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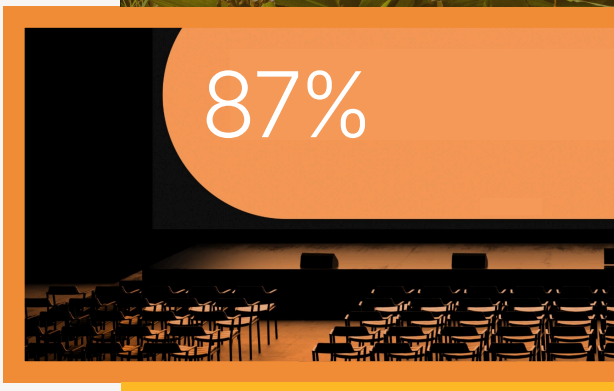
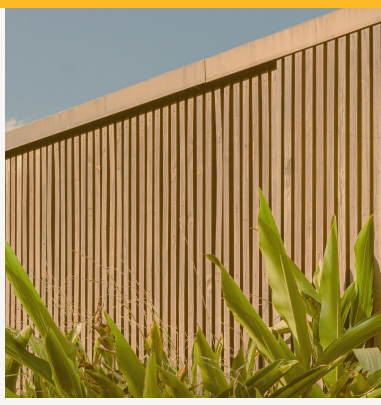


Applying space utilization data to business cases

Whitepaper 4 of 6



Dr. Bart Valks
Smart campus expert

Introduction

In the previous whitepaper, you learned how to create a report for your institution’s space usage.

Now, we'll discuss how to translate the results from the report into real estate decision-making.

Key takeaways

1

75% is a good benchmark for actual frequency and occupancy rates. It's unclear what constitutes a good benchmark for scheduled rates, but a certain amount of overcapacity is required.

2

Future supply should be sized by comparing frequency and occupancy rates against the 75% benchmark.

3

In an initial business case, we recommend determining potential savings solely from increasing the frequency rate and not the occupancy rate.

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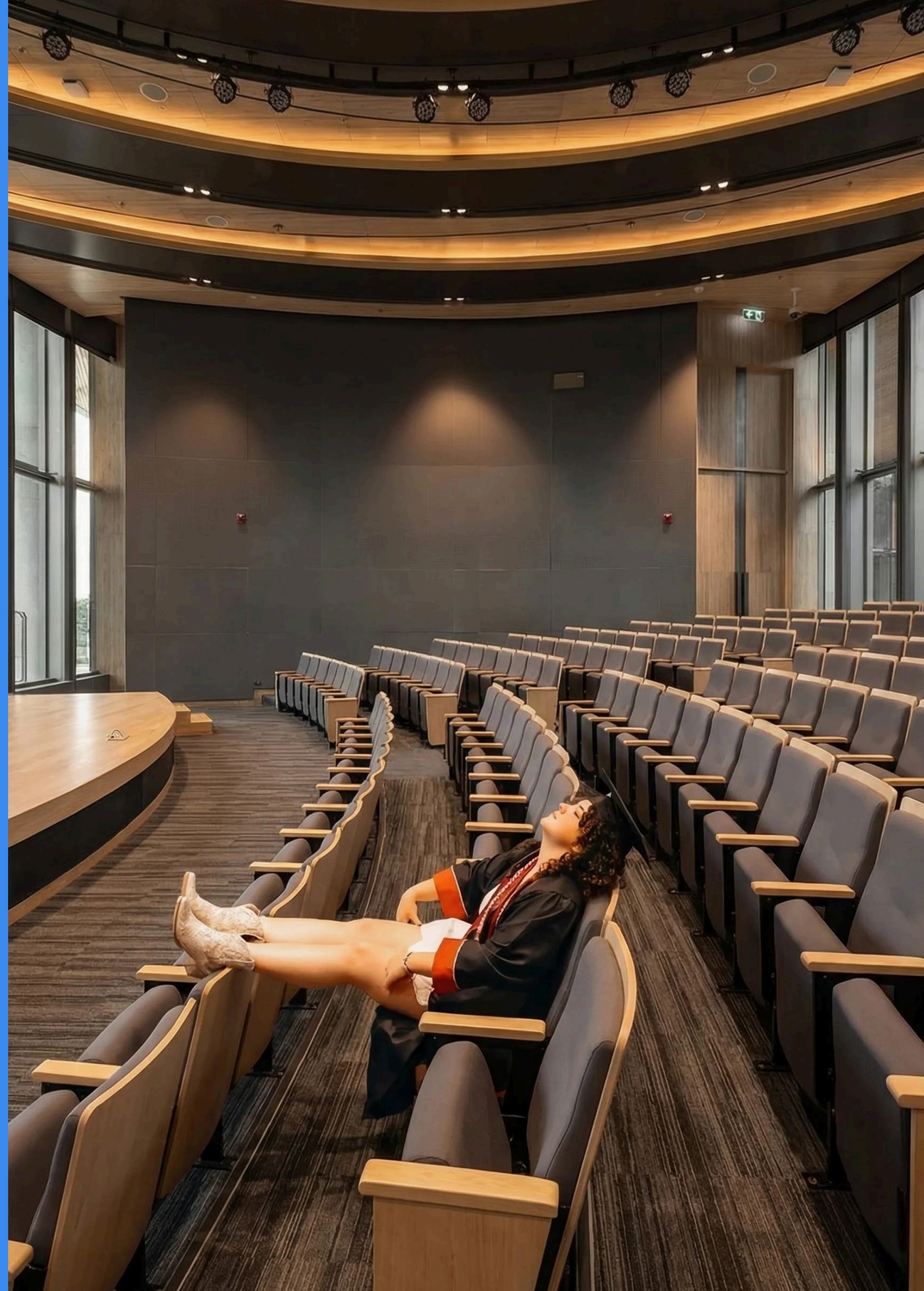


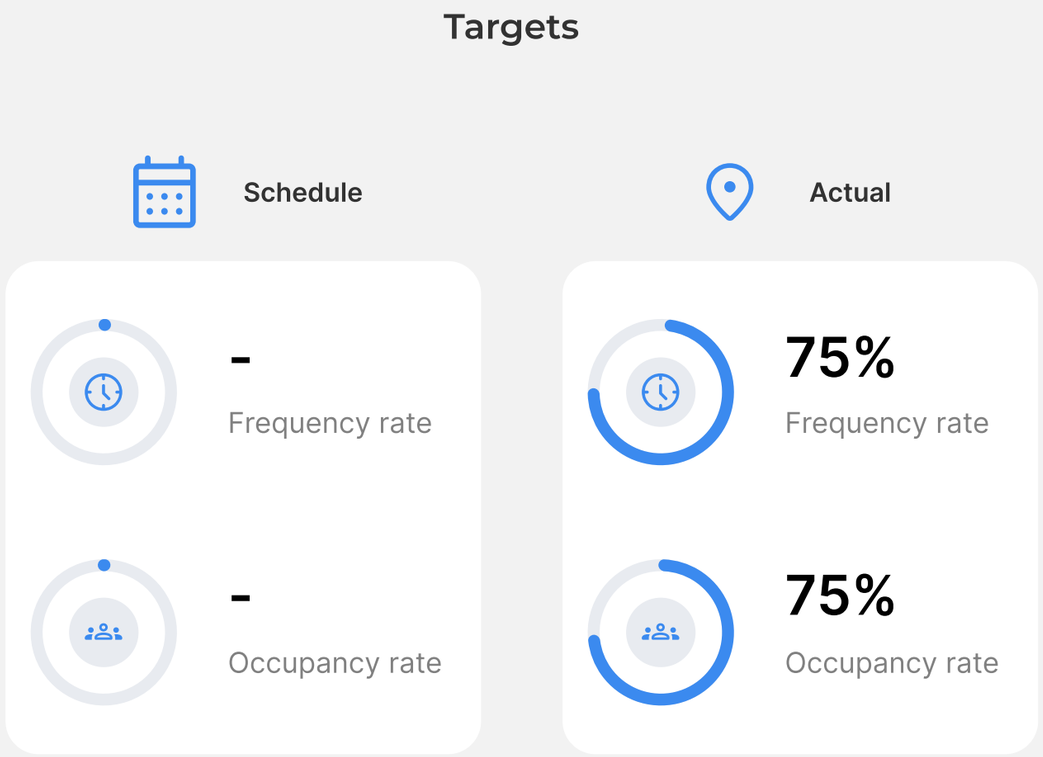
The optimal frequency and occupancy rates

Before we look at the business case, we first need to discuss the targets for frequency and occupancy rates. We briefly touched on this in the previous whitepaper: the graphs showed a target of 75% for both rates.

Targets for frequency and occupancy rates appear in various publications. In 1996, the British National Audit Office already wrote that achieving a 70% frequency rate and a 70% occupancy rate (in actual space use) can be very challenging [1]. The Space Management Group also referred to this in 2006, adding that there is wide variation in the targets that institutions set for themselves. [2]

Another example is TEFMA (the umbrella organization for Australian higher education institutions): it uses 75% frequency rate and occupancy rate as targets for actual use, adding that these figures apply to a teaching week of 67.5 hours [3]. 770-75% thus seems to be a reasonable target for actual frequency and occupancy rates.

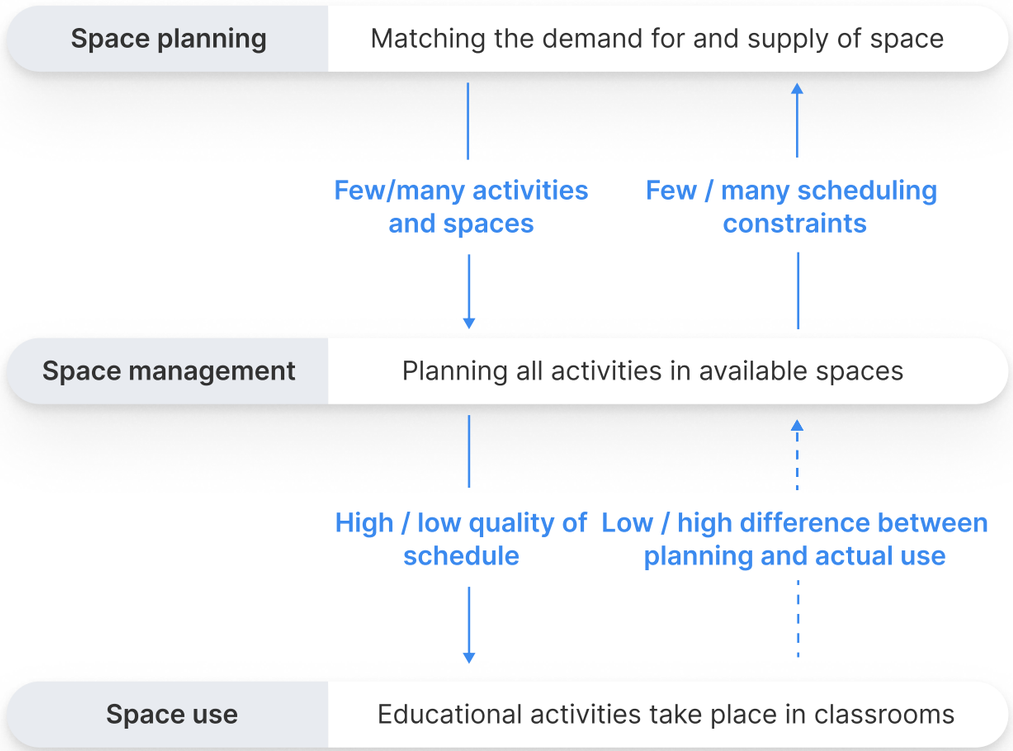
[1] NAO. (1996). Space management in higher education: a good practice guide. London: National Audit Office.
[2] Space Management Group. (2006b). Space utilisation: practice, performance and guidelines. Retrieved from: http://www.smg.ac.uk/index.html
[3] TEFMA (2009). Space planning guidelines. Retrieved from: https://www.adelaide.edu.au/infrastructure/ua/media/1497/TEFMA-Space%20Planning%20Guidelines_Edition3.pdf



According to various university umbrella organizations, a frequency rate and occupancy rate of 75% is achievable.

While there are no concrete targets for the scheduled space use, a certain margin is needed to accommodate everything.

The next question is how these targets relate to frequency and occupancy rates in the schedule. There is no clear answer to this question (yet). The Space Management Group wrote in 2006 that assumptions for this were incorporated into the space standards, but that these had not been updated for a long time [4]. More recent studies on space utilization and scheduling also lack information on this [5]. This is due to the way that space standards and space use influence each other – see the figure below [6].



[4] Space Management Group. (2006b). Space utilisation: practice, performance and guidelines. Retrieved from: http://www.smg.ac.uk/index.html. P. 11
[5] Valks, B. (2021) Smart campus tools. Technologies to support campus users and campus managers. Delft: TU Delft.
Oude Vrielink, R.A. (2025) Improving the quality of classroom allocation in higher education. Towards the efficient and effective use of space. Twente: University of Twente.
[6] Figuur o.b.v. Valks, B. (2021) Smart campus tools. Technologies to support campus users and campus managers. Delft: TU Delft.

At the highest level, the match between demand and supply of space determines whether efficient frequency and occupancy rates are even possible. Simply put: if you have a lot of rooms and few classes to schedule, the scheduled frequency will by definition be low.

At the same time, this match is affected by the need to schedule the education. This scheduling is subject to requirements and restrictions. As a result, there is always more space required than simply adding up the number of scheduled hours.

Examples of requirements and restrictions include:

- the time when teachers are available
- the time when students are available (i.e., when no other courses are scheduled in their curriculum)
- the requested room size and facilities
- the maximum distance between two consecutive classes.

The stricter the requirements, the harder it is to schedule efficiently. This means more rooms are needed to schedule all the classes. Suppose each teacher can only teach on Tuesdays: then much more space is needed to accommodate all classes on Tuesdays. The more requirements there are in the schedule, the more space is needed, and the lower the frequency and occupancy rates will be.

Therefore, at least a certain surplus is needed to create a good schedule. Real-time information about space utilization allows you to see how the schedule compares to actual usage. Were the estimates for the number of requested hours and room sizes accurate, or could they be refined? Ultimately, the answer to these questions will also provide insight into what constitutes good objectives for the schedule.

The data-driven business case

The Space Management Group has a method to calculate the potential savings from more efficient use of space [7]. They calculate, based on the utilization rate (average use of a chair in a classroom) [8], how many square meters of teaching space are actually being used.

For example, if the utilization rate is 25% and an institution has 100,000 square meters of teaching space, then 25,000 square meters are actually being used. They then present in tables how an increase or decrease of space usage affects the total m2 needed, and thus the accommodation costs.

In this first calculation example, we follow the approach of the Space Management Group, taking the utilization rate as our starting point. We use the calculation example of a fictitious institution, which was also used in whitepaper 1. We choose a target space usage of a 75% frequency rate and 75% occupancy rate in the future.

In this calculation example, we use the average actual frequency and occupancy rates as a starting point, following the SMG method. It's also possible to use higher or peak utilization as a starting point. In that case, the frequency and/or occupancy rates are less likely to exceed 75% in a given week in the future. The potential savings are also, of course, smaller.

[7] Space Management Group. (2006b). Space utilisation: practice, performance and guidelines. Retrieved from: http://www.smg.ac.uk/index.html. P. 22-23
[8] The utilisation rate (average use of a seat in an education space) can be determined by multiplying the frequency rate and occupancy rate.

Sample calculation Higher Education Institution

Approach 1 (Space Management Group)

Key figures

500.000	m2 gross floor area (GFA)
165.000 (33%)	education function as % of total m2 GFA
123.750 (75%)	teaching spaces as % of education function
€ 87 mln.	annual operating costs
€ 2.800 per m2 BVO	investment costs new building

Current space usage

67%	frequency rate
42%	occupancy rate
27%	utilization rate (frequency rate * occupancy rate)

Target space usage

75%	frequency rate
75%	occupancy rate
56%	utilization rate (frequency rate * occupancy rate)

From current to target space usage

48%	required teaching space compared to current supply (27% / 56%)
59.430	required teaching space (m2 GFA)
64.320	potential savings in teaching space (m2 GFA)
€ 11,2 mln.	potential savings in annual operating costs

Sample calculation Higher Education Institution

Approach 2 (Pleq)

Key figures

500.000	m2 gross floor area (GFA)
165.000 (33%)	education function as % of total m2 GFA
123.750 (75%)	teaching spaces as % of education function
€ 87 mln.	annual operating costs
€ 2.800 per m2 BVO	investment costs new building

Current space usage

67%	frequency rate
42%	occupancy rate

Target space usage

75%	frequency rate
75%	occupancy rate

From current to target space usage

89%	required teaching space compared to current supply (27% / 56%)
110.550	required teaching space (m2 GFA)
13.200	potential savings in teaching space (m2 GFA)
€ 2,3 mln.	potential savings in annual operating costs

The outcome of this calculation, based on the targets and the results, is that this institution can reduce its teaching space by more than 50%! While this comparison is valid and this increase in frequency and occupancy is theoretically possible, it is a rather risky approach.

This is because it is difficult to predict whether a reduction in the number of rooms will lead to an increase in either the frequency or the occupancy rate, or both. And if a reduction in rooms only results in an increase in the frequency rate, or if a significant mismatch in the occupancy rate arises, then there will still be a shortage, and it will be impossible to design a proper teaching schedule.

We expect that with a stable student population, a disposal of teaching space would initially lead to a faster increase of the frequency rate. The number of classes will remain roughly the same, but fewer classrooms will be available. Increasing the occupancy rate is more complex, as it depends on the match between group and classroom size, and student attendance.

Because of this uncertainty, we propose initially calculating potential efficiency gains solely based on frequency rates. This initial step will already yield an efficiency gain of 11% compared to the current situation, and will provide greater certainty that all classes can be fully scheduled. In further steps to increase the space efficiency, the Space Management Group's calculation example can always be used.

A business case based on the average space usage and simply improving the frequency rate to 75% can already save millions.

Hitting a moving target

Unfortunately, the business case for more efficient use of space isn't static. Student numbers change every year, and classroom capacity also changes regularly. So, we're trying to hit a moving target. Keep this in mind when developing your business case and consider the projections for at least the next five years. Below, we've created three variations on the business case: a growth scenario, a stable scenario, and a shrinking scenario.

Calculate your business case for various growth and/or shrinkage scenarios for at least the next five years. This will give you insight into what growth or decline means for the business case and what interventions are needed.

There are several options for the interventions. In the case of a potential portfolio reduction, you can calculate, as shown here, a reduction in operating costs based on the space sold or rented at the cost level that covers your expenses. However, you could also include sales proceeds, or only include the cost savings for closing off the unused spaces. For new construction, we calculate avoided investment amounts. This choice is, of course, based on the assumption that you can avoid this investment over the longer term.

Sample calculation Higher Education Institution

Approach 2 (Pleq): Scenario's for growth and shrinkage

Key figures

500.000	m2 gross floor area (GFA)
165.000 (33%)	education function as % of total m2 GFA
123.750 (75%)	teaching spaces as % of education function
€ 87 mln.	annual operating costs
€ 2.800 per m2 BVO	investment costs new building

From 67% to 75% frequency rate; 11% increase in efficiency

At 10% decrease of student population

20%	space surplus
24.600	potential savings in teaching space (m2 GFA)
€ 4,3 mln.	potential savings in annual operating costs

At a stable student population

11%	space surplus
13.200	potential savings in teaching space (m2 GFA)
€ 2,3 mln.	potential savings in annual operating costs

At a 10% increase of student population

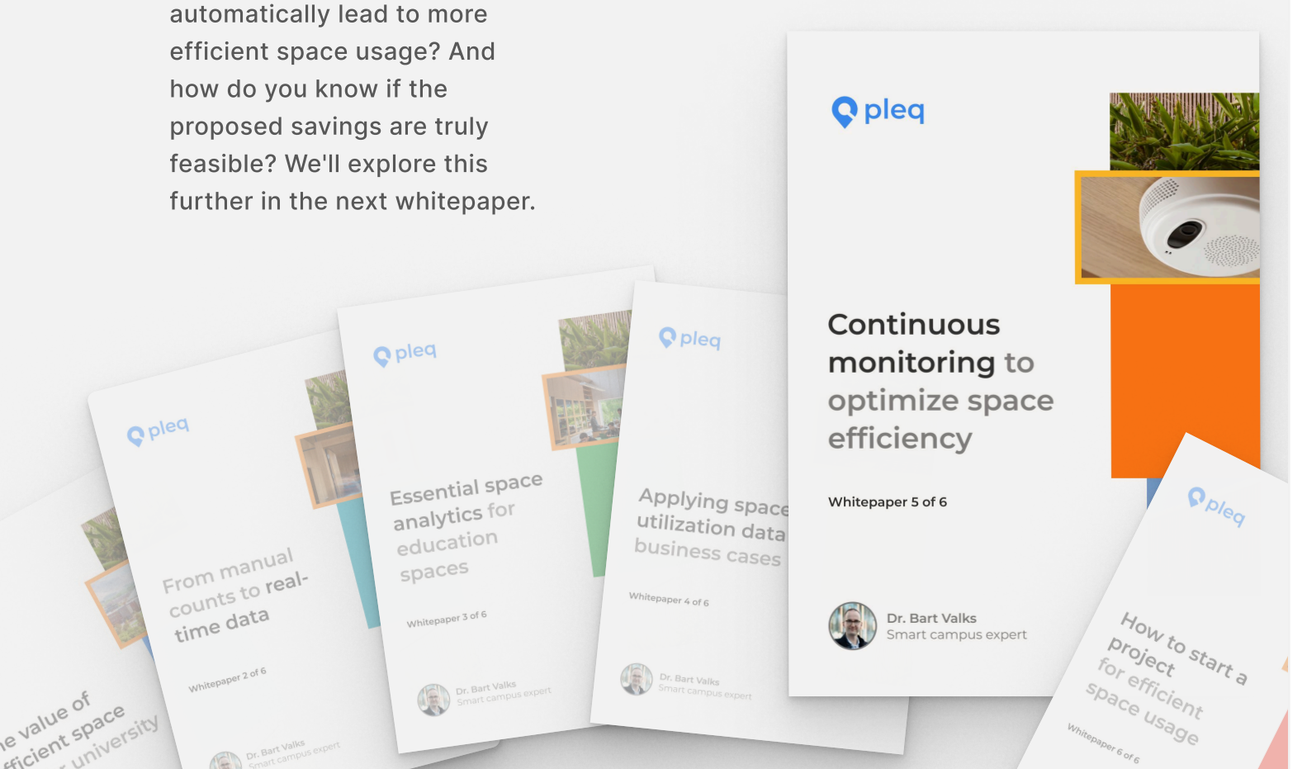
1% (10%)	space surplus (avoided new construction)
12.300	avoided new construction (m2 GFA)
€ 34,4 mln.	avoided investment costs

Next whitepaper

Continuous monitoring to optimize space efficiency

In this whitepaper, we've shown you how to translate the insights from your space use measurements into a business case, supporting decision-making about your real estate portfolio.

However, you're bound to have questions about this during the decision-making process. Does the removal of teaching spaces automatically lead to more efficient space usage? And how do you know if the proposed savings are truly feasible? We'll explore this further in the next whitepaper.



Are you curious what your business case looks like?

Schedule an appointment

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