
Kurzfassung der Studienarbeit

Name: Britta Merklingshaus

Thema: A Concept for a Bus Rapid Transit between Noi Bai International Airport and the City Centre of Hanoi

Betreuer: Prof. Dr.-Ing. Manfred Boltze
Dr.-Ing. Khuat Viet Hung
Dipl.-Ing. Wolfgang Kittler

The Noi Bai International Airport (NBIA) in the north of Hanoi is the second biggest airport in Vietnam, a socialist republic with a population of around 85.3 million inhabitants. Along with the fast economic growth of this developing country, comes an increasing quantity of air-passengers leading to an increasing demand along the corridor between NBIA and the city centre of Hanoi. Currently, only two regular bus lines (bus line no. 7 and no. 17) connect the airport with the local public transport of Hanoi. As the result of an extremely high travel demand of non-air-transport passengers, these buses are prevalently overcrowded which makes it unattractive for air-passengers to use the public transport service.

This student research project aims at the improvement of the connection between NBIA and the city centre of Hanoi with public transport. The main objective is the development of a concept for a Bus Rapid Transport (BRT) that connects the airport with the urban core of Hanoi taking into account the feasibility of the concept and its impacts.

The first part of this thesis deals with public transport in developing countries. The current state of public transport services in developing cities often does little to serve the actual mobility needs of the population. However, people have to fulfil their daily mobility needs and the existing public transport facilities are not adequate, both in quality and quantity, to fulfil the demand. BRT is considered as a suitable system to solve this problem, because it can be implemented at relatively lower cost and with lower technology compared to other mass rapid transit (MRT) systems. The concept combines stations, vehicles, planning, and intelligent transport system elements into an integrated system with a unique identity. BRT has the potential to significantly reduce transportation problems such as congestion, safety, air quality, and fuel consumption. Three case studies of successfully implemented BRT systems are presented. One can be seen as the best-in-class system, whereas the other two have been chosen due to their similar conditions to Hanoi regarding urban structure, density, income, and motorcycle usage.

In order to get familiar with the background of this thesis, general information of Hanoi is outlined including the physical settings, land use, population, and socio-economic conditions. Furthermore, Hanoi's transport infrastructure and its transport system are closely described. This part rounds off with general information about the Noi Bai International Airport and a forecast of air-transport in Vietnam.

For the purpose of identifying deficiencies of the current connection between NBIA and the city centre of Hanoi, a system of objectives will be developed that gives an idea of the requirements for BRT. The primary objective "to provide a high-quality bus-based transit system that delivers fast, comfortable, safe, environmentally friendly, and cost-effective urban mobility" is derived from the definition of BRT. Further

objectives on the secondary and tertiary level will be identified that describe the primary objective more detailed. For each of the identified objectives several criteria can be found.

In a next step the actual state of the current connection between NBIA and the city centre of Hanoi is examined including the regular bus service, offered shuttle minibuses, and taxis. In order to find out more about the actual access and egress modes to NBIA, an airport user survey for airport passengers and airport employees was conducted. Besides obtaining information about the general conditions of public transport as access and egress mode to the airport, the objective of the survey is to find out which transport modes are mainly used to get to the airport and to learn something about how people assess their used transport mode regarding certain criteria. Furthermore, the airport users' opinion about a possible BRT connection between the city centre of Hanoi and NBIA is of interest. The analysed results of the questionnaire will show, that taxi is the mainly used egress / access mode for air-passengers while the majority of the airport employees use the regular bus service.

In order to identify deficiencies of the current connection with public transport, the different modes are analysed and assessed according to the criteria of the system of objectives. The assessment of bus line no. 7 and 17 revealed deficiencies of different degrees. Some of them have the potential to be reduced while others must be accepted as unavoidable characteristics of the regular bus service.

The last part of the thesis deals with the improvement of the connection between NBIA and the city centre of Hanoi. Even though the focus lays on the improvement through the development of a concept for a BRT, measures to improve the existent regular bus service are introduced in the first step since a BRT system cannot be realised overnight. These improvements include trivial but crucial measures, such as signposting of the bus stop at NBIA, the implementation of an official bus stop, and the provision of necessary passenger information. Furthermore, an express bus is proposed in order to increase the attractiveness for passengers, especially the air-passengers and employees, who want to get directly from the city centre of Hanoi to NBIA (or otherwise). Those measures can be accomplished in the short-term (0 to 1 year) and have the potential to reduce some of the current deficiencies.

In the next step, measures to implement BRT in Hanoi will be discussed. These measures are derived from the main features of BRT and can be classified into four different groups, namely "operation", "infrastructure", "technology", and "customer service". The majority of these discussed BRT-measures can be realised in the mid-term (3 to 5 years) whereas the realisation of some measures is only manageable in the long-term (more than 10 years).

Based on the short-, mid- and long-term measures three different time-dependent scenarios will be derived. Scenario I (improvement of the existing bus connection) includes all short-term measures and focuses on a near-time feasible improvement of the crucial deficiencies. Scenario II (implementation of a BRT service) implies all short- and mid-term measures and covers all fundamental features of BRT. On this basis Scenario III (implementation of an enhanced BRT service) summarises all identified measures including the long-term measure which cannot be realised in the mid-term due to the lack of appropriate conditions.

In order to assess the developed scenarios for an improved connection between NBIA and the city centre of Hanoi, the system of objectives that has been developed will again be used. Thereby, the system of objectives helps to evaluate every scenario in detail and permits a ranking between the alternatives.

Scenario I already improves the existing situation (“0-scenario”) significantly. Thus, it is recommended to implement these relatively low cost measures instantly in order to improve the currently unsatisfactory connection between NBIA and the city centre of Hanoi.

A further remarkable step to achieve a sustainable and high quality public transport system can be achieved by implementing Scenario II, which forms the basis for cost-effective urban mobility through BRT with excellence in customer service. Due to the high improvement compared to the current situation as well as to Scenario I, it is highly recommended to implement the BRT system with the measures proposed in Scenario II.

Due to the little further achievable improvement of Scenario III compared to Scenario II, and the high additional costs for the long-term measures, the cost-benefit ratio is assumed to be very high for only one single BRT-line. Thus, it is not recommended to realise these measures for an enhanced BRT system with only one line. This appraisal should be reconsidered in case of the implementation of a whole BRT-network in Hanoi.

Finally, the general impacts of the implementation of Scenario II on traffic, social aspects, environment and economy are outlined in a qualitative manner.

The implementation of the recommended BRT system will most likely attract more people to shift from private vehicles to the public transport. However, the effects and impacts of one single BRT line are limited and do not tap the full potential of BRT as sustainable public transport system. Thus, in a further step the development of a whole BRT network should be considered, that has the potential to form the backbone of urban transportation in Hanoi.

Britta Merklingshaus

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