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Requirements for a Lifecycle
Management of Public Real Estates
Focusing on Higher Education Institutes
in Germany

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ABSTRACT

German research facilities and higher education institutes (universities and colleges) are currently facing numerous legal, organisational and economic changes. Additionally, the competition for financial resources and outstanding students is increasing. The cumulated demand of necessary maintenance, reconstruction and intended building projects in particular has led to the awareness for the need of a value-oriented lifecycle management. It is therefore the aim of the paper to identify forms of best practice property management for an efficient lifecycle management.

One possible way to establish a real estate lifecycle management is by applying the procurement model of public private partnership (PPP). With PPP a private partner takes over the design, the construction, the finance and the operations of a public building or infrastructure for a long period contract. Because of this long-term bundling of responsibility, sufficient incentives remain for optimizing lifecycle costing. In Germany, there is almost no practical experience with PPP in the university and research institutes sector.

The aim of the paper is to show the potentials and barriers of PPP for universities and research institutes. The paper investigates a set of specific success metrics and suggests a PPP screening test. The test is based on a literature review, experts' opinions and 13 examined model projects.

Notwithstanding, the crucial basis for any lifecycle management is detailed building and operational data. The paper will discuss a data structure model which contains the crucial data elements needed to support a cost analysis and reasoned decisions for a lifecycle management.

KEY WORDS

Public private partnership, lifecycle costs, lifecycle management, public real estates, university, research institutes

INTRODUCTION

The quality of education has a great impact to the social and economic development of a country. In recent years, there has been an increasing required capital investment in the higher education sector in Germany. This is due to the increasing number of students from today 1.97 million students (Statistisches Bundesamt, 2007) to a projected 2.7 million in 2012/14 (Kultusministerkonferenz, 2005), the implementation of bachelor and master studies and the changing demand over long time period. In addition, the higher education sector suffers from a backlog demand of necessary maintenance and reconstruction as well as intended building projects. Because the competition of the financial resources is increasing, the allocation of resources has to be more efficient.

In particular the increased demand of necessary maintenance, reconstruction and intended building projects led to the awareness for the need of value-oriented lifecycle management. It is therefore the aim of the paper to identify forms of best practice property management for an efficient lifecycle management.

One possible way to establish real estate lifecycle management is by applying the procurement model of public private partnership (PPP). With PPP, a private partner takes over the design, the construction, the finance and the operation of a public building or infrastructure for a long period of contract. Because of these long-term bundling of responsibility, sufficient incentives remain for optimizing lifecycle costing.

In Germany, there is almost no practical experience with PPP in the university and research institutes sector. The aim of the paper is to show the potentials and barriers of PPP for universities and research institutes.

Notwithstanding, the essential basis for any lifecycle management are detailed building and operational data. The paper discusses a data structure model which contains the crucial data elements needed to support a cost analysis and reasoned decisions for a lifecycle management.

RESEARCH METHODOLOGY

The paper is based on the research project "Lifecycle Management of Public Estate with a Focus on Universities and Research Institutes" ("Lebenszyklusorientiertes Management öffentlicher Immobilien am Beispiel von Hochschulen und Wissenschaftseinrichtungen" [LEMA]) of the Bauhaus-Universität Weimar in cooperation Hochschul-Informations-System GmbH (HIS) (cp. Alfen, Fischer, Schwanck, et. al. 2008).

The research is based on theoretical examination and scientific backing of a changing-process. The research is divided into two categories: analysis and the ascertainment of the solutions and studies three major aspects:

Part 1 gives a specific overview of the real estate portfolio of universities and research facilities. This part investigates the legal framework and the financial and organisational structure of property management of universities and research facilities.

Part 2 is based on the 1st part and concentrates on PPP projects. Potentials and barriers of PPP for universities and research institutes are shown. The investigation includes a set of specific success metrics and a PPP screening test which is based on a literature review, expert opinions and 13 examined model projects in Germany (see following Table 1).

institution	federal state	projects	description
Rheinisch-Westfälische Technische Hochschule Aachen	North Rhine-Westphalia	building for an institute	complex of new buildings
Humboldt-Universität zu Berlin	Berlin	1. building for an institute; 2. building for an institute and lecture rooms	1. rehabilitation / modification; 2. rehabilitation / modification; both are single buildings
Ruhr-Universität Bochum	North Rhine-Westphalia	Centre with seminar rooms, stores and childcare	new single building
Rheinische Friedrich-Wilhelms-Universität Bonn	North Rhine-Westphalia	experimental stations	complex of buildings; new buildings and rehabilitation / modification of buildings
Georg-August-Universität Göttingen	Lower Saxony	computer centre	rehabilitation / modification / extension of a single building
Ernst-Moritz-Arndt-Universität Greifswald	Mecklenburg-Western Pomerania	canteen	new single building
Universität Hildesheim	Lower Saxony	building for an institute	new single building
Hochschule für Film und Fernsehen „Konrad Wolf“ Potsdam	Brandenburg	canteen	new single building
Fachhochschule Schmalkalden	Thuringia	building for an institute and administration	rehabilitation / modification of a single building
Universität Stuttgart	Baden-Wuerttemberg	building for an institute	new single building
Bauhaus-Universität Weimar	Thuringia	building for an institute and administration	complex of buildings; new buildings and rehabilitation / modification of buildings
Studentenwerk Thüringen	Thuringia	canteen	rehabilitation / modification of a single building

Table 1: Real Estate Portfolio of Higher Education and Research Facilities

(Alfen, Fischer, Schwanck, et. al., 2008, p. 133)

Part 3 discusses a data structure model which contains the crucial data elements needed to support a cost analysis and well thought-out decisions for a lifecycle management.

Along the research process a number of interviews and workshops were held with representatives of higher education institutes, research facilities, student unions and delegates from state and federal administrative bodies as well.

FINDINGS

To establish the lifecycle management in the management of public estates and thus the higher education, it is important to note that the implementation depends first of all on the political, legal, organisational and economic framework.

The specifics of the property management of the higher education sector in Germany therefore have to be analysed. This has led to the perception that the sector's estates are highly heterogeneous, the following scheme summarises the variety of building types:

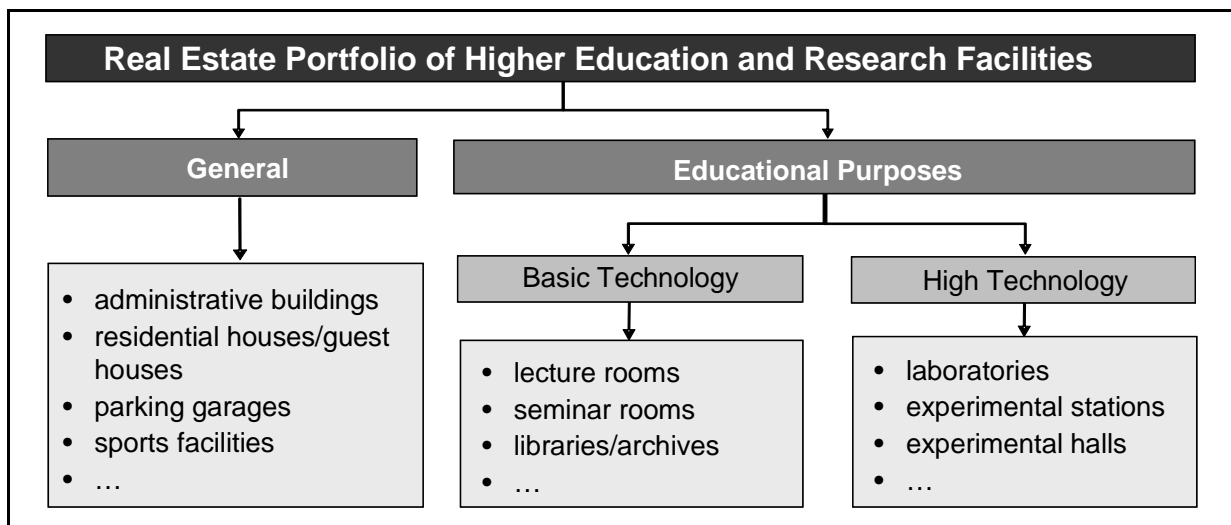


Figure 1: Real Estate Portfolio of Higher Education and Research Facilities
(Alfen, Fischer, Schwanck, et. al. 2008, p. 15)

For the purpose of the intended classification of PPP projects, the portfolio of higher education estates were clustered. Several distinctive features between the estates and between the PPP projects were chosen:

- the level of technology (from low to high),
- the type of PPP project (construction or reconstruction),
- the project's scope (single building or portfolio) and
- the property location (distributed or concentrated location).

The following figure shows the clustering:

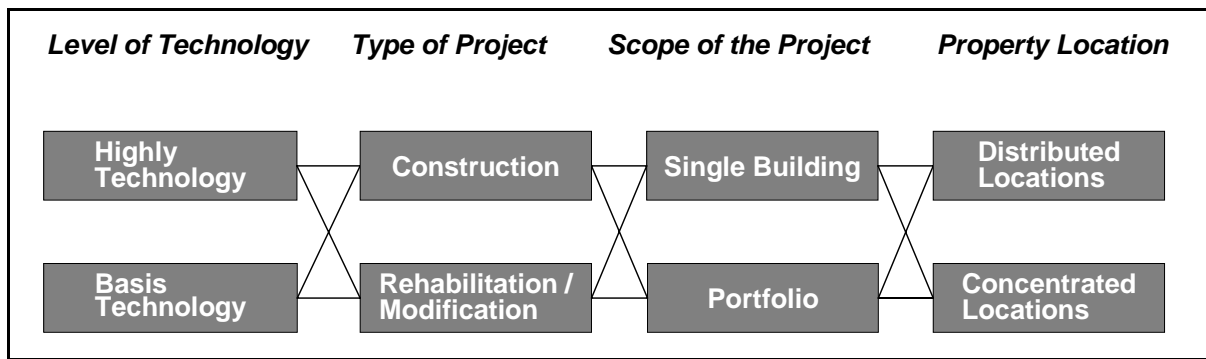


Figure 2: Clustering

(cp. Alfen, Fischer, Schwanck, et. al. 2008, pp. 19-21)

The higher education sector is regulated by a number of state and federal laws. However, with the withdrawal of the state from higher education policy, a transformation process has begun, implying amendments of state laws as well as subsequent changes of federal higher education laws. Altogether, these legal actions aim at strengthening responsibility and funding of the federal states. As a consequence, a small number of higher education institutions have been granted more or less extensive autonomy. The degree of economic and legal autonomy depends on the regulatory changes which vary from transfer of owner responsibility to - in a few cases - the shift of property ownership to universities and colleges combined with the transfer of related construction personnel and budget.

The table below shows the current estate management models in the German higher education sector:

Model	Estate Management	Planning & Construction	Maintenance	Operation	Distribution Federal States*
1	State Company	State Company	State Company	State Company	1
2	State Company	State Company	State Company	University	6
3	State Department	State Company	State Company	University	2
4	University	State Company	State Company	University	6
5	University	State Company	University	University	2
6	University	University	University	University	4

* Total of federal states more than 16, due to parallel estate management systems within one state

Table 2: Distribution Estate Management Models within Federal States
(Alfen, Fischer, Schwanck, et. al. 2008, p. 98)

The assessment of the current estate management models in Germany shows that it is essential for a lifecycle management that one responsible body is in charge of design, construction and operation of the real estate. This is only possible if

- the institution (university, college or research facility),
- a state company for real estate management or
- a higher education real estate company

takes over the complete property management including planning, construction, maintenance and possibly the utilisation. The whole process has to be centralised and the institution or company has to get the legal and economic responsibility for all parts of the process. The following figure summarises the suitability and the advantages of the three possible forms of organisation.

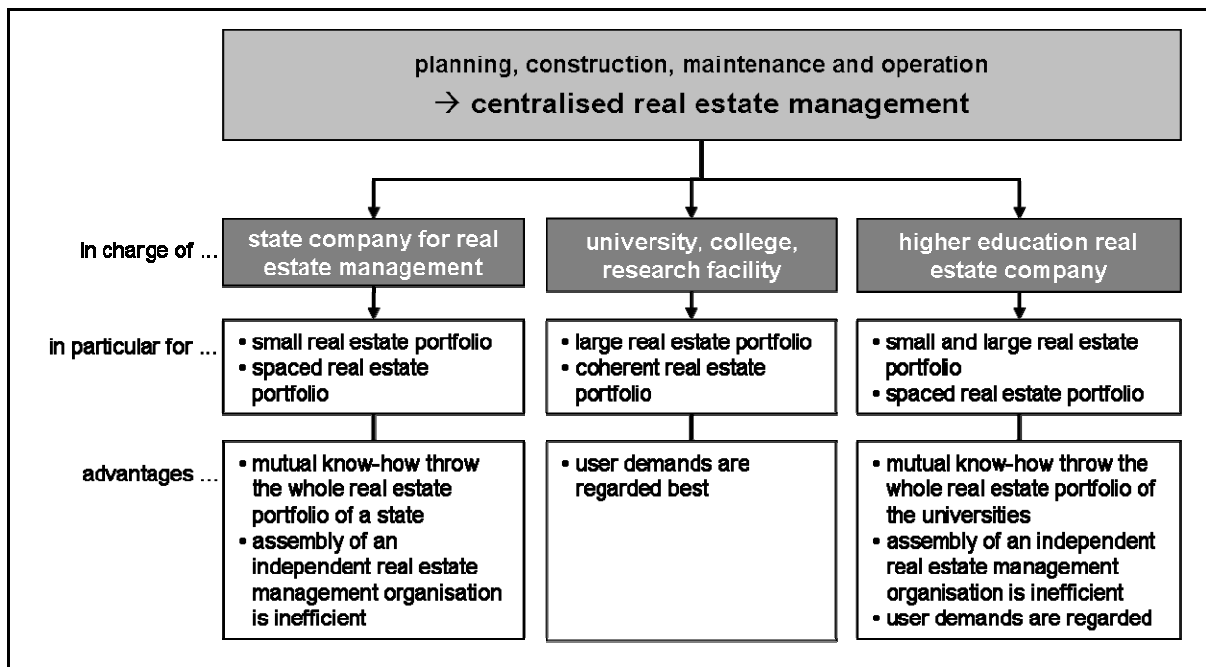


Figure 3: Recommendations of a Centralised Organizing Model of Real Estate Management

As presented in Table 2, such a complex centralised management model (see Figure 3) is realised in just few cases. One example exists for some universities and colleges in the state of Baden-Wuerttemberg where a state company is in charge of the whole property management including planning, construction, maintenance and operation. Merely four states have allowed higher education institutions full autonomy over their estates' lifecycle. But even in these partly time-restricted pilot schemes the institutions remain dependent on state funding.

Changing the organisation of the real estate management system in such a considerable way and establishing a well performing lifecycle management will be probably a slow process due to conflicts of interests between the involved groups and the necessity of personnel changes.

With public private partnership, there exists a further procurement method for universities and research facilities – as for the total public real estate portfolio – to establish a real estate lifecycle management. The private partner takes over planning, financing, construction, maintenance and operation and in some cases utilisation. PPP usually represents a 20 to 30 years agreement between private enterprise and the state. Because of the long-term bundling of responsibility, sufficient incentives exist for optimizing lifecycle costing. In contrast to Germany, analysis has displayed a significant number of international PPP projects in higher

education sectors, especially in the United Kingdom. Those examples show that the specifics of higher education institutes are not a barrier for PPP projects.

country	city, region	name of the project	size of the project / amount of actions	part of the contract	contract period [years]	volume of the project [€]	date of commission
Australia	Brisbane, Queensland	Southbank EPIcentre (Education Precinct International)	whole campus, new buildings / rehabilitations and modifications	design, build, finance, operate	30	330 m	as of 2005 (part of the campus), whole project not finished yet
Austria	Vienna	Vienna Biocenter 2	single building for laboratories and offices, part of the portfolio	design, build, finance, operate		12 m	2004
Ireland	Ringaskiddy, Cork Harbour	National Maritime College	new college	design, build, finance, facility management	25	52 m	2004
Ireland	Cork	Cork School of Music (CSM)	new college	design, build, finance, facility management	25	210 m	2007
United Kingdom	Hatfield, Hertfordshire	University of Hertfordshire, Havilland Campus	new dormitory and sports and leisure facilities	design, build, finance, operate	30	167 m	2003
United Kingdom	Manchester	The Royal Northern College of Music (RNCM)	new dormitory with subterranean garage	design, build, finance, operate	30	30 m	2001
United Kingdom	Manchester, Metropolitan County Greater Manchester	Wright Robinson Sports College Manchester	new whole campus	design, build, finance, operate	25	170 m	2007
United Kingdom	Teddington, Middlesex	National Physical Laboratory	whole complex of buildings, new buildings / rehabilitations and modifications	design, build, finance, operate	25	141 m	1988
United Kingdom	Shrivenham, Oxfordshire	Joint Services Command and Staff College (JSCSC)	new whole campus	design, build, finance, operate	30	285 m	2000

Table 3: Examples of international PPP-projects (contract signed)
(cp. Alfen, Fischer, Schwanck, et. al., 2008, pp. 113-119)

To establish PPP as a possible realisation model for higher education institutes in Germany, it is necessary to mind the specifics for universities and research facilities. For this purpose, a specific PPP screening test for universities and research facilities has been developed in the research project to evaluate in an early stage the potential of advantages of PPP. In order to assess the applicability of PPP for different kinds of project, a set of 51 questions was developed based on literature review and expert opinions. Project characteristics will differ by their legal,

financial and organisational environment, which can indeed be very different. Such a specific assembled checklist will help collect all requisite information completely and in a classified order which consists of the following parts:

1. Project characteristics,
2. Legal, financial and organisational framework and
3. Project specific parameters.

The screening test involved the criteria given below (following Alfen, Fischer, 2006, p. 20)

1. common criteria:
 - financial feasibility,
 - legal feasibility,
 - project classification within portfolio,
2. specific criteria of a project:
 - scope and elements of service,
 - project volume,
 - market interest,
 - payment mechanisms and
 - risk distribution.

Financial feasibility, legal feasibility and project classification within portfolio are general criteria. If the tests of those criteria have a negative result, the whole project should not be realised as PPP – those criteria are exclusion criteria.

Specific criteria of a project are the scope and elements of service, the project volume, the market interest, the payment mechanisms and the risk distribution. Potential for more efficiency of a PPP project results from these factors.

After the PPP screening test was completed for all of the 13 model projects, the results were presented and handed over to the respective higher education institution. With these results, a first qualitative assessment of the projects' PPP feasibility was carried through and this presumably enables the higher education institutions to screen future projects themselves.

Besides its use as a PPP feasibility check, the screening test was found to have additional benefits as well:

- it serves as a project designing instrument,
- it reveals inherent need for action,
- it may be useful for necessary political alterations,
- it leads to an advance in knowledge by all closely and loosely involved project participants.

For the majority of the examined projects, PPP feasibility has been ascertained, although with the limitation of financial feasibility, due to the lack of funding commitment by federal state departments. Two out of thirteen cases were not proven PPP qualified. Here, restrictive project specific circumstances such as being protected as a historic building (a monument) were detected as obstructive factors which likely would reduce the scope for innovative market solutions and thus the chances for efficiency gains throughout the lifecycle of the higher education estates.

The subsequent evaluation of the different contracting models has shown that, in the majority of the examined cases, the DBFO (Design Build Finance Operate) type of PPP model where the construction and operation are procured by the private sector, but where the property ownership remains public, is widely applicable by the higher education institutions.

The result of the projects' analysis is that PPP is one possible approach to establish a lifecycle estate management in the higher education sector, where public decision makers can learn from private sector participants. It is also important to note that, leaving the current regulatory restrictions aside, a considerable potential for PPP in the German higher education sector has been identified. In view of the preliminary national and international experiences with PPP in the school sector, an increase of efficiency and effectiveness in the higher education property management may tentatively be presumed.

Notwithstanding, the crucial basis for further planning of the evaluated higher education projects is detailed building- and user-specific data which allows both the public entity and the private bidders a long-term cash flow forecast by calculating the public sector comparator (PSC) and value for money. This precondition of documented lifecycle costs was not found in any of the evaluated projects. On the contrary, most of the participating universities and colleges possess only highly fragmented construction and operation data of their portfolio due to the conventionally split responsibility for delivery and maintenance of higher education buildings.

The aim of structuring building data with the focus on lifecycle management is analysis and interpretation. In particular for the planning of new buildings, objective databases are necessary to calculate realistic investment volume and follow-up costs. Concerning the utilisation of the building, the data model should be the basis for a benchmarking pool. To get meaningful results, the data model has to be up to date, correct and comprehensive. A small structure and no redundancies will support those requirements. The necessary data structure could split up into two categories:

- the master files of the building: location, user, facilities, utilisation, category of the building, condition of the fabric of the building, level of technology, available space, etc. and
- the financial data according to DIN 276 and DIN 18960 resp. DIN 32736 (incl. consumption data).

All in all, the collection of qualitative and quantitative data of lifecycle costs is not only essential for decisions on the type of procurement (and hence for the implementation of PPP), but also builds the foundation for lifecycle estate management in the higher education sector.

CONCLUSIONS AND DISCUSSION

As in other sectors of public real estate (for example schools or administration buildings), PPP is one possible lifecycle oriented method for the procurement of buildings of universities and research institutes to attain economic benefit. Characteristics of such partnership agreements of public and private partners are sharing of responsibilities, tasks and risks. Additionally, the characteristic of PPP are incentive pattern for the private partner to abide by the agreement. The attention and integration of the lifecycle management and the description of output specification effect innovation potential of the private partner. Those are the aspects are more advantageous for projects when compared to conventional procurement.

The analysis has shown that there is a need to change the regulations and organisational structures in the higher education institutes in Germany. Universities themselves should have the right to decide on the allocation of financial resources, act in a self-supporting manner and allocate their spending according to their needs. If a more economic real estate management is desired by politicians, universities and research facilities should decide by

themselves how they can reach the best outcome for their institution including how they manage their real estate portfolio.

In summary, the questionnaire has been a very useful tool in evaluating the characteristics of the projects. The questionnaire needs to be amended only on a small number of points and shall be developed further as a guidance tool. If positive experiences will grow in this sector, PPP could get a powerful alternative procurement version.

At the moment, there are few projects in Germany – for example Hamburg “Hafen City” and Bochum “Seminarraumzentrum West” – in an advanced state of PPP-project development. This shows that the interest to PPP procurement is growing even with difficulties at the legal framework. But still, the legal framework has to be improved to establish PPP as an alternative realisable procurement for universities, colleges and research facilities.

Additionally, the information about the functionality of the PPP procurement route has to be improved as well. If those institutes stick to old prejudices and are unaware of the possible advantages, they will never take the PPP procurement into consideration and they will miss a powerful instrument and useful procurement alternative. But as positive experiences grow in this PPP sector, this lack of awareness and understanding will disappear.

Generally, PPP in the higher education and the research sector is feasible and provides value for money.

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