

## Review on the Sense of Hospitality Occupancy Sensing

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### ABSTRACT

This review is about the added value of occupancy sensing and the factors that influence the added value. The objective of this review is “To gain insight into the added value of occupancy sensing from a facility management perspective and the factors that influence the perceived added value”. This Review paper with a literature review shows that the added value of facility management is difficult to make tangible. Many organizations see facility management as a cost item, and therefore the costs must always be taken into account. There is a shift from cost to added value for the organisation, but this only works if the strategy of Facility Management (FM)/Corporate Real Estate Management (CREM) is aligned with the strategy of the organization. In many cases, this does not yet appear to be the case. For future research, the advice is to look more into other smart features and their added value. Data maturity is a limitation for this research, and the relationship between data maturity and facility management should be studied more. The future is digital and data-driven, and there are not sufficient studies about that.

**Research limitations/implications:** The limitations of these are that there is only one interview with a non-user. Their opinion would be more valuable if there where the respondents were asked more about the data maturity of the organisation and their alignment with the organization strategy.

**Practical implications:** The results can be used by everybody who need to get an insight in the use of occupancy sensing from a facility management perspective and the added value for facility management.

**Originality/value:** While there is a significant amount of literature about occupancy sensing and the use of sensors in office environments, there is only limited research about the added value of occupancy sensing from a facility management perspective.

**Keywords:** Sensing; Occupancy; Management; Human behaviour

## INTRODUCTION

Several factors influence the added value of occupancy sensing. From the literature, these were data maturity, human behaviour and quality of the sensors. For the study, goal/motivation, preconditions and data/IT are added. The interviews show that organisations choose occupancy sensing mainly because smart buildings are on the rise, it is popular and because they can make decisions based on the data and evidence. The most important precondition is that it must be known in advance

what needs to be measured and that the facility managers are included in the process. The most significant influence on the success of added value is human behaviour. If the end-users are not included in the new way of working, there is a good chance that they are not satisfied and that there is no added value. The functioning of the IT and the use of the data also influence the added value. This review shows that added value is only achieved if the preconditions are met, and factors such as human behaviour are taken into account. When this works well, facility

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management as a department will also be able to deliver substantial value to the entire organization [1].

## INFLUENCING FACTORS

The factors that influence the perception of the added value of occupancy sensing are the goal/motivation, the conditions, human behaviour and the use of data and IT. The goal or motivation to start with occupancy sensing is an influence on the added value. The literature review showed that the added value of facility management is hard to show and that it is essential that the FM/CREM strategy is aligned with the strategy of the organisation. There is a shift from a cost-based approach to an added value approach, but in practice, it appears that this shift has not yet been made in many organisations. That will also explain why, for most respondents, the purpose of occupancy sensing is to be able to use the data as evidence. This way, they can show management how much they save and how efficiently they work. Within the development of the FM organisations from reactive to proactive generating evidence is still a reactive way of working. However, the data can be used to do better analysis and predictions. This allows the facility manager to fulfil the role of a proactive business partner.

An additional motivation for using occupancy sensing is that the insight can be used to set up rooms more efficiently. At the moment that the rooms are set up more efficiently, the respondents also want to use the data to support the employees in their work and give them insight into the use of the space. In this way, a change process can be supported, and employees are more satisfied and therefore, more productive. Some organisations want to improve their image and brand and use occupancy sensing to contribute to this. This was the suspicion before the research started and was confirmed by the interviews. Finally, for many organizations, the sustainability aspect is a reason to use occupancy sensing. However, it appears that this is not the main reason. The use of smart features is changing the role of the facility manager; the prediction is that in the future, the decisions will be primarily data-based. In that case, the smart features are used to support the primary activities of the facility manager. They can help improve the professionalisation of FM in an organisation and the level of control. The literature review showed that data maturity, Human behaviour and the quality of the sensors are also factors that influence the added value of occupancy sensing. The prediction was that there were additional conditions, so that was the topic of the second sub-question.

The most important precondition for generating added value is that it must be known in advance what exactly needs to be measured and what the organisation wants to know. This can be done based on a complaint or issue. A strong alignment between the FM strategy and the organisation strategy contributes to the insight into this precondition. As a result, there is a good chance that organisations that are more data-mature will be able to meet this precondition more easily. The organisations that are less data mature and are not aligned with the corporate strategy have more trouble with this because of the more reactive way of working. From the supplier side, it is essential to involve the relevant stakeholders from the beginning in the process to make

sure supply and demand are aligned. From the user side, it is crucial to take time to find the most suitable supplier and define the requirements because the study shows that not every supplier can deliver what the user wants. The literature showed that the behaviour of the end-users could influence the added value of occupancy sensing. An Added value of occupancy sensing is the more efficient use of a building. This is beneficial for the employees, but the employees must know that it is also an added value for them. Occupancy sensing stimulates a different way of working, and using that success takes time, and it is essential to guide the end-users in that process. Human behaviour is that influential on the added value of occupancy, sensing that if it is neglected there will never be any added value, and it is a waste of investment.

With the help of the supplier, the data can be shown in useful dashboards. The facility manager can use the dashboards to optimise the use of the building or to adjust the services to the behaviour of the end-users. The fail factors are the use of multiple systems, technical problems and the lack of responsibility for the use of the data. The role of the facility manager is essential in the handling of the data. If the added value of facility management is not embedded in the organisation, the importance of the data for the whole organisation is not recognized and therefore not used at its full potential. The suppliers are implying that technically everything is possible but that the human factor obstructs this. The users are implying that the suppliers cannot deliver everything they want. This is because not all the systems can connect, and that has to be developed.

## ADDED VALUE

Jensen and Voordt, et al. [2] defined ten types of added value for FM/CREM: Satisfaction, Cost, Productivity, Reliability, Adaptation, Culture, Social, Economic, Spatial and Environmental. The added value of occupancy sensing for the respondents focused mainly on satisfaction, cost, productivity and culture (image). The review shows that added value for facility management is challenging to show because it is mainly seen as a cost item. From a facility management perspective, the added value of occupancy sensing is that they can use data to set up the building more efficiently, offer employees more insight and create data-based decisions that allow them to work more proactively. The added value of occupancy sensing can contribute to the insight into the added value of facility management in an organisation. However, this can only be achieved if the factors as mentioned earlier are taken into account. The smart features are still under development, but the expectation is that data will become even more critical in the future. When the FM/CREM organization is well aligned with the strategy of the organization, a facility manager with data-based facility management can have a significant impact on the functioning of the entire organization. The review shows that to get added value from occupancy sensing, many conditions must be fulfilled. The non-users showed in their interview that not every organization could comply with those conditions, and therefore it is not a sustainable investment.

## DISCUSSION AND CONCLUSION

The conclusion shows that occupancy sensing is regularly used as window dressing, which prevents the facility manager from getting the full potential out of it. It is used to improve the image of the organisation and therefore there is no focus at other possible benefits that occupancy sensing could generate. However, if this is taken into account, it is important that the right shareholders are involved in the process from the outset to ensure that the benefits are achieved for everyone.

It is essential to think about the operation phase and who should manage it from the start with this type of project. The review shows that facility management is not always seen as a priority. It is still mainly seen as a cost item, and therefore the facility managers use the data as a means of accounting for their work. There would be remarkably more profit made if the data could be used to steer the processes proactively. The definition of facility management states that a facility manager is always busy improving the processes and the entire organisation benefits from this. This review has focused on occupancy sensing, but it applies to all smart features.

What is striking is that the "fail factors" are things that at first sight seem logical and are taken into account as a matter of course. However, the research shows that it is often difficult for organisations to manage these factors. Especially the human factor should not be underestimated because they can counteract the added value when they are not included in the process.

It turns out that occupancy sensing can add value to the facility manager. The data is used for better building, and it also really contributes to employee satisfaction. High employee satisfaction can also lead to higher productivity [3], which is beneficial for the facility manager because it often has to deal directly with the complaints. The data can enhance the strategic position of FM. In the best-case scenario, FM is data-driven in a strategic position. However, the availability of data can help these FM professionals to strengthen their strategic role, and can thus contribute to the further professionalisation of the profession.

The facilities professionals know that if FM is not aligned with the values and mission of an organisation, it can never deliver added value in a sustainable way [4]. Unfortunately, this is not

known at the organisations themselves, and it is up to the facility department to show this priority. That is precisely why the non-user chooses not to use occupancy sensing. The non-user knows that they are not in the strategic position within the organisation to address people in the way they work and that management does not support any agreements. Therefore the investment in occupancy sensing is not profitable [5].

This review started with the benefits of a smart feature but ended on a larger scale with the importance of the role of the facility manager within the organisation. The moment an organisation identifies facility management as a cost item, proving and utilising the added value of occupancy sensing will be much more challenging to achieve than the moment the data can be used to steer the entire organisation efficiently [6].

This study aimed to gain insight into the added value of occupancy sensing from a facility management perspective and the factors that influence the perceived added value. This goal was formulated because there was a suspicion that occupancy was not used as its full potential and that the facility manager had to deal with that. There are two questions formulated for this: (1) what factors influence the perception of the added value of occupancy sensing? and (2) what is the added value of occupancy sensing from a facility management perspective?

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