Infrastructure Management in due Consideration of the Operating Cost of the Material Infrastructure

Name: Julia Osterried  
E-Mail: j.osterried@tum.de  
Supervisor: Prof. Dr.-Ing. Josef Zimmermann  
Chair of Construction Management and Real Estate Development  
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Motivation
Sustainable transportation infrastructure is fundamental for a well-functioning economy. Infrastructure management requires knowledge of the investment and operating costs of infrastructure objects over its total life cycle. Currently, there is no efficient and integrated infrastructure management in Germany.

State of research
The objects of the transportation infrastructure e.g. roads, bridges and tunnels are understood as real estate properties. The different properties of the transportation infrastructure are standardized based on given standard structures, where individual real estate components are grouped and treated as one structure. Within each standard structure the components are assigned their corresponding cost characteristics.

The operating stage of real estate properties can be distinguished into the object and the functional operation. Object operation refers to all operating services within the scope of managing and financing the object, while functional operation comprises the business processes of the user. The documentation of operating costs of real estate properties varies with the operating agencies of the transportation infrastructure. Although regulations have provided a general basis for documenting the operating cost of roads, no standardized system for recording and further processing is mandatory. Thus, there is no adequate cost accounting system. This means in particular, that the necessary processes of cost management are not available.

In order to assess the given situation, the cost per valuation kilometre of services respectively activities in the functional operation of road maintenance for a
The normalized costs of an activity during operation vary from agency to agency in the same federal state. The position and the behaviour of costs depend on several structural factors. Examples for cost drivers are economies of scale, learning or location.

Approach of research
The required activities of the functional operation are acquired empirically. On this basis, a general system of cost accounting will be developed to monitor and record the costs of the operating activities of transportation infrastructure during its operation. This requires a definition of cost elements, cost centres and cost objects for roads, bridges and tunnels. The costs of the defined activities are collected from existing objects if available or otherwise deduced theoretically. As a next step, cost drivers will be qualified and quantified. Taking account of specific cost drivers, cost parameters of activities for transportation infrastructure are thus determined of the functional operation in the operating stage. Finally, these determined costs are integrated to the developed cost accounting structure.

Objective of research
Based on standard structures, a model is to be developed to systematically record, classify, analyse, summarize, allocate and forecast operating costs for transportation infrastructure objects. This data can be provided forming the basis for planning, controlling and coordinating the functional operation. Applicable in early project phases, the obtained information can be used for forecasting costs of future projects of the transportation infrastructure. Thus, based on the existing stock, it will be possible to determine an appropriate budget of operating costs for roads, bridges and tunnels of the transportation infrastructure as part of infrastructure management.

References

Zimmermann, Josef; Osterried, Julia; et. al.: Infrastrukturmanagement unter besonderer Berücksichtigung der Investitions- und Betriebskosten in der Betriebsphase. Forschungsbericht am Lehrstuhl für Bauprozessmanagement und Immobilienentwicklung an der Technischen Universität München 2017.


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