

**Report on the thesis manuscript de Ladislava Fialka Sobkova  
« Mobile-Based Sensing – Smartphone Application For Long-Term Urban  
Lifestyle And Mobility Sensing"**

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At a time of accelerating climate change, visible and present today in our cities and territories, the impact of the transformation of our urban lifestyles is a vital issue. The practice of decarbonized mobilities is at the heart of our significant changes to live differently. Therefore, the promotion of walking and cycling as among the new ways of getting around the city is necessary. Ladislava Fialka Sobková's manuscript is part of this approach: evaluating the impact of walking in an urban environment, particularly in Prague and the Central Bohemia Region.

The core of the work proposed in this thesis concerns using digital algorithms and mobile technologies to observe the reality of market practice in the Prague case study. This analysis collects information from surveys and an aggregation model using multi-agent technologies to perform statistical processing and obtain publishable trends. The production of an app, UrbanFit, has encountered difficulties in being finalized for economic and partnership reasons; however, intensive work allowed a way to analyze and show consolidation of results.

Before going into the details of the technical explanations from Chapter 4 onwards, a theoretical state of the art is presented to give a more global context to work done and the analysis of the case study.

The manuscript ends with a discussion in Chapter 7 and brief conclusions in Chapter 8.

In the appendix, we have a bibliography with 150 references. In addition, we find the list of the five scientific international publications of this work.

I would like to make a few comments on the work before going into the details of each chapter.

Ladislava Fialka Sobková's work is exciting and on a relevant topic. Walking in cities is one of the indispensable transformations. The study presents a theoretical part on state of the art, an application part with the design of a data model, a multi-agent system for processing and an application for operational feedback.

The application part suffered from the impossibility of its realization, which deprived us of its use and validation in natural conditions. Nevertheless, the work is pertinent, of high quality and valid.

You can read my comments and suggestions for each chapter (after the definitions and terminologies).

### 1. Concerning state of the art (Chapter 3):

It is a very comprehensive work that seeks to address the different aspects of the studied issue.

As is often the case in this type of research, I would like to highlight the students' attention to a few elements to which one should always pay attention:

- Be aware of the importance of using only less than five years old sources. However, it's necessary to present recent sources because we live in a fast-changing environment and even more so when we are in the technology field. (*Figures 3, 6, 7, 8, 11, 13*)
- Concerning the work on walking (and cycling) in cities, it would have been interesting to integrate:
  - o the work that the global network of cities, [C40 Cities](#), is developing. Even more appropriate since Prague is part of this network, a worldwide pioneer in transforming our cities. The C40 Knowledge Hub is very rich in information with [very recent projects](#) on this topic, too  
For information, the C40 is working on this topic with the development of a methodology and tools. The [C40 Walking and Cycling Benefits Tool](#) is built upon three years of work with Novo Nordisk, supporting 18 C40 cities to provide the evidence for the health, economic and climate benefits of walking and cycling. The research is based on an extensive literature review and developed with experts from the University of Cambridge and the University of Zurich
- The research work of the European [project PASTA](#) (February 2021): Physical Activity Through Sustainable Transport Approaches. This study followed nearly 2,000 people in seven European cities (Antwerp, Belgium; Barcelona, Spain; London, UK; Orebro, Sweden; Rome, Italy; Vienna, Austria; Zurich, Switzerland). The PASTA project is the first study of the carbon-reducing impact of city-based lifestyle changes and reveals that increases in active mobility significantly lower carbon footprints, even in European cities that already have a high incidence of walking and cycling
- Perhaps it would have been better to add a 3.2.1 that starts with the systemic effects of climate change in cities and the role of active mobilities such as walking.

### 2. Concerning the Smartphone application proposal, Chapter 4

The chapter presents the whole application with the typology of the data to be collected. Indeed, this aggregation allows the construction of an application integrated into a broader context than walking. Moreover, the information collected is open to incorporating other active mobilities and even the time spent in different mobilities. Therefore, the presentation of the interface is clear and justified.

As with state of the art, it would have been interesting to go into more detail in 4.3 Marketing strategy, which is very brief. In addition, on page 31, it would be interesting for the reader to be able to contextualize UrbanFit in comparison with other [existing application proposals](#).

### 3. Concerning the Possibilities of data utilization, Chapter 5

This chapter gives indications concerning the openings for the use of data collected. It mentions the global walking index, some evolutions, and the topography and urban morphology indicators. It also refers to the physical activity indicator and notes the impact factor by the HEAT methodology of the World Health Organisation.

From my point of view, it would have been interesting to start from the Global Walkability Index (GWI) to establish a more explicit correlation with the data managed by UrbaFit and thus have a better

understanding of their combination. On the other hand, the Institute for Transportation and Development Policy (ITDP) has made an exciting [classification](#) of various tools and methodologies.

The reference (117) is for improving in London the GWI originally proposed by Krambeck in 2006, but there is an extensive bibliography on the subject to extend it. It may be interesting to drill down between the different proposals to extract a more exhaustive collection of data to explore.

#### **4. Concerning the Case study, Chapter 6**

This chapter presents in detail the case study in Prague. In the introduction to the manuscript, we read about the case study in the Central Bohemian Region. However, the result is only for Prague. My curiosity leads me to ask as far as Bohemia's result is concerned.

As already mentioned at the beginning of this document, I understand the difficulty of having this type of more recent data (figures 28, 29).

The presentation of data processing is clear, and most importantly, it is transparent about difficulties and limitations regarding the receipt of data and the intervals of availability.

#### **5. Discussion Chapter 7**

Indeed, it is a regret that the UrbanFit application did not go all the way to completion. It is more accessible for studies of citizens' and users' behaviour to use data provided in real or delayed time by an application in natural conditions. This situation probably handicaps the results and analyses of the study in its various considerations. It would be interesting to explore how the use of Geolife can continue the work by adapting it to the specific conditions in the Czech Republic. In the text, there is also a reference to the open data platform [GOLEMIO](#). In the future, is it not possible to include a data set to extend the [Smart Prague Index](#) to walkability.

Concerning the tracks for the future, the way to join the ETHICA© project of the University of Saskatchewan can be interesting. However, exploring this way could open an exciting perspective.

Another way is to join the project on walking and cycling in cities that the C40 is conducting today.