

# NEW MOBILITY & INFRASTRUCTURE BUILDING

Research the new requirements of infrastructure building adapt to the new mobilities by historical narratives and social practices methodologies

Student

Haochen Yang (4845935)

Chair of Complex, "New York Midtown"

Thesis "New Mobility & Infrastructure Building"

## I INTRODUCTION

### 1.1 | Relevance of Design and Research-Methodology

The Lecture Series of Research Method deepened my understanding of architecture design and enhanced my awareness of the importance of research methodology during a design process. Architecture, unlike many other subjects, is based on people's experience and perception rather than the invariant theorems and laws. This subject's particularity determines that it does not have a universal rule which is suitable for every project. However, architectural research encompasses a relatively wider diversity of substantive foci and methodological choices.<sup>1</sup> One consensus we need to be aware of is, architecture design is not a realization of self-creation. Every project uses public resources no matter capital or land, so it is architects' responsibility using scientific methodology to guide specific design. That means a persuasive design plan must be based on strong theoretical or practical research. The research activity and design practice are two inseparable parts that could complement each other in the progress. And during the different period of architectural training, the deeper the learning, the higher the proportion of research. Therefore, as our understanding of architecture deepens, it is even more necessary to strengthen the research process of design objects and themes.

To make more scientific research, it is especially important to learn different methodologies and find out how these methods specifically apply to different research questions. In this course, we are exposed to several different research methods and gained a general understanding of them. This could be of great benefit to our research theme in graduation studio.

### 1.2 | Specific Research Topic

For the chair of Complex, we mostly start from a macro perspective of urban context to decide our own research aspect, and then gradually focus on the site to find specific problems and deepen our research. New York City is the most cosmopolitan city with great influence in the world, but the transportation problem has always been its urgent task. Mobility and infrastructure is the aspect with the most contradictory and most prominent problem concentrated in my opinion. This situation is even more concentrated in the site of our group, where the entrance of the most congested tunnel in NYC, Lincoln tunnel placed, also the busiest train station and the largest bus terminal located. Now the transportation efficiency in the site is greatly reduced because the infrastructure connecting Lincoln Tunnel are operated beyond capacity. This could be traced back to the reason that the infrastructure planning in the past was uneconomical and detached from the status quo of the city.

Nowadays the growing pressure on urban passenger transport systems has increased the demand for new and innovative solutions to increase its efficiency. New mobility emerged and gradually became part of people's life. With the introduction of the Shared Economy startups in the market, shared mobility is growing every year. There is another trend called Mobility as a Service, which suggests buying mobility services based on consumer needs instead of buying the means of mobility. The mobility is changing rapidly, but the typology of infrastructure buildings has been maintained for decades. This becomes an issue that architects need to care about: How can transportation hub in NYC meet the existing travel need and adapt to changes of new mobilities that may arise in the future?

The research will start from the contradictions between new mobility and old infrastructure building, and the end point still fall on the architectural solution. During the research process, social problems need to be considered, for example the change of transportation and the issues left over from history, and analysis of streamline, function and space from an architectural perspective is also an important part. Ultimately, the research question will explore the possibility of a new typology, which would be the theoretical basis for my design argumentation.

## II RESEARCH-METHODOLOGICAL DISCUSSION

### 2.1 | Selection of Research Methods

From the beginning of clarifying my research approaches there are some important definitions to emphasize. Giving a clear scope is significant achieving research purpose precisely. For my research question, the mobility is mainly the citywide mobility, the short-distance transportation in the city. These travel modes and related infrastructure spaces are changing faster and more obvious. Due to the railway system is relatively independent and the mode is relatively fixed, it is excluded in my research. That is why time becomes an important element for the architectural spatial results in this topic I want to research.

The objective of the research is to have a general understanding of the history and current state of New York transportation and provide theoretical basis for the program, flows, space, and functions of architectural design of infrastructure building. Specifically, I hope to find out how people's transportation methods affect the change of station space, how to solve the conflicts between the recent transportation modes and the present bus terminal, as well as the new requirements of infrastructure building under the development of new citywide mobilities in NYC. Therefore, I identified the two methodology, history narratives and social practices as the main tools to explore further research.

### 2.2 | Exploration

Obviously, my research problem is more inclined to an ultimate architectural problem, which is easier to use the conclusion into design practice. Therefore, the research process is not directly result-oriented but should be derived step by step. I divide the research question into three sub questions ranging from history, present to future to better comprehend the topic. Every sub question represents a different period of research and uses a different research method.

The first question I want to solve is: How people's change of mobility influenced the infrastructure buildings' development in NYC's history? In this phase I would use historical research method to study people's change of mobilities in New York City during different eras, and how these travel modes affected the space of terminals in history. The output of history research is not verse, or essay, or some other literary form; the output is narrative.<sup>2</sup> I would investigate spatial narratives of the changing terminal spaces by studying the social background.

Then in phase II I would investigate the spatial and social practices of the present situation, including the site analysis and the hard data of current travel modes, so it will include both quantitative and qualitative research. During the trip in New York, I found focusing on the largest bus terminal in the site, Port Authority Bus Terminal, is the best way to find out the conflicts between the current travel modes and the terminal spaces. Finding solutions to solve these conflicts could also provide inspiration for my future designs.

In phase III, I will focus on the future trend of mobility based on the information of the new mobilities we have for now and propose an ambition of a transport hub with a new definition. That would also base on the method on investigating social practices.

### 2.3 | Epistemic Frameworks

In my architectural research, I devise a combination of these two basic methodological approaches with different research tools. However, at the same time, I critically position myself by keeping a distance from direct adaptation of any fixed methodology, in favor of critically adjusting both methods and tools to the demands of my research.

It is almost an axiom nowadays that "the present can be understood only with reference to the past." "Historical setting" is in some way endowed with the power both to evoke and to solve problems still unstated.<sup>3</sup> Hence, we can say that the present can be understood only with reference to its past. As for the transportation situation in NYC, what I found important is the mobility of citizens' daily life is always changing because of the rapidly development of technology and economy. I made a simple diagram (FIG. 1) to show the main citywide mobilities of different era (after 19<sup>th</sup> Century) in NYC. I also

collect the materials of terminals in these eras. From the history research we can see how people's preference switched and how transportation terminals were designed to suit the transformation and integration of transportation modes.

For the present situation analysis, a methodology combining both quantitative and qualitative research is used. Quantitative research is important in this part because the actual situation requires more accurate data to support the conclusion which will be used for architecture design. For the site analysis, the more detailed and specific the information, the deeper my understanding will be. Therefore, I searched for the data and maps about transportation in NYC and make charts and diagrams to compare different travel modes (FIG.2). With the help of these research and tools, I found the most contradictory and most concentrated traffic nodes and problems in the site, as well as the numbers and proportion of transportation modes people travel today.

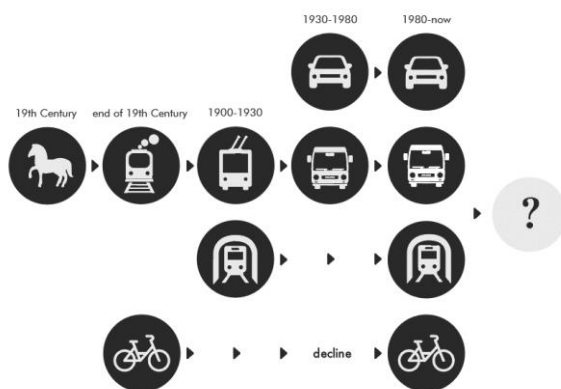


FIG. 1 History of Mobility in NYC

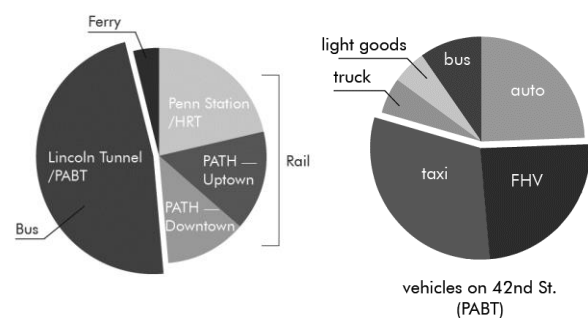


FIG. 2 Charts of Current Situation in Site

### III RESEARCH-METHODOLOGICAL REFLECTION

#### 3.1 | Context of History Narratives Methodology

Historical research method is proved by scholars and researchers as a suitable way to review existing knowledge and interpret current problems. The purpose of this method is evidently to further the solution of a definite problem though helping to explain a present situation-either the actual or some definite past institutional situation which is assumed for the purposes of study to be present.

From the literature about historical research method, comparing it with scientific research methods can draw its research characteristics obviously. History details the differences among events, whereas the sciences focus on similarities. History lacks the sciences' ideal models, whose usefulness varies inversely with the number of characteristics to which they apply. Gaddis (2002) suggests that a particular contrast between history and social science is that history insists on the interdependence of variables, whilst mainstream social science methods rely on identifying the 'independent variable' which affects (causes) changes in dependent variables.<sup>4</sup> Considering this theory in my research, modes of mobility and infrastructure construction in history are the two main variables and the relationship between them is the focus of my research. Therefore, qualitative methodology of historical narratives is undoubtedly the most suitable research method for this question.

According to information online, there are four generic methods applied in historical research: source criticism, time series analysis, the use of comparative methods and counterfactual analysis.<sup>5</sup> For my research, time series analysis would be the main method which help with the timeline of transportation change in NYC. Comparative method would also be chosen because the comparison between NYC and the whole world situation in different eras reflects New York's unique historical development background.

### **3.2 | Context of Social Practices Methodology**

Social interaction has essential effects on social reality. Understanding the social contexts in which actions and interactions take place is of utmost importance for planning one's goals and activities.<sup>6</sup> Social practice theory seeks to determine the link between practice and context within social situations.<sup>7</sup> The everyday practices could reflect the deeper origin of city context and history background, so that we could conclude with people's needs now and possible changes in the future. In fact, social practices can be seen as recurrent joint actions performed for shared social reasons.<sup>8</sup> Social practices are similar for groups of individuals at a specific time and location.

After the site visit, I found the first-hand information about social practices which I could get further conclusion from. This methodology is the best way for me to organize all the current materials by analytic drawing, diagramming, mapping and also case study. In a word, social practice perspective offers more robust accounts of how social and behavioral change comes about than conventional approaches and offers novel insights and targets for interventions.

Today many architects are associated with social practices in both their theoretical and practical work. For example, in John Turner's article *The Squatter Settlement: An Architecture that Works*, he found the existential value of the *barriada* is the product of three freedoms: the freedom of community self-selection; the freedom to budget one's own resources and the freedom to shape one's own environment.<sup>9</sup> The conclusion he got is based on the detailed social practices research of slum areas in different cities, including the data of household income and age-sex distribution as well as the usage of specific spaces in typical low-class families. Informative social evidence is the source of reliable conclusions.

### **3.3 | Critical Positioning**

In my approach, historical narratives and social practices are used as epistemic frameworks to read and comprehend materials. The two methodologies are the most suitable theoretical basis for my research in general, but when focusing on specific topic, there are still some inaccurate ways that need to be adjusted. Especially for social practices methodology, what I want to figure out is the current situation of transportation in NYC, probably related to social issues in some extent so that divergent research is necessary. I used hard data to make diagrams and mappings, while interview local citizens' opinion about the future mobility in NYC. Combining both quantitative and qualitative research is a wiser way that could diverse information sources of conclusions and get more fruitful results.

## **IV POSITIONING**

### **4.1 | Individual Architectural Position Conclusion**

The final purpose of investigating history narratives and social practices of the topic: mobility and infrastructure building is to provide a solution to the current problem in the site: the mismatch of the bus terminal design and the new citywide mobility. To reach this purpose, I try to review and synthesize the existing knowledge: the development of the transportation in NYC, and also explore more general issues about the existing situations or problems, even anticipate the future trends and create new design goals.

The importance of historical research is undisputed. If a class is to be set to study contemporary municipal problems, it must first be made to drag slowly through the history of European municipalities; if a student undertakes to treat critically or constructively a bit of current theory he is likely to be regarded as unscientific and unscholarly if he fails first to read and summarize in a "historical part" all that has been written on the subject before.<sup>10</sup> To understand the historical method and to make use of it in scientific work or in teaching we must first realize just what is the end of scientific investigation and how it is that an appeal to history can aid us in attaining this end. For my research, the terrible situation of the current Port Authority Bus Terminal makes me rethinking

problems with the design of the building, but find out the main contradiction is focused on time. Robert Paaswell, a civil engineer who helped select designs for the new PABT said, "It's a mid-20th century bus terminal trying to meet mid-21st century needs." The demand for transportation hubs is changing, but the typology of transportation hubs has been maintained for decades, so it is unable to meet the continuously updated transit and transfer mode. Then the research of the history about the two objects: mobility and terminal space, is the first thing I decide to do. However, in addition to the narrative of the history, the more important thing is that I need to summarize the close relationship between the two research objects. Finding out how people solve the spatial problem in history is the main purpose of this part. I will not follow the content of the methodology completely, but add my own analysis and understanding from the aspect of architecture. History narratives would only be the basis and the starting point of the whole research.

Then for the afterwards research, different methodology needs to be used to analysis current situation and to predict future trend. I already made it clear from the beginning that what I want to do is to improve the current situation of transportation terminal and also try to adapt to the future new mobility. I made site analysis by investigating the social practices, found out the major transportation mode and the changing trend of recent years; the main transportation problem is congestion problem of human and vehicular traffic in the site and the problem is mainly caused by the inefficiency of the infrastructure; the future mobility will be more sustainable and private customized as the rise of for-hire vehicles, etc. All these findings are based on social practice methodology, but not just it. A combination all kinds of research tools and flexible selection of different research modes according to requirements are also of vital importance.

In conclusion, while the importance of research methodology is already proved crucial and valid in technical research, it could also appropriate to architectural humanities. When we begin with an established methodology and apply this to a new context, there need adjustments and that could come into new possibilities. And that's why there are a great many valid and useful forms for architectural research to take. When start an architecture research topic, we shouldn't restrict ourselves to a single paradigm of methodology, but try to find out more approaches flexibly combining multiple methods. In this way, the conclusions will be more scientific and more conducive to architectural design.

**END NOTES:**

- 1 Linda Groat and David Wang. Chapter 1. In *Architectural Research Methods*, second edition, Printed in the United States of America
- 2 Linda Groat and David Wang. Chapter 6. In *Architectural Research Methods*, second edition, Printed in the United States of America
- 3 R. F. Hoxie. Historical Method vs. Historical Narrative, *Journal of Political Economy*, Vol. 14, No. 9 (Nov., 1906), pp. 568-572, The University of Chicago Press
- 4 Peter J. Buckley. Historical Research Approaches to the Analysis of Internationalisation, Published online: 29 September 2016
- 5 Peter J. Buckley. Historical Research Approaches to the Analysis of Internationalisation, Published online: 29 September 2016
- 6 Virginia Dignum, Frank Dignum, and Catholijn Jonker. Social analysis for the design of joint action: towards a methodology, Delft University of Technology, Utrecht University, The Netherlands
- 7 A. L. B. Smolka. Social practice and social change: activity theory in perspective. *Human Development*, 44(6):362–367, 2001.
- 8 Raimo Tuomela. *Philosophy of Social Practices: A Collective Acceptance View*. Cambridge University Press, 2002.
- 9 The John Turner Archive: The Squatter Settlement: An Architecture that Works. *Architecture of Democracy, Architectural Design*, August 1968
- 10 R. F. Hoxie. Historical Method vs. Historical Narrative, *Journal of Political Economy*, Vol. 14, No. 9 (Nov., 1906), pp. 568-572, The University of Chicago Press

**BIBLIOGRAPHY**

- Linda Groat and David Wang. *Architectural Research Methods*, second edition, Printed in the United States of America
- R. F. Hoxie. Historical Method vs. Historical Narrative, *Journal of Political Economy*, Vol. 14, No. 9 (Nov., 1906), pp. 568-572, The University of Chicago Press
- Peter J. Buckley. Historical Research Approaches to the Analysis of Internationalisation, Published online: 29 September 2016
- Virginia Dignum, Frank Dignum, and Catholijn Jonker. Social analysis for the design of joint action: towards a methodology, Delft University of Technology, Utrecht University, The Netherlands
- A. L. B. Smolka. Social practice and social change: activity theory in perspective. *Human Development*, 44(6):362–367, 2001.
- Raimo Tuomela. *Philosophy of Social Practices: A Collective Acceptance View*. Cambridge University Press, 2002.
- The John Turner Archive: The Squatter Settlement: An Architecture that Works. *Architecture of Democracy, Architectural Design*, August 1968
- R. F. Hoxie. Historical Method vs. Historical Narrative, *Journal of Political Economy*, Vol. 14, No. 9 (Nov., 1906), pp. 568-572, The University of Chicago Press