Reading reflections

USP 570

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Week 8

- The 'Diamond of Assenbly'

Levinson and Krizek (2018 Chapter.12) introduced some dynamic interaction mechanisms of transportation. This system is not static. From motivation to implementation, polictical facotors features prominently but is hard to capture. Economic factors are helpful for understanding the dynamic process. The anaylises based on supply and demand are classical approaches. The supply and demand curves of microeconomics illustrate that demand drops as the price increase. Elasticity, how steep or flat of the slop of demand curve, decides the relationship between quantities and price such as auto tirp is inelastic in the price of fuel, which means large changes in fuel prices have small effects on total driving. The existence of consumer suplus proves that the subsidies on transit are necessary for maximizing the overall socail benefits.

Except moving along the demand curve, the curve itself could move too. Income level, service quality, or complement/substitue goods could shift the location. Any change of the demand and supply could induce traffic and development. As shown by the 'diamond of assenbly', The effects of transportation investment are cyclical. Building infrastructure improves accessibility by reducing travel times, that increase land value and economic productivity. It induce more travel demand and lead to congestion and next round of investment.

- Metro Designing Guide

The Draft of "Designing Livable Streets & Trails" is an encyclopedic guide, which covered all major points of street design: The expectations, funcetions, elements, integration, design decisions, and implementation strategyies. It is intresting that the guide consider some emerging technologies like automated vehicles. The current draft mentioned that automated vhicles could provide a reliable level of mobility and street designs should envolve these technologies and changing demands. But the draft doesn't give more about the proposed solution or plan. The potential may include how to utilize the curve space, pick-up and drop-off area, etc. Although automated vehicle still not be offered, it worth exploring now.

- Discussion: dynamics and causality

The chaper 12 (Levinson and Krizek 2018) involved two difficult conepts of dyanamics and cauality. As the author said, moving along or shifting a demand curve, we can calculate the change of quantity and price. The reality is the change only represents one moment of the whole proccess. For incomplete and asymmetric information, each moment has some residuals and unknown variables. When come to the cycle of effects in the 'Diamond of Assembly', the accumulated error make the precise prediction impossible. If the cycle keep replicating, we

can keep observing and find the rule. However, there are always some new events happened or new variables added in each round. In many circumstances, even the direction of factor effects, positive or negative, is a question. In case of automated/connected vehicles, we are interested in their potential impacts on current transportation system. These technology should change the travel cost and demand, then induce more traffic and development. They can increase the efficiency of the system while produce more VMT. It can saving many parking lots but may lead to wider spawl. There are so many factor change at the same time. It is even hard to say what will happened at the second step of the cycle.

Causalyity is a more challenging topic. John Stuart Mill gives the three conditions: "Concomitant variation is the extent to which a cause X and an effect Y occur together or vary together in the way predicted by the hypothesis under consideration; The time order of occurrence condition states that the causing event must occur either before or simultaneously with the effect; it cannot occur after- wards; The absence of other possible causal factors means that the factor or variable being investigated should be the only possible causal explanation." The last condition represents the 'sufficiency' principle, which is the most difficult to satisfy and not feasible for most research on transprotation. The second one only can reject the effects of Y on X but cannot prove the causality bewteen them. The first condition reflect the equivariance principle, which includes 'measurement equivariance' and 'formal invariance'. Researcher often use former approach, use previous models and modify some assumptions or parameters in simulation like cheaper travel cost hasing longer VMT. The part of 'formal invariance' is critical for applicability but is still hard to comfirm. Many scholar still keen on this field because they believe AVs and ridesharing could fill the gap between the 'Mount Transit' and 'Mount Auto.' The transcendental empiricism by Deleuze might give us some inspiration.

References

Levinson, David M, and Kevin J Krizek. 2018. *Metropolitan Land Use and Transport: Planning for Place and Plexus.* Routledge. https://doi.org/10.4324/9781315684482.