

Ten Years of Asset Management Systems: What Has It Brought?

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Abstract

A decade ago the first international standard for an asset management system (AMS), the PAS 55, was published. Although attention for asset management has increased during this decade, the awareness of the need for an asset management system has not yet reached the top levels of organizations. Asset management literature claims that this is caused by a lack of empirical research on the added value of asset management systems. This research aims to fill this knowledge gap by analyzing the experiences of power and gas grid operators. The phrase *“Impact of asset management systems”* has been defined based on a literature study on impact of management systems in general and on a context study of the sector. The research identified the most relevant impact factors, in terms of the motivations, challenges, positive and negative effects and the critical success factors. The research also found that the AMS primarily influences the organizational effectiveness of an organization and not the asset or financial performance. Further research should focus on how to measure this organizational effectiveness.

Keywords: Impact study, asset management, management systems, power and gas grid operators.

Introduction

Although the importance of asset management in organization has increased due to stricter quality, safety and environmental requirements and growing risks (Komonen, 2012) and the standards for asset management systems, like ISO 55000 and PAS 55, claim many significant improvements and benefits, the awareness of the need for an asset management system has not reached the top levels of organizations (Wijnia & Herder, 2010). This is also acknowledged by Schipper and Dik in their business case for the PAS 55. They notice that asset managers are looking for an answer to the question of how to get executive attention for the need for PAS 55. According to them, the reason is that top management will not commit to the implementation of an asset

management system without having a solid business case for it (Schipper & Dik, 2013). These examples make clear that there is a need for research into the impact of asset management on organizations, as this knowledge is necessary to be able to make an informed decision on whether or not to invest in such a management system. This need is acknowledged by Hodkiewicz, who, in a paper on where asset management is headed, identifies that currently all concepts of asset management have been based on anecdotal evidence and claims by consulting organizations and industry associations and that there is a demand for empirical research and multi-organization comparisons on what factors are important in the assessment of the impact of asset management (Hodkiewicz, 2014). This research aims to fill the gap of the lack of empirical data on the impact of asset

management systems, by analyzing the experiences of multiple organizations.

Impact definition

The impact of management systems has been subject of many studies in the past. Especially the impact of specific management systems ISO 9001 on quality management and ISO 14001 on environmental management on firms has been studied extensively (Carlsson & Carlsson, 1996; Chow-Chua, Goh, & Wan, 2003; Mallak, Bringelson, & Lyth, 1998; Withers & Ebrahimpour, 1999) (Gavronski, Ferrer, & Paiva, 2008; Morrow & Rondinelli, 2002; Schylander & Martinuzzi, 2007). Based on this literature study, five categories of impact factors of implementing a management system were identified: the motivations for, the challenges of, the positive and negative effects of and the critical success factors for implementing an AMS.

The sector of power and gas grid operators was chosen for their relative high maturity in asset management procedures. All Dutch grid operators have implemented an AMS and most of the organization have received certification for their systems. To complete the definition of the term impact, the aspects of the grid operators that might be influenced by the AMS are studied. Based on quality and capacity documents of the Dutch grid operators, it appears that these organizations generally have at least four company values: Reliability, safety, public image and regulatory compliance. Furthermore, based on discussions with asset managers of these organizations, three different preconditions for existence of almost any organizations are added to this list: employee satisfaction, organizational effectiveness and financial efficiency.

The term impact has thus been defined as the influence of impact-factors in five categories (motivations, challenges, positive and negative effects and critical success factors) on four company values for grid operators (reliability, safety, public image and regulatory requirements) and on three general preconditions for existence of almost any organization (employee satisfaction, organizational effectiveness and financial efficiency).

Methodology

Besides the definition of impact, the literature study on impact of management systems also provided input for potential impact factors. From these papers lists of factors were filtered and placed in one of the five categories of impact. Based on discussions with asset management experts, the lists have been brought back to 8 to 15 most probable impact factors per category. Based on these factors a questionnaire was designed for the online survey.

In semi-structured interviews with the asset managers of seven Dutch grid operators, interviewees were asked in open questions to indicate the most relevant factors in all five categories, after which the relevance of the factors identified from literature was discussed. Based on these results the survey questionnaire was adopted and sent out to both Dutch and foreign grid operators. Out of the relevant respondents, 16 were representatives of all different foreign grid operators from all over the world and 18 were representatives of 5 Dutch grid operators. These results have been triangulated to determine the most relevant impact factors, according to the following scheme.

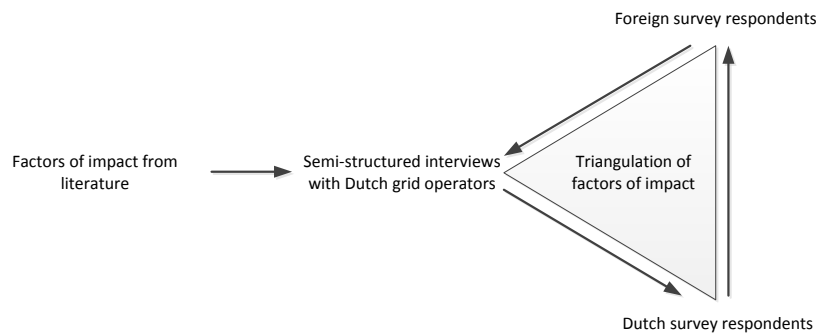


Figure 1: Simplified scheme of the research methodology.

Results

The following table provides an overview of the most relevant factors of implementing an AMS for grid operators. Most grid operators felt both an internal and an external motivation to implement an AMS. Most of them expected an increase in performance from the assets, but have not registered this positive effect yet. The other motivations were satisfied by the positive effects. The grid operators have professionalized their organization with a clearer structure of roles and responsibilities. Also, the management of risks has been improved through the system, meaning that risks related to the assets are known, documented and assessed on their impact. These effects combined have increased the transparency of operation and facilitated financial decision making by top management. Because the grid operators can substantiate their decision and actions, there are also better able to comply with rules and regulations.

The role separation that is prescribed by the AMS norms between the AO, AM and SP forces these organization to change their way of working. These cultural changes have led to

increased complexity, double work and friction between the AM and SP departments. Convincing the staff of the new procedures and securing their commitment proves to be a real challenge and has cost more time and manpower than expected. The AMS also requires the organization to get their asset information in order, but because part of this information is lost or non-existent this proves to be a challenge as well. The norm is also said to be multi-interpretable in some aspects which leads to discussion within the organization and difficulties in setting adequate objectives for the system.

Results of the research point out a leading role of top management is essential for the implementation of the AMS, together with the support of the middle management, as these managers have to actively use the system. Attention for all employees involved, especially those affected by the cultural changes caused by implementing the AMS, is also crucial to get their commitment. Finally, a pragmatic plan and a realistic planning for the implementation process needs to be designed, if the organization wants to reduce or avoid some of the challenges and negative effects.

Table 1: An overview of the most relevant impact factors of implementing an AMS for grid operators.

Category	Most relevant impact factors
Motivation	- To meet regulatory requirements; - To professionalize the internal structure and processes;

	- To increase the performance of assets; - To improve risk management.
Challenges	- Managing the cultural changes; - Working up the quality of the asset-data; - Aligning the objectives of the AMS with the strategy of the organization; - Embedding the system into the organization.
Positive effects	- Professionalization of the internal organization; - Improved risk management; - Improved regulatory compliance; - Improved focus on the management of assets.
Negative effects	- The system requires more time and manpower than expected; - Increased complexity due to role separation; - Bureaucracy; - Multi-interpretability of the norm.
Critical success factors	- Leading role of top-management in the implementation; - Middle management support; - Commitment of involved staff; - Pragmatic plan and planning for the implementation process.

Based on the in-depth information from the interviews with asset managers at Dutch grid operators the impact of implementing an AMS can be visualized. In Figure 2 all mentioned impact factors in the same category on the horizontal axis and influencing the same organizational aspect on the vertical axis are combined. So the circles indicate how many factors influence the organizational aspect.

The organizational effectiveness, employee satisfaction and regulatory compliance and their associated circles are marked with a red line to indicate that these aspects are mainly influenced by the implementation of the AMS. Also, the following findings are noteworthy:

- Positive influence of the system primarily focuses on the organizational effectiveness of the internal organization and to a lesser extent on the company values of the grid operators, like the reliability and safety of assets;
- The negative influence of implementing the system is mainly focused at the organizational effectiveness and employee satisfaction in the organizations, while the

negative influence of the company values seems very limited;

- A distinction can be made between the impact of the system itself and the impact of the transition that the organization goes through. The impact of the transition exists of challenges and critical success factors that are related to the management of the transition. These factors only influence the organizational effectiveness and the employee satisfaction of the organizations and show strong similarities with impact of other management systems.

Conclusions

Based on the results of this research, I conclude that most interviewed representatives and respondents of Dutch and foreign grid operators are satisfied with the impact that the implementation of the AMS has had on their organizations. Positive effects are generally assigned a higher relevance than the negative effects and some negative effects only seem to have a temporal character. This research can therefore be used as promotional purposes by the AM community

towards organizations that are considering the implementation of an AMS. Furthermore, it provides insights into what can be expected of the implementation process and the system itself. It is questionable whether the increase in organizational effectiveness is satisfying for more commercial organizations. It is assumed that these organization would be particularly interested in improving the performance of their assets. Further research in a more commercial sector would have to be executed to support this.

This research shows that grid operators, who have been working with asset management systems for almost a decade, have registered mainly positive effects on the internal organizational effectiveness. Although increased financial and asset performance as a results of implementing an AMS are claimed

by both the PAS 55 and the ISO 55000, these effects are not gathered among the most relevant positive factors so far.

The distinction between the impact of the system itself and the impact of the transition resulting from the implementation, points out that specific attention must be allocated to the organization of the implementation process. In-depth information from the interviews showed that organizations had taken too little time for the implementation, paid too little attention to the involved staff and forced the system upon the organization. This is despite the fact that literature on critical success factors for implementing management systems indicate that sufficient time and commitment of the staff are essential for the implementation.

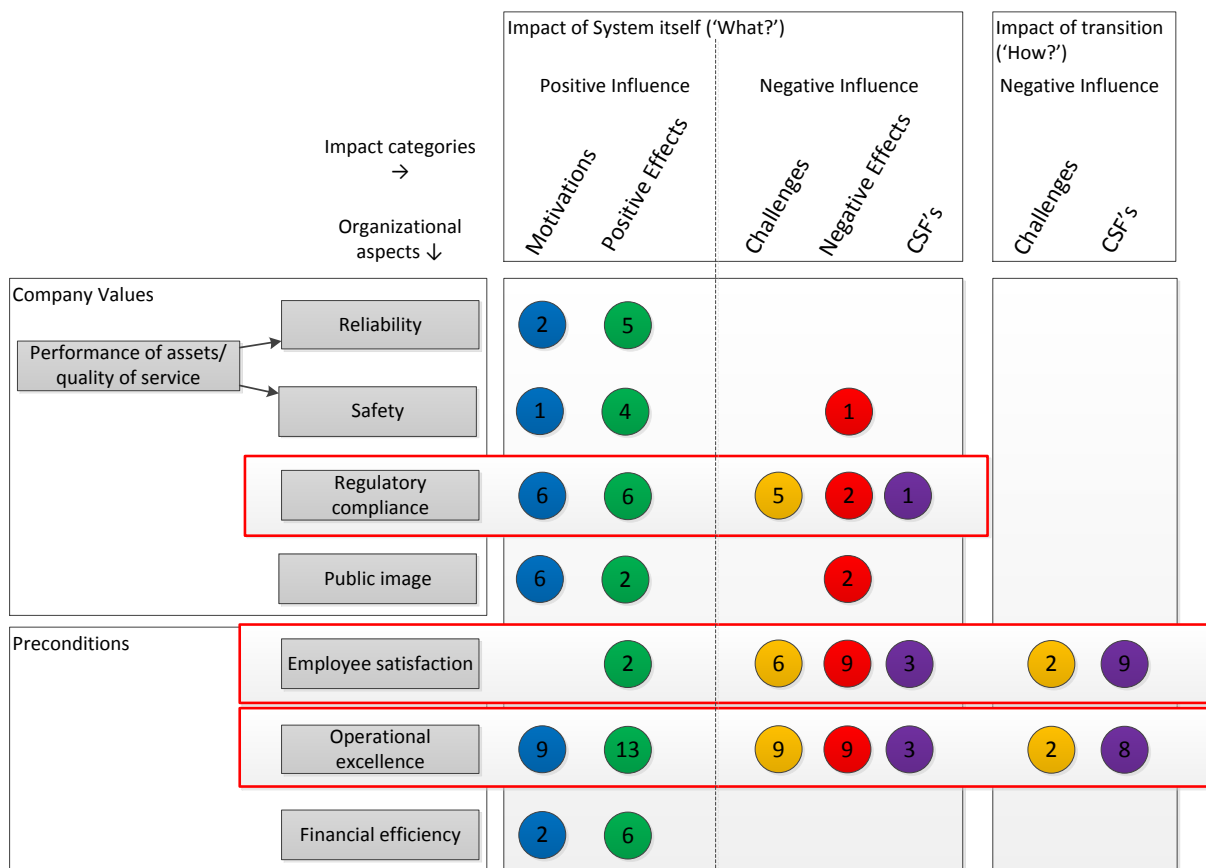


Figure 2: A visualization of the impact of implementing an AMS for grid operators.

Based on the significant differences between the results of the Dutch and foreign survey respondents, it seems that the Dutch grid operators have more asset management knowledge and are a step further in the maturity of asset management principles compared to most foreign grid operators. The foreign grid operators assigned a significantly higher relevance to challenges related to setting adequate asset management goals and to the lack of asset management knowledge. Furthermore, they experienced the increased knowledge of their assets, focus on continuous improvement and health and safety to a higher extent than the Dutch. This could indicate that the gap between the starting point of the organization and the requirements for an AMS is larger for most of the foreign grid operators than for the Dutch. Finally, foreign grid operators assigned a significant higher relevance to the factor that their expectations were too high, possibly indicating that Dutch grid operators had a more realistic view of what the AMS would bring their organization.

Discussion and Reflection

All respondents of the survey represent organizations that are in different stages of the implementation process. This raises an interesting discussion, as it is not clear from what moment on the relevance of impact factors has been assessed. Ideally, organizations under study would have started implementing an AMS at the same moment, so the results were also comparable on the aspects of time.

Another aspect up for discussion related to the respondents of the survey, is the position of the respondent in the organization. Although from the static information of the respondents, it appears that most of them have a function as asset-, grid- or risk manager. Others have a more senior function or are involved with the service provider. Ideally for the comparability of results, respondents would have a similar position in the organizations. Representatives from different departments will likely have a different perspective on the impact of the AMS. If all respondents have the same position the results can be corrected for potential bias, based on in-depth information or objective data. This is more difficult for the results in this research.

Finally, although all respondents that were included in the results indicated that they have implemented an AMS, there is no unambiguous definition of an asset management systems. It is difficult to judge whether the respondents from Brazil and India have more or less the same understanding of an AMS as the grid operators in the Netherlands and the UK. It is therefore questionable whether these respondents perceive the questions similarly to the Dutch respondents. If they perceive the questions differently, or if they have a different definition of what an AMS is, then this could really affect the results. More research in the maturity of asset management at these organizations and in these countries is necessary to be able to assess this potential difference.

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