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17–19 May 2018, Zadar, Croatia

Road and Rail Infrastructure V

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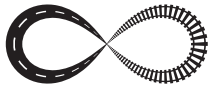
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MOBILITY MANAGEMENT AT RHEINMAIN UNIVERSITY – AN EXAMPLE FOR THE STRATEGIC IMPLEMENTATION OF MOBILITY MANAGEMENT AT UNIVERSITIES

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Abstract

In the past two decades the concept of mobility management (MM) has trail-blazed new adept ways of addressing and integrating mobility demand and behaviour patterns into the planning process. MM has proven its effectiveness within a broad range of implementing contexts and has been successfully implemented as a proficient tool for addressing the transport challenges of critical traffic generators; such as large companies or universities. RheinMain University is among the largest “trip generators” in the city of Wiesbaden. In the light of rising student numbers and current plans to redevelop and centralize its different campus locations the university must find sustainable and feasible solutions to manage their challenging traffic and transport demands and to strengthen the attractiveness of the university for employees and future students alike. Within their sustainability and climate protection program the university is developing an ambitious mobility management plan to secure its long-term accessibility by fostering flexible, efficient and multi-modal mobility means for students and employees with special dedication to limit CO₂-Emissions of the university and its members. The proposed paper aims at showing the potential and process of MM at universities at the example of the RheinMain University in Wiesbaden. The paper describes the general MM-process and adopts it to the specific challenges and demands of universities, their stakeholders and peer groups. The focus is on discussing the pursued goals, overall benefits. The Paper will present the methodology and key findings of an in-depth mobility survey among employees and students as well as the main results of an analysis and ongoing monitoring of the coherent traffic related emissions. Based on that sound analysis of mobility demands and impacts practical measures (e.g. parking management, sharing modes, subsidized pt-tickets) are developed and finally critical success factors are discussed.

Keywords: mobility management, transport planning, process, universities

1 Introduction: Mobility Management at RheinMain University of applied Sciences

1.1 RheinMain University – current situation and perspective

The RheinMain University of Applied Sciences has a student-body of 12.500 full-time students as well as around 1.000 employees on 4 campus locations. Three of its campus locations are located within the city of Wiesbaden while the fourth campus is situated in the city of Rüsselsheim, approx. 20 km southeast of Wiesbaden. With its already high numbers of students and employees the university is among the largest “trip generators” in the city of Wiesbaden. The number of students as well as employees are projected to steadily increase until 2025

which will lead to higher mobility demands at all its campus locations. In the light rising student numbers and its plans to redevelop and centralize its different campus locations the university must particularly find sustainable and feasible solutions concepts to manage their traffic and transport volumes and demands. The following analysis is mainly focused on the main campus located west from the city centre that will eventually host all four faculties that are currently located on three campus locations within the city of Wiesbaden.

1.2 Mobility Management – a brief introduction

In the past two decades the concept of mobility management (MM) has trail-blazed new adept ways of addressing and integrating mobility demand and behaviour patterns into the planning process. MM has proven its effectiveness within a broad range of implementing contexts and has been successfully implemented as a proficient tool for addressing the transport challenges of critical traffic generators; such as large companies or universities. The concept of MM does not solely focus on transport supply and infrastructure but on transport planning that meets the actual mobility demands as well as the efficient use of the given transport infrastructure. The central goal of an effective MM is to efficiently meet the mobility needs of individuals as well as large groups by integrating their demands into the planning process. As a complementary tool for traffic and transport planning MM adds a user centric and demand oriented focus into the planning process which effectively and efficiently increases the success of infrastructural projects and investments on all levels. The key to a successful MM-process is the early, transparent and effective integration, cooperation and coordination of all relevant stakeholders such as companies, employers, users, transport providers and city and transport planners. MM as a conceptual process of coordination and managing usually does not require large monetary investments and therefor usually has a highly favourable cost-benefit ratio.

2 The process of Mobility Management at RheinMain University

MM at RheinMain University exemplarily illustrates the complex process of an integrated mobility management scheme at universities and beyond.

2.1 Reasons, Drivers and Goals for Mobility Management at RheinMain University

The high density of universities and colleges in the Rhine-Main region challenges the individual institutions to create a unique profile and to provide attractive traits and benefits for its students and employees. Comparable examples at other colleges and universities show that the implementation of innovative mobility solutions within an integrated mobility management can strongly contribute to the attractiveness of the university as a place of study and work. Addressing the mobility needs of employees and students strengthens the attractiveness of the university as an employer as well as a modern institution of higher education sustainably. Furthermore, within their sustainability and climate protection program the RheinMain University is consequently developing an ambitious mobility management plan to secure its long-term accessibility by fostering flexible, efficient and multi-modal mobility means for students and employees with special dedication to limit CO²-Emissions of the university and its members.

The facilitation of campus locations throughout the city of Wiesbaden already leads to a high demand of transport for solely organizational purposes. In the light of centralizing peripheral faculties at the main campus location the university is facing severe challenges in the field of traffic and transport: On the one hand additional spaces and lots in the nearby neighborhood must be acquired and developed without burdening the urban surroundings with increasing traffic volumes. On the other hand, already-occupied space must be used more efficiently. Further, the definite elimination of parking structures at the main campus

due to severe disrepair and constant need of cost-intensive maintenance as well as the strong call for an adequate management and pricing of parking space for employers and students by the state supervisory audit will lead to a consequent reduction and reorganization of parking spaces on site.

The organized student body of the RheinMain University (AStA) already plays a significant role in promoting sustainable and multi-modal transport means. The AStA not just offers a state-wide subsidized public transport ticket financed on a solidarity principle base but also a bike sharing system for students with 200 bikes around the city as well as a cooperation with a car-sharing company. With its dedication to promote multi-modal transport the AStA has been a strong player, communicator and pioneer not just for the university but for the whole city. Implementing a sustainable mobility management also caters to complementary strategic goals: In the context of the new developed bachelor course “Mobility Management” at the Department of Architecture and Civil Engineering, it seems apparent to establish an exemplary mobility management process at the university. Additionally, the MM process can act as a possible initial spark for future Third Mission activities with other actors and stakeholders in the city of Wiesbaden and the region. The MM process at the RheinMain University pursues the following goals:

- 1) Long-term preservation and consolidation of accessibility for the different campus locations.
- 2) Environmentally friendly and economically feasible mobility and traffic development with special dedication to reduce traffic-related CO₂ emissions.
- 3) Enable flexible (“multimodal”) and efficient mobility for students and employees.
- 4) Strengthening the attractiveness of RheinMain University as a study and workplace.
- 5) Establish the university as an innovative learning and research institution in the field of sustainable mobility and mobility management publicly.

2.2 Key Actors and Stakeholders

The MM process is characterized by transparency and open outcome orientation must integrate all key actors and stakeholders appropriately. The MM process at RheinMain University is supported and monitored by various players and stakeholders who pursue individual agendas and goals. To establish the MM process in the long term a concept for the organizational anchoring was developed to define the roles, tasks and processes as well as evaluation criteria. The overall goal is to include all relevant groups into the process and decision making. Relevant stakeholders are students, employees, university administration, city`s transport planners, environmental planners, transport companies, car sharing and bike sharing companies and mobility management experts to coordinate and monitor the process and its results. To formally and efficiently integrate the different groups and positions into the process the complementary structure of a working and steering group was implemented:

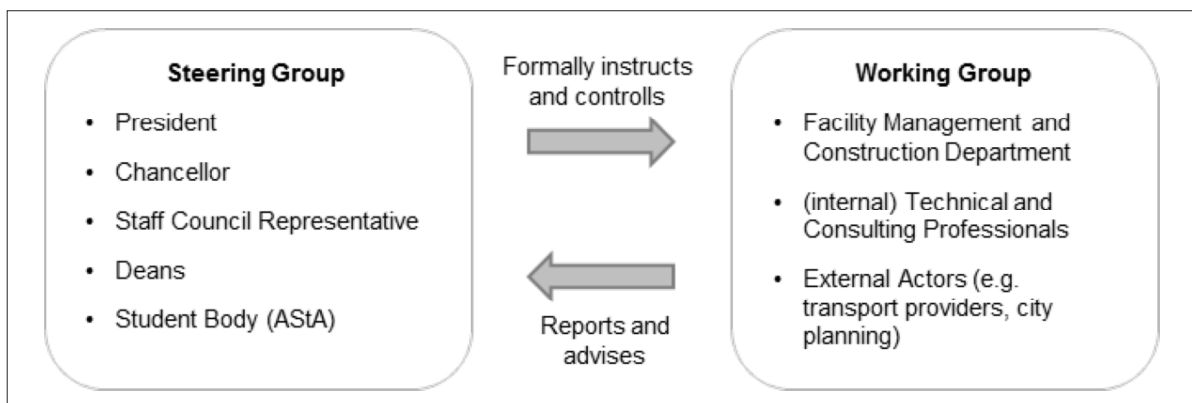


Figure 1 Key Actors and stakeholders

The steering group formally instructs the working group; The working group reports to the steering group on its results and gives recommendations for further action and advises the steering group on decisions.

2.3 Process and Methodology

The MM concept at RheinMain University focuses on the optimization of service-trips and the commutes of employees and students. The fundamental base of the MM process constitutes in a sound analysis of the actual mobility needs and demands of employees and students. Therefore the mobility management process is divided into two phases:

- Phase 1 includes all steps needed to design and articulate an MM plan
- Phase 2 includes the implementation of measures and their evaluation

This report describes the ongoing project in Phase 1 that consists of the following tasks that have already been implemented to a large extent:

- a) **Mobility survey of employees and students:**
Based on a quantitative mobility survey, the demand for mobility and the mobility behavior of university members were analyzed. In addition to general indicators such as use of transport or existing mobility resources, current and future mobility needs and mode shift potentials were identified. Based on the results of the mobility survey, it was possible to derive traffic-related emissions which are a key aspect for the evaluation of measures.
- b) **Analysis of spatial and traffic structural conditions at the individual locations:**
To derive adequate statements on mobility behavior of employees and students, it is necessary to examine local framework conditions, such as the location within the urban context, existing transport services, connection qualities and other university-specific characteristics.
- c) **Analysis of the residential location of employees and students:**
The analysis of the residential location will be conducted from the mobility survey and verified by administrative data.
- d) **Development of a MM concept:**
Based on the analysis of the mobility needs, a multi-modal concept for RheinMain University is developed. In addition to concrete bundles of measures to improve the mobility of students and employees, the mobility concept defines the goals of the mobility management concept and associated measures in regard to evaluation.

3 Mobility Survey of employees and students

In 2017, the mobility behavior of employees and students was observed through quantitative mobility surveys. The surveys were focused on mobility behavior and mobility needs but also comprised personal reasons for choosing the specific means of transport and the theoretic willingness to use other modes and retrieved corresponding data on residential details and socio-demographic characteristics. In the light of the current structural and organizational plans to centralize the campus locations, the presented data shows the findings at the main campus location. It should be emphasized that the results of the mobility survey must be interpreted in a broader context. The choice of transport is usually not based on a solitary parameter: For instance, car use is not solely based on pleasant parking conditions or shorter travel times. Intrinsic factors and personal behavior routines as well as the lack of alternative mobility options also play a crucial role for transport choices. The survey response rates were 60 % for employees (n = 118) and 16 % for students (n = 401).

The analyses of mobility behavior have shown that motorized individual traffic is by far the most popular transport mode for commuting employees, Figure 2. While more than 70 % use their personal car on a daily basis, only 10 % of employees commute by public transport.

Among students other trends are noted: The public transport share amounts to 44 % and motorized individual traffic to 23 % of commutes. The differences in the choice of transport modes suggest that certain structural and resource relating conditions may lead to different behaviors. Regarding to RheinMain University, it can be stated that factors such as available mobility resources (e.g. free public transport for students, free parking on-site), exposable income, distance from the place of residence and the location of the university favor specific mobility behaviors.

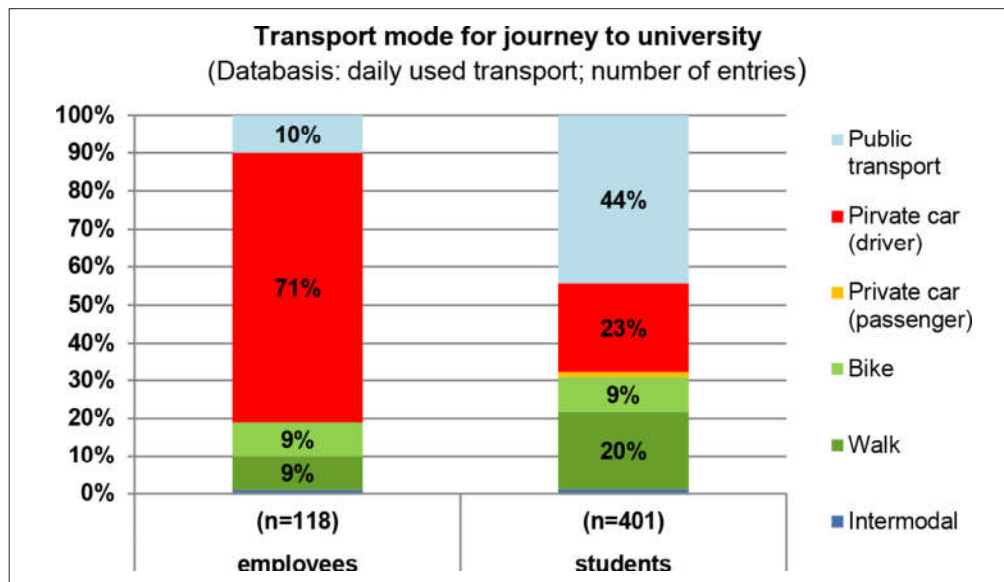


Figure 2 Transport mode for journey to university (databasis: Mobility survey at RheinMain University 2017)

To derive reliable statements for mode shift potentials, the personal reasons for car use were retrieved. Figure 3 shows that nearly 75 % of car users state that their travel times with public transport were too long. 55 % of car users state that they need their car for other activities immediately before or after work. 40 % of the respondents say that they use their car because it was too expensive to use public transport. The results show that the main reasons for car use are external characteristics of public transport and the personal and residential car-dependence. Intrinsic factors such as convenience (26 %) also play a significant role should be addressed in the concept design.

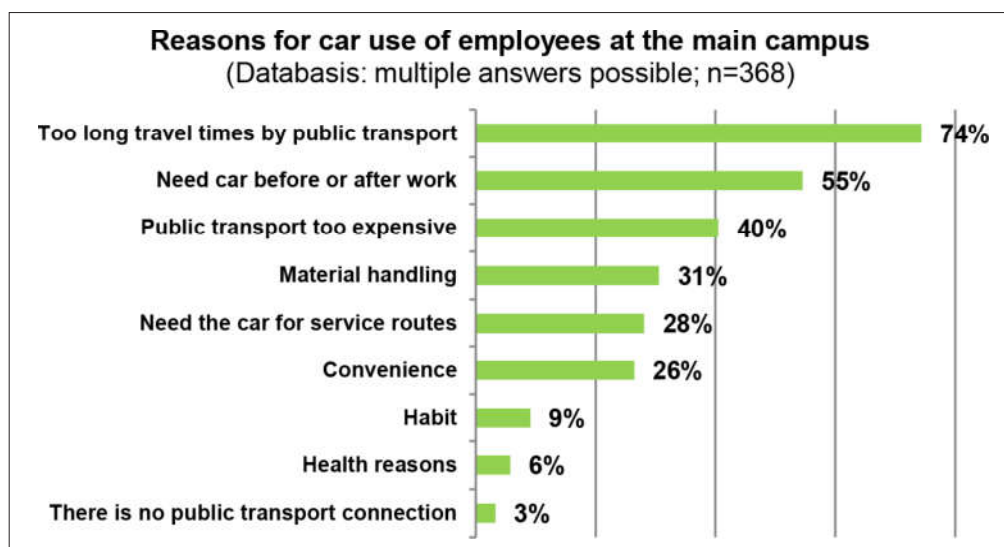


Figure 3 Reasons for car use of employees at the main campus (databasis: Mobility survey at RheinMain University 2017)

The willingness to use alternative modes is in addition to the reasons for choosing a certain mode of transport indicates important matters for mobility management concepts. The results of the mobility survey suggest that most participants are theoretically willing to use more environmentally friendly modes of transport, Figure 4. More than 50 % of users consider commuting by public transport or bicycle. More than one third of the employees would be willing to carpool.

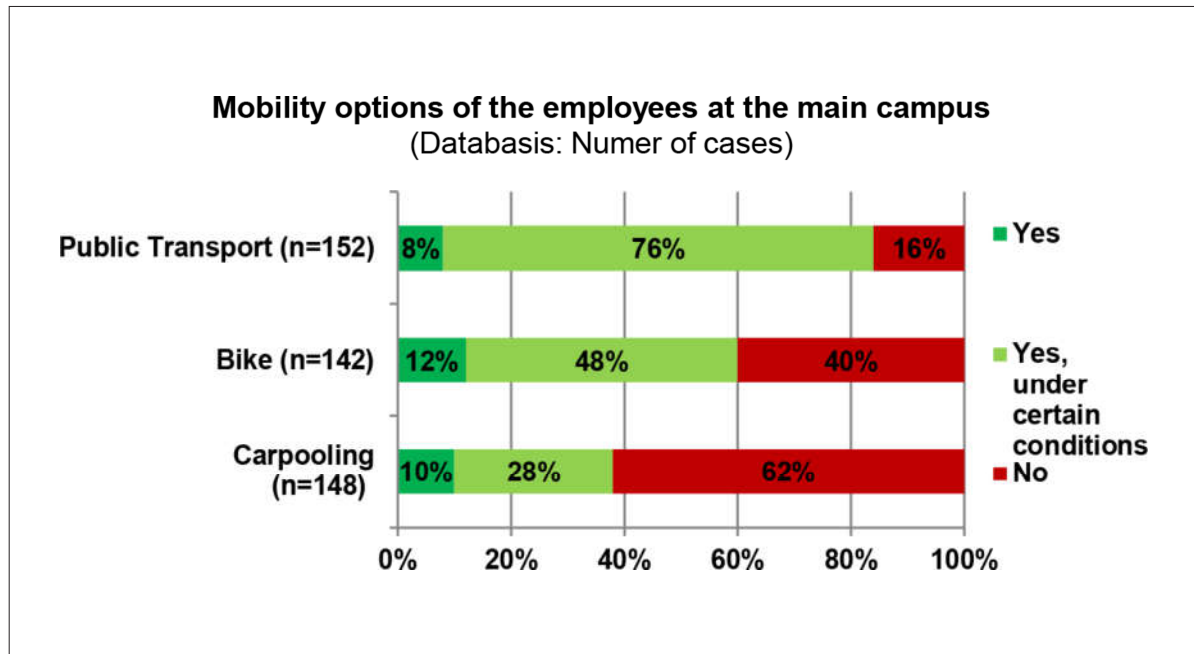


Figure 4 Mobility options of the employees at the main campus databasis: Mobility survey at RheinMain University 2017)

4 Discussion and outlook

The following section presents possible MM measures , discusses critical success factors and and gives an outlook on forthcoming developments at RheinMain University’s MM process.

4.1 Possible measures

Based on the mobility survey and the experience with other comparable MM processes, a variety of different infrastructural and organizational measures to achieve the MM goals at RheinMain University can be developed and proposed. The implementation of these measures highly depends on various internal and external factors, which can only be influenced to a limited extent within the MM process. In the following some possible measures are presented:

- **Strategic integration into planning processes**
Wherever important strategic decisions on city-wide transport planning are made, the university should be heard as an important actor and integrated into the planning process. For this purpose, the university has to provide adequate human resources in the administration.
- **Improvement of public transport**
The timetable of public transport services must be directly geared to the demand of employees and students and be based on the average working hours of the employees and on the students’ lectures. The services must be expanded during peak hours. Direct connections to the main station and other relevant transfer points without time-consuming detours through the city-centre must be implemented.

- **Direct connection to the planned tramway**
The city of Wiesbaden is currently planning the implementation of a new tramway system (“Citybahn”). For the University a direct connection of the main campus to the new tram network is highly favourable. Therefore, the planning process must be critically accompanied and actively supported.
- **Implementation of multimodal services**
To expand mobility services, bike sharing and car-sharing services for employees will be implemented directly on-site. The existing offers for students are to be expanded.
- **Improvement of bicycle infrastructure**
To increase the use of bicycles, the university must be connected to a city-wide network of cycle paths and signposted accordingly. Direct access to the campus must be barrier-free. Parking facilities for bicycles must be convenient, safe and rain-covered. Additionally, facilities for changing and showers should be offered. In addition, a well-equipped bicycle workshop and access to utensils such as bicycle pumps or tools are recommended.
- **Parking Management**
For the efficient use of available parking space and for the effective regulation of car traffic, parking space must be actively monitored, managed and effectively priced for both employees and students.
- **Carpooling**
To reduce the number of cars and the demand for parking space, carpooling to increase the occupancy rate should be increased. An internal platform can help to connect and coordinate employees and students from the same places of origin. Where sufficient public transport is missing, joint car rides should receive special privileges (eg. exemption / reduction of parking fees).

Other possible measures could embrace the implementation of charging infrastructure for electric vehicles and active business travel and fleet management.

4.2 Critical success factors

From the early-stage experiences at RheinMain University and other experiences with similar MM processes at other universities (e.g.. TU Darmstadt, RWTH Aachen, Ruhr-University Bochum), the following critical success factors can be derived:

- The project should be initiated and directed directly by the President or comparable high-level executives to represent the overall importance of the project and to guarantee a high level of realization.
- Crucial for the acceptance of the project and its results within the organization is the early-stage and continuous participation of all relevant stakeholders and peer groups throughout the process.
- Especially with personal habits and privileges affected, an open process and transparent communication must be advocated to enable and secure the necessary support throughout the organization.
- Furthermore, public planning institutions and transport operators must be proactively integrated into the process: On the one hand the quality of public transport services is the basis for the success of an MM concept and must be promoted adequately. On the other hand, the traffic effects to be expected from MM at large traffic generators should be discussed with the responsible authorities at an early stage.
- The project should be supervised professionally, ideally by existing technical capacities within the university. However, depending on the nature and extent of the tasks as well as the internal resources available, external technical support is necessary, e.g. to develop detailed concepts for individual measures.

4.3 Outlook

This report documents the temporary results of the ongoing MM process at RheinMain University. Based on the results so far, concrete measures will be developed in the next phase of the project. The subsequent implementation of these measures will be progressively advanced and their effectiveness continuously evaluated.

At an early stage of the MM process, for example, the wish for an integrated public transport ticket for employees was articulated and appropriate implementation strategies were developed. In 2018, however, the so-called “Landesticket” was introduced at short notice, with which all employees of the state of Hesse (incl. universities) can use public transport free of charge throughout the state. Thereby the measures and strategies developed so far have become obsolete. This field trial will initially last one year and will then be evaluated. If the field trial will be extended is not yet certain and, in addition to a positive evaluation result, also depends on the outcome of the upcoming state elections and the new political agenda of the new government.

This example clearly shows that potential effects from internal and external developments must be constantly integrated into the process and, if necessary, the process and the measures developed must be adapted accordingly.

The process, which is now being pursued, gradually leads to local transport planning being geared to the mobility needs of university students and staff, while at the same time allowing the university to realize its strategic development goals at the main campus. In the medium term, the mobility needs of students and staff will be met more efficiently and sustainably, thereby increasing and consolidating the accessibility and attractiveness of the university as an employer and place of study in the long term. In conclusion, MM will be a significant cornerstone for the further strategic and structural development of the university.

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