

MIXED APPROACH IN ARCHITECTURAL RESEARCH DESIGN

The use of GIS-based tools supported by local site engagement via personal interviewing method

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Thesis "Talent Machine"

I INTRODUCTION TO THE RESEARCH QUESTION

Architecture is a complex field of study that indirectly relates to multiple professions and spheres of science and art. It is crucial to select proper analytical methods since the very beginning of the conducted research. In order to achieve a successful outcome of the design process, a solid foundation is desired. Only by providing comprehensive research conclusions, is it possible. Therefore, research-methodological awareness is a key issue to build these foundations. It is related to gaining better understanding of the site or context, as well as future function and future users of the final project.

The series of lectures on *Research Methods* have brought these issues closer, and raised awareness of the importance of the methodological approach in the research process. Several research methods were presented, which gave a broader insight into a multitude of available analytical methods that have been implemented in the architectural practice throughout history up to the present day.

An issue that seems most interesting of these mentioned in the course was the fact that heuristic techniques might not always lead to a successful solution, but to a failure as well. It is a learning process that is not always followed by optimal or unequivocally correct answer to the thesis question. Even if such risk exists, it does not mean that the whole method failed. The educative process itself matters. Natural order of things implies that the variety of methods allows to adapt the most adequate ones, which would lead to justified conclusions, or also to a possible rejection of the initial approach or hypothesis. In my individual research I tried to keep my eyes open for many directions where the chosen method may drive my exploration. By selecting a certain method and analytical tools, prior to implementing and adjusting them during the course of study, it made me shape my own optimized way of learning and observation. The research process is in a constant state of change and I expect it will keep evolving on every stage of my master thesis development.

The subject of my thesis is focused on Midtown Manhattan in New York City, under supervision of the Chair of Complex Projects. The problem statement that I defined is *a risk that the arrival of big tech empires to Midtown NE is going to affect the balance of economic and social bonds and fair chances for their healthy growth*. The research question is: *How can New York's intellectual capital be used in the era of technological development in a sustainable way?*

II RESEARCH DESIGN AND MOTIVATING CHOSEN APPROACH

The research approach has required obtaining a wide and precise set of data of the city of New York from the very beginning and has been further processed. For this reason, the primary part of the research focused mostly on the quantitative method: collecting hard data, mapping the data and operating on statistics. It turned out rather quickly that the produced data - in order to become more reliable - also needs another source of verification. Therefore, the second part of the research had a qualitative tendency – conducting personal interviews during the site visit. The combination of these mixed approaches allowed to build up solid foundations that were subsequently verified in their original context.

The data which is used in the quantitative approach was based on statistics of *NYC Open Data* published by New York City Government, and the census data provided by *United States Census Bureau*. The results obtained can be easily compared with a certain area of interest (Northeast Midtown Manhattan). Numerical data enables further analysis and comparison with other available sources. In this method it is possible to select necessary variables and remove the unnecessary ones. If needed, mathematical operations can be carried out to obtain a new kind of desirable variables. Afterwards, the results are mapped, which allows to present the initial numerical data in a graphical form. It is done using GIS processing software (*Geographic Information System*). The quantitative approach appears to be the best heuristic method for measuring, categorizing and identifying patterns in the analyzed area. Also, using this sort of data has proven to be the most reliable in this type of research, as it can be conducted on a larger scale and multiple topics, where it is necessary to generate the largest amount of data in a relatively short time. In this way a generalized and objective overview on the analyzed

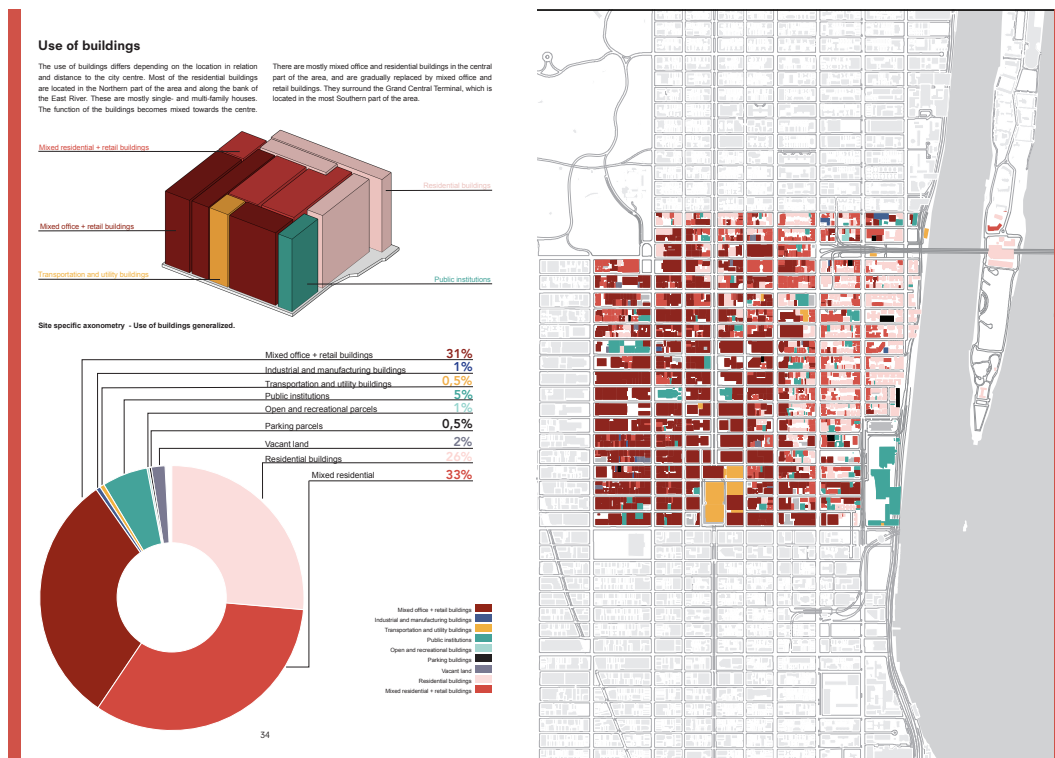
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location can be obtained. So, the quantitative GIS-based method appeared to be a suitable preparation for the following work on site.



A map of Manhattan presenting assessed land value per square foot created with GIS software.

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A booklet page presenting mapped and analyzed data for the use of buildings in Northeast Midtown.

The qualitative method was carried out next. The method for this approach took form of personal interviews conducted at the researched site. The interviews had an unstructured or semi-structured character, as a few general questions were asked to trigger more specific answers. This active way of researching appeared to be a very informative method for learning about the area on site itself. There were several key topics that the answers revolved around which regarded common and personal opinions of the studied area giving a deeper insight into addressed issues that might have been omitted during quantitative research. The interviews were documented as audiovisual recording. Afterwards, notes were taken to list the most useful information which was then carefully analyzed and compared with the research done before. As the result, the quantitative method of statistic-based data was verified with the social qualitative method of on-site interviews.



A picture from a filmed interview with a doorman Jose at the site on November 17, 2019

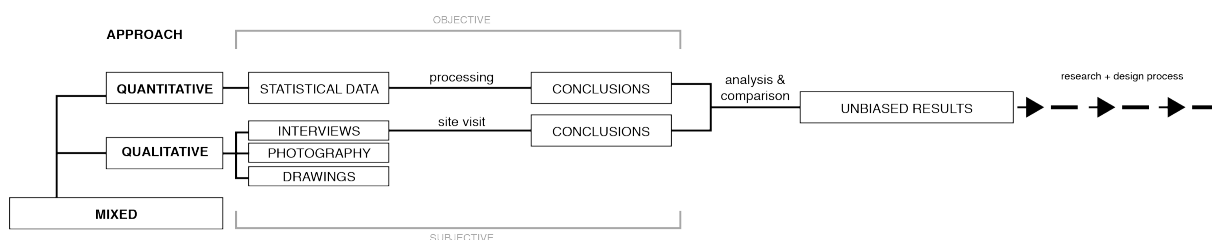
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A picture from an interview with an ice rink manager Brianna on November 18, 2019.

This approach can be indirectly referred to the lecture on *Types and Typology*. Statistical analysis method allowed to obtain a set of conclusions that could be summarized as a corresponding set of generalized categories. Such categories consist of factors shaping types that New York City consists of, that were pointed out in the categorization process. However, there is an unavoidable risk that such a process may omit some important details that might appear crucial to the research.

According to the article by Nicholas Chrisman *A transformational approach to GIS operations*, the issue that turned up since the introduction of Geographical Information Science software has been the abundance of data which could lead to errors or misunderstandings. The challenge is to learn to use the new tool consciously. Therefore, it is extremely important to implement a secondary research approach that supports the first one and simultaneously verifies it. In the book *Representing Place – Landscape Painting and Maps*, Edward Casey wrote how important it is nowadays to produce descriptive and clear images. He justified that visual media connected us with the world in a way that was not only product of mind or spoken word. The obtained visual product – here a map – was more valuable if there was a story behind it. Herbert Rubin wrote in the book *Qualitative Interviewing: The Art of Hearing Data* that the interviewing model implemented factors that cannot appear during visual presentation; feelings, personality, interests and experiences. Rubin added that (unlike maps and pictures) interviewers were not expected to be neutral. However, in order to conduct a successful interview, the researcher must learn to draw unbiased conclusions from these conversations, which is the greatest challenge.



A diagram showing adapted mixed research approach.

III EVOLUTION AND ADAPTATION OF GIS- AND INTERVIEW- BASED RESEARCH METHODS

The first time when Geospatial Information System was used for mapping numerical data was in 1970s, developed in 1980s. Karen Halttunen, a professor of History and American Studies and Ethnicity at the University of Southern California, wrote that until then spatial analysis had used to be metaphorical, done by defining borders, crossroads and margins. At the moment of technological

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development GIS emerged giving access to new tools. Since then the primary concept of this research method has hardly changed. Computer became the main tool in handling large amounts of data. However, the use of modern computers enables not only quantitative approach but currently it also introduces research based on qualitative approach.

This new approach triggered mixed reaction amongst different groups. While geographers were glad to have a new tool that gave them basically unlimited and extremely precise tool in their professional practice, the new way of processing numerical data met also with opposition of feminist or critical human geographers. Instead, they started using unconventional methods of research, such as interviewing, writing narratives, drawing non-digital maps, making diagrams, taking photographs, recording videos and sounds. One of the most recognizable activists in this project was Daniel Dorling, a professor at Department of Geography at Sheffield University, who wrote an article entitled *Human Cartography: When it is good to Map*, 1998. Dorling pointed out that since the birth of quantitative geography, human geography had been devalued. He accused researchers of ignoring traditional ways of studying society and starting something that might be described as *mass production* of mapping data in the present day.

Another activist opposing against common use of GIS was a feminist Mei-Po Kwan. According to her article *Feminist Visualization: Re-envisioning GIS as a Method in Feminist Geographic Research*, critical engagement and GIS remained two separate things, which made GIS a limited tool. She suggested redesigning GIS software to widely use it in feminist geography and research. Feminist politics and program could be implemented in GIS which would possibly be used for critical research driving feminist actions. Mei-Po Kwan also justifies the importance of visual recognition of data. In her opinion purely quantitative method oversees major historical and social phenomena, which requires additional support, such as documenting pictures, sounds, emotions – senses in general.

Eric Sheppard was another critic known for the innovative use of GIS tools. He took up the challenge of combining the dualistic character of quantitative and qualitative research methods. In the article *Quantitative geography: representations, practices, and possibilities* he implied that the main improvement of GIS software was a necessity to calculate the risk of transformation of the initial information in the process of multiplying data operations and analyzing final conclusions.

By drawing attention to a number of issues considering the use of GIS as a research tool, these researchers contributed to making recognizable changes in the development of geospatial data processing approach. By bringing attention to the methods they presented, it became clear that implementing people's movements, habits, experiences and emotions can lead to the creation of a precise analytical representation of urban and social space. Their approaches were informative for defining the method of location analysis, both from the urban and social side. However, it was also necessary in this case to explore ways oriented towards architecture.

William Miller in the book *Introducing Geodesign: The Concept* recalled the example of Frank Lloyd Wright using methods of geodesign (although he did not yet know this term) while working on the commission of Fallingwater. In order to carry out the project, it was crucial for Wright to understand the topography, location, direction of water stream, or placement of boulders for the future foundations of the house. It also incorporated solar analysis, views towards and from the house, finding possible sources of heating and cooling. All this information Wright kept in his mind as multiple layers of data and dealing with them simultaneously while drawing floorplans of the proposed building. Therefore, Frank Lloyd Wright can be considered the pioneer of geospatial research methods. All the information gathered by Wright relates to the way in which GIS software is structured nowadays. The site data of Fallingwater created a holistic overview by overlaying all the orderly structured information about it, in the exact same way as GIS does currently. A similar approach seemed desirable in the research, however needed to be adjusted.

IV INDIVIDUAL RESEARCH IN THE CONTEXT OF PRECEDENTS

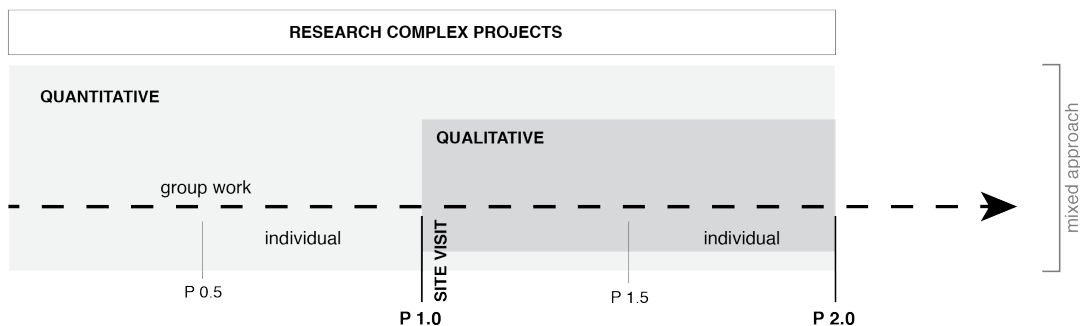
In my research process I needed to make several adjustments of the methods explained above. The methods that I selected kept evolving during the entire process, which was a key part of the research

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design. From the purely methodological point of view, my approach is probably most similar to the way proposed by Eric Sheppard, while it also relates in a few aspects to the approach presented by Dorling and Kwan. The approach of Frank Lloyd Wright was eventually rejected due to the fact that his research focused mostly on one specific site, while my case relates rather to the urban scale of the city as a whole. Moreover, it is crucial for my research to carry out also social, not only spatial analysis, which Wright misses in his work. Therefore, I decided to focus on other studied methods.

While Dorling negated the use of GIS entirely (but only pointed out the importance of social factor of the information), Kwan went a step further by claiming that GIS was actually not a bad tool at its core but should be redesigned and used consciously in order to obtain reliable information. Sheppard in a way balanced these two statements and suggested combining quantitative and qualitative approaches simultaneously with the aim to optimize the research process.

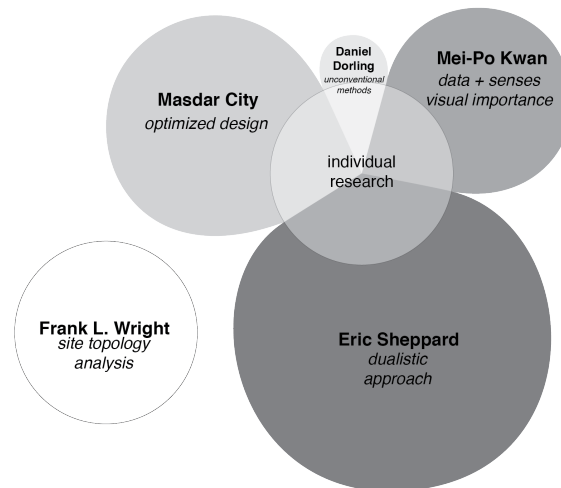
So, the method explained by Sheppard seemed most relevant for my research approach and therefore I decided to adopt it. However, some transformations immediately appeared necessary. It was impossible in my research process to conduct the qualitative research at the same time as the quantitative, from this simple reason that the site visit took place only two months after the GIS-based method had been started. Besides that, I selected a few methods mentioned by Mei-Po Kwan – personal interviews, the goal of which was to verify the preceding GIS-based research.



The order of conducted research types in the studio schedule timeline.

The most current use of GIS-based research can be presented on several examples, like the one of the future city of Masdar, in Abu Dhabi. The team of urban planners and architects who worked on the masterplan for the visionary city used advanced techniques of layered geospatial information including landscape, urban and architectural fields. The goal of the project was to design a fully sustainable city driven by solar energy and to achieve zero waste and carbon emissions. Such an objective is crucial in the profession of architect and related to it. In my research I am trying to designate a similar path, but on a significantly smaller scale. Except for that, I also intend to pay more attention to the demographic analysis to implement it to the statistical data. But in overall terms, the example of Masdar is directly comparable to the main studio approach of the chair of Complex Projects, based on creating broad research in order to collect data finalizing with a comprehensive design. Even the studio title “complex” is accidentally strongly related to the method adapted in GIS – this technique is based on handling complex sets of multi-layered data in order to produce precise summaries and draw genuine conclusions from a thorough analysis.

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Positioning of individual research in relation to precedents.

This concept is further reflected upon not only in the academic spheres, but also at events such as GeoDesign Summit. At the last Summit that took place in 2010 Thomas Fisher, the dean of University of Minnesota College of Design, said: *From a sustainability point of view, there is a great potential to move design in a new direction. [...] As designers, we are often intuitive, but our decisions are not based on data. We do not know the consequences. Geodesign allows architects to make decisions based on impacts such as water use and carbon output.* Fisher's position also supports the approach that I have adopted, and sets the azimuth of the Complex Projects' chair.

All of the mentioned findings have shaped the direction of my research design. Basing on the series of lectures on the Research Methods, I have dug deeper into understanding the analytical characteristics of my individual learning process, which is essential for the future design. Regarding the research question, it has evolved as well, determining the path of interest while encountering new methods and topics. While exploring the methodologies of doing research, I have drawn two main conclusions. First of all, it appeared clear that in my case adopting not only one but several methods of researching is necessary. Secondly, the findings pointed out that the mixed approach should consider and compromise both objective and subjective points of view. By that means research outcome is expected to be more credible, giving solid foundations for the resulting master thesis.

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