



Prof. dr hab. Magdalena Ziolo
Faculty of Economics, Finance and Management
University of Szczecin
Mickiewicza 64, 71-101 Szczecin
magdalena.ziolo@usz.edu.pl

Review of the PhD Thesis

Author: Rahman Fakhani

Author's affiliation: Univeristy of Gdańsk; Faculty of Economics

Title: "A Comparative Research of Urban Mobility in Poland and Germany on the Behaviour of Different Generations"

Supervisor: Dr hab. Michał Suchanek, prof. UG

General comments

The basis for assessing Rahman Fakhani's doctoral dissertation, "A Comparative Research of Urban Mobility in Poland and Germany on the Behavior of Different Generations," is a letter from dr hab. Przemysław Borkowski, prof. UG, Chairman of the Discipline Council Economics and Finance of the University of Gdańsk of February 23, 2023.

Rahman Fakhani's dissertation submitted for review was written on 289 pages of standard typescript. The theoretical and empirical-research part is written on 210 pages. The remaining pages contain a list of literature - a total of 730 items without categorizing them into monographs, websites, legal acts, etc.; a list of tables (59), figures (29), and a list of attachments (7 from A-F). The structure of the dissertation consists of an introduction, five chapters, and concussions. Proportions were maintained between the scope of considerations in the theoretical part (Chapters 1,2,3) and the empirical part of the dissertation (Chapters 4,5).

Studying the dissertation is supported by the figures and tables, in both parts - devoted to theoretical and empirical-research considerations. The Ph. D. thesis was written in English. The language of the dissertation is understandable and does not raise objections. The thesis was

written in a communicative and user-friendly way. Other elements should also be assessed positively, as evidenced by the correct selection and use of literature and other sources, primarily strategic documents in the field. The Ph.D. Candidate used various sources of information.

When assessing Rahman Fakhani's doctoral dissertation, the formal and legal review requirements are referred to in par. 6 sec. 4 of the Regulation of the Ministry of Science and Higher Education of January 19, 2018, on the detailed procedure and conditions for conducting activities in the doctoral procedure, in the habilitation procedure, and in the procedure for conferring the title of professor (Rozporządzenie MNiSW z dnia 19 stycznia 2018 r. w sprawie szczegółowego trybu i warunków przeprowadzania czynności w przewodzie doktorskim, w postępowaniu habilitacyjnym oraz w postępowaniu o nadanie tytułu profesora (DzU 2018 poz. 261) and the provisions (Article 13(1)) of the Act of March 14, 2003, on academic degrees and titles and degrees and titles in the field of art (ustawa z dnia 14 marca 2003 r. o stopniach naukowych i tytule naukowym oraz o stopniach i tytule w zakresie sztuki (DzU 2017 poz. 1789). The following assessment criteria were taken into account when evaluating the doctoral thesis:

- rank and justification of the scientific problem;
- originality and soundness of the research methodology;
- the substantive quality of the dissertation and the correctness of the results obtained;
- the formal requirements.

The doctoral thesis addresses the problem of sustainable mobility in the context of transport behavior research. This new, original approach fills the research gap and significantly contributes to the existing state of knowledge. Sustainable urban mobility is a consequence and, at the same time, an element of several actions currently taken by countries on a global scale to reduce the negative human impact on the climate and the environment. Climate-related risk is one of the most frequently mentioned risks regarding strength and impact (Global Risks Report 2022, ECB 2021)¹. Reducing GHG emissions as the main factor responsible for creating climate risk has become a strategic priority of governments (Paris Agreement, 2015)².

The European Union has so far adopted several documents, including the European Green Deal and EU Taxonomy, which force market participants to take several adjustment measures

¹ [https://www.weforum.org/reports/global-risks-report-2023/;\(accessed:23.04.2023\)](https://www.weforum.org/reports/global-risks-report-2023/;(accessed:23.04.2023))
https://www.bankingsupervision.europa.eu/legalframework/publiccons/pdf/climate-related_risks/ssm.202005_draft_guide_on_climate-related_and_environmental_risks.en.pdf

² [https://unfccc.int/process-and-meetings/the-paris-agreement/;\(accessed:23.04.2023\)](https://unfccc.int/process-and-meetings/the-paris-agreement/;(accessed:23.04.2023))



focused on reducing the negative impact of the activity of market participants on the climate. Sustainable mobility is shaped by several factors, among which consumers' choices determined by their attitudes, decisions, and behaviors are essential. Sustainable urban mobility is enforced by regulations in the field of climate neutrality, which concern, e.g., local governments, which, as organizers of public transport, are obliged to adopt public transport to low-emission requirements. Such adaptation includes the organization of public transport services using electric vehicles, providing infrastructure supporting the reduction of the use of means of transport responsible for GHG (greenhouse gasses) emissions, e.g., ensuring access to fast urban rail and parking spaces at transfer stations, or introducing systemic solutions, e.g., a ban on entry of high-emission vehicles to separate urban zones. Transport behavior in the context of urban mobility is part of the so-called green consumerism, which as a phenomenon, assumes a diverse dimension and strength, e.g., depending on gender and generation.

This dissertation uses the so-called "generations" in a comparative analysis study of two Warsaw and Berlin urban centers. The research problem undertaken in the dissertation is original, novel, and highly important due to the efforts and activities currently undertaken by all stakeholders to stop climate change. The research objective of the thesis is to investigate the mobility behavior between Generation X (Gen X), Generation Y (Gen Y), and Generation Z (Gen Z) and to identify commonalities but also differences, as well as underlying behaviors. The objective and the aim of the thesis are related to this problem. The thesis aims to achieve meaningful results by identifying trends and opportunities for future-oriented and sustainable mobility. Seven following research questions have been raised:

- (1) What are the main factors influencing mobility behavior in daily commuting?
- (2) What is the living situation and how satisfied are the citizens with respect to the living environment?
- (3) What are the differences and trends in mobility behavior between the two cities in general?
- (4) What are the general differences and trends in mobility behavior between the generations?
- (5) What are the differences and trends in mobility behavior between the different generations within both cities of Warsaw and Berlin?
- (6) What are the differences and trends in the mobility behavior of the respective generations in a direct comparison between Warsaw and Berlin?
- (7) How do the trends in mobility behavior of different generations affect future planning for sustainable transportation infrastructure?



The main research hypotheses are as follows:

H1 In Berlin, sustainable modes of transport are more developed than in Warsaw, which means that they are also used more frequently in comparison.

H2 There is a trend that younger generations have a more environmentally conscious lifestyle and thus exhibit more sustainable mobility behaviors.

H3 The younger the generation, the more likely it is to use alternative modes of transport to the car, such as bicycles or mobility sharing offerings.

H4 There is a general trend among all generations of a high willingness to use more sustainable transport modes if a sufficient mobility offering is provided.

When assessing the coherence of research questions with the objective and aim, it can be concluded that the research questions were excessively (4 out of 7 questions concerned) focused on "differences" compared to other categories, such as "similarities" and "underlying", which were not included in the questions. Question 7 is defined too narrowly about the objective, as it concerns only infrastructural issues. In contrast, the objective refers to broadly understood future-oriented and sustainable mobility emphasizing trends and opportunities (opportunities were not highlighted in the questions). In the context of future-oriented and sustainable mobility, there was no question about system solutions used by local/regional authorities as an element of urban policy in the field of shaping sustainable urban mobility, including motivators to change transport behavior, e.g., free public transport on selected days, tariff solutions affecting on the price of tickets, green taxes/transport fees, or green urban zones.

Regarding the evaluation of hypotheses, when formulating them, they lacked consistency with the main research categories, i.e., while the research questions refer to mobility behavior and generations, the research hypotheses (except H2) refer to other issues such as modes of transport or younger generations (H2 - younger comparing to what?) which is misleading and makes hypotheses challenging to verify because they are not precise.

Methodological soundness requires indicating which "generation" the given hypothesis and, thus, the research applies. At the same time, the hypotheses are too complex because they often contain more than one assumption, e.g., H1 is in fact two hypotheses assuming that "In Berlin, sustainable modes of transport are more developed than in Warsaw" and "they (sustainable modes of transport) are also used more frequently in comparison." A similar remark applies to H2. The complexity of hypotheses makes it challenging to verify and understand them. The hypotheses would be more precise if uniform and defined research categories were maintained.

In H2, attention is paid to an environmentally conscious lifestyle. Still, further on, the broader context of "sustainable mobility behaviors" is mentioned (The environmental pillar is

one of three sustainability pillars, so why tackle only environmental aspects in the context of sustainable mobility H2?). Considering that transport modes are an element of urban mobility, the hypotheses are defined too narrowly in the context of the title of the dissertation and the research concept.

The research methodology is consistent with the research concept; in particular, it corresponds to the objective, aim, research questions, and hypotheses. The study used qualitative and quantitative research methods. The data source for the analysis was primary data obtained through an online survey. The sample size consists of 537 participants - 246 participants in Warsaw and 291 in Berlin. In the case of Berlin, the sample was dominated by men, and in the case of Warsaw, by women. The study excluded the BB generation. Considering the presence of individual "generations" in Warsaw's study sample, there were no significant differences between their representatives. In the case of Berlin, these differences were more visible (max. $\pm 22\%$). In the justification of the sample selection and the discussion on its size, confirmed by a literature review, obtaining from 220 to 250 evaluable responses for Warsaw and Berlin is required. To receive 480 evaluable responses, 1,600 to 3,200 people should be invited to the study. The dissertation does not provide information on how many people the questionnaire was previously sent to, and I kindly ask to provide such information during the public defense. However, it is known that the study lasted one month, from May 25th to June 25th, and covered the urban citizens of Warsaw and Berlin. The questionnaire is an attachment to the doctoral thesis (Appendix B).

Questions in the questionnaire were divided into the following groups:

- Questions regarding personal values;
- Questions regarding mobility and travel behavior (choice of transport);
- Questions regarding mobility in the light of smart cities;
- Questions in the field of "future living."

The layout of the research questionnaire is consistent with the objective, aim, research questions, and hypotheses. In the questionnaire (e.g., the question what is the main reason for your choice of transportation to get to work (...)?), a variant of the answer "sustainability" was used; how was this answer interpreted/understood when preparing the research results? I kindly ask to refer to this issue during the defense. The questions were closed and open-ended. The Likert scale was used in the study. The one-factor analysis of variance (ANOVA) is used to examine correlations and differences. The Ph.D. thesis needs more information and justification for choosing comparative analysis (Warsaw - Berlin) as the research method based on related



work. In this context, I kindly ask Ph. D. Candidate to indicate similar research studies in the field of mobility using a comparative analysis of Berlin and Warsaw. The factor differentiating the position of Warsaw and Berlin is the population density (twice as high in Berlin). Does this factor affect sustainable urban mobility, and how? What implications does it have for the results of the study? I couldn't find any comments on this in the text.

The thesis is divided into five chapters. Chapters 1.-3. consist of three subchapters, chapter 4 consists of five subchapters, whereas the last Chapter 5 consists of four subchapters. The table of contents of the Ph.D. thesis is correct. However, there is no coherency between the title of Chapter 4 to its content. The title promises content related to the research methodology, but only the last point of Chapter 4 discusses this issue. In the table of contents, there is also the need for a strong emphasis and theoretical background for comparative analysis, which is, after all, the important research tool included in the title of the Ph.D. thesis.

The first chapter presents the theoretical framework for urban mobility in a smart city through the prism of the sustainable development paradigm. In particular, the chapter presents key definitions and concepts for defining a sustainable smart city. Attention was also paid to the key elements and areas of the sustainable smart city concept, e.g., smart living, smart health, smart education & smart society, smart work, smart mobility, smart energy & smart infrastructure, smart government and smart governance, smart economy, and smart environment. The chapter also discusses the practical implications of using the sustainable smart city concept in selected countries. Attention was also paid to transportation as a factor of sustainable development. In particular, much attention was paid to the challenges facing the transport sector related to reducing GHG emissions and low-emission. Reference was also made to the urban planning issue concerning selected aspects of sustainable transportation and current policy in the light of sustainable transport development. The last subsection of the chapter discusses urban mobility in a smart city. Key elements and concepts related to the idea were presented, trends in urban planning were identified, and attention was paid to mobility as a service. The chapter was developed correctly based on a good literature review.

The second chapter presents the issues and state of research and fundamental theories regarding the irrationality of transport behavior. In particular, a discussion was undertaken on classical consumer behavior theories (e.g., Keynes, Smith, Marshall, Pareto) and the Veblenian social-psychological model, Pavlovian Learning Model, the Freudian Psychoanalytic model, Subjective Probability Approach and the Expected Utility Theory, Maslow's Hierarchy of Needs. In this part of the discussion, there was no reference to the indicated theories on transport issues and a comment to what extent these theories are essential for designing the concept and

explaining the study results. The second group of theories to which attention is devoted is Modern Consumer Behavior Models, where such theories as the Prospect Theory, Simon's Satisficing Model, Howard Sheth Model, Theory of Reasoned Action and the Theory of Planned Behavior, Engel - Blackwell-Minard Model and others were discussed. The chapter ends with discussing transport behavior in the light of consumer models. This part discusses the fundamental factors influencing transport behavior, indicates the impact of classical and modern consumer behavior on urban mobility behavior, and describes the Theory of Modal Choice. The chapter was developed correctly.

Chapter 3 is devoted to the behavioral patterns of different generations. This chapter reviews the achievements of generation as a subject of economic and social research. The following generations, referred to as - Baby Boomer Generation, Generation X, Generation Y, and Generation Z, were characterized by transport choices between generations. Discussions on the problem of mobility behavior with urban living on its impact on urban architecture were also undertaken. The chapter was prepared correctly based on reliable data sources and a literature review.

Chapter 4 presents the research methodology. In particular, issues related to the status quo and prospects of urban mobility in Poland were discussed, as well as the context of the smart city and smart mobility in Warsaw. However, smart mobility was presented in a very limited manner (p. 115). Then, in an analogous arrangement of issues and problems, a discussion was started in Germany and then in Berlin, for which basic statistics and facts about smart cities and smart mobility were analyzed. In the next step, a comparative analysis of the cities of Warsaw and Berlin was made, taking into account basic demographic and economic statistics and urban mobility. However, this comparison did not attempt to compare sustainable urban mobility. The last section of the chapter presents the research methodology, particularly the questionnaire design and applied survey tool, then sample requirements and the obtained data and data preparation process are discussed. A separate subsection contains a description of the applied statistical methods, including factor analysis, logistic regression, and applied statistics for analyzing the differences between generations (e.g., ANOVA, Pearson). Comparing the content of the chapter with its title, it would be more appropriate to call this chapter "Comparison analysis of urban mobility behavior and research methodology", because the research methodology itself is included in the last subsection of the chapter, and the title shows that the chapter refers entirely to the research methodology, which can be misleading because points 4.1., 4.2., 4.3. are facts and statistics regarding the comparative analysis of Warsaw and Berlin,



as well as the diagnosis of the actual state and prospects of urban mobility in the cities under study, i.e. issues that go beyond the methodology.

Chapter 5 presents the results of comparative analysis studies in the system research model and the daily commute, means of transport and basis mobility behavior, personal attitudes and experiences, aspects influencing mobility, and socio-economic factors. Then, a model for urban living and transport behavior was presented, considering research questions, variables, and research areas. In the next section, the interpretation of the main factors influencing daily commute is referred to in detail; results of the city comparison for urban living and urban mobility behavior and results of the generations comparison for Warsaw and Berlin were presented.

The Ph.D. thesis ends with conclusions that show that Berlin is more developed in terms of the researched issues than Warsaw, which is not surprising, and that the process of transformation of the examined cities towards sustainable mobility is at the initial stage of development, which is also not surprising. H1 has been confirmed for bicycles but not for public transport, which is surprising for Warsaw, which has a less developed public transport system than Berlin. Due to more extensive traffic jams in Warsaw than in Berlin, public transport is more prevalent in this city, which may justify such results. H2 was positively verified for Berlin but rejected for Warsaw. Common to both cities is that the younger generation tends to use alternative means of transport (except for Warsaw, where Gen Z hardly uses bicycles). It also did not confirm the decreasing importance of cars for younger generations, but the results show less importance of the car as a means of transport in Berlin than in Warsaw. H3 was confirmed for both examined cities, with the car-sharing phenomenon being more vital in Berlin and ride-hailing and bike-sharing in Warsaw. Here the question arises why in Berlin, which is "less attached to cars," the car-sharing phenomenon is more robust than in Warsaw, and how do the study results for H3 correspond with the results for H2? H4 has been confirmed - for both cities, the demand for sustainable urban planning is high and different patterns of behavior have been identified for individual generations in this regard.

Specific comments

The work was written carefully, in the correct language. With more than 700 bibliography items, however, it would be desirable to group them into categories - monographs, journals, legal acts, websites, and others, which would facilitate the search for selected items. In addition,



the term "future prospects" used in the chapter may be redundant because prospects always refer to the future.

The Main Contribution of the Thesis

The main achievements of Rahman Fakhani's Ph.D. thesis are:

- identifying and searching the relationship between transport behaviors of different generations and sustainable urban mobility;
- Covering the research gap in the scope of sustainable urban mobility, especially by addressing the theoretical and empirical approach and tools to explain the problem of how transport behaviors related to "generations" may impact the smart city and smart mobility;
- Explaining and providing new, original knowledge about sustainable urban mobility in reducing negative externalities (GHG) in the context of transport behavior.

Final conclusions

This Ph.D. thesis represents a great deal of work and contains original and valuable scientific results. The results are well presented and their interpretation is at a high scientific level. This thesis is ready to be defended orally and for sure meets the requirements laid down for the degree of Ph.D., defined by Polish law (Ustawa o stopniach naukowych i tytule naukowym z 14.03.2003). Therefore, I declare that the PhD thesis of mgr Rahman Fakhani meets all formal and customary requirements for the doctoral dissertations and I am applying for admission of mgr Rahman Fakhani to the following stages of the PhD procedure.

Wojciechowski Piotr

26.04.2023



