass transit, and the surveilled exclusivity of aerial pods all serve as physical manifestations of social stratification. Integrating Adey's dimensions into Grava's pragmatic framework ultimately proves that to engineer a city's movement is to engineer the very limits of its social power and governance. The future scope of this field must critically investigate the limits of the current socio-infrastructure mega-development model and the growing societal backlash against hyper-mobility. Future research should explore the paradigm of "resonant mobility"—a framework that shifts the focus from maximizing sheer movement to improving the

quality of socio-territorial encounters and sustainable relations. Additionally, subsequent studies must address how marginalized populations actively contest entrenched infrastructural power dynamics through everyday spatial appropriation, bottom-up architectural resistance, and urban commoning practices in contested spaces.

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