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Management system maturity assessment based on the IMS-MM: Case study in two companies

J.P.T. Domingues, P. Sampaio & P.M. Arezes
Department of Production and Systems, University of Minho, Braga-Guimarães, Portugal

I. Inácio
LIPOR, Serviço Intermunicipalizado de Gestão de Resíduos do Grande Porto, Porto, Portugal

C. Reis
Yazaki-Saltano de Ovar Produtos Eléctricos, Ltd., Ovar, Aveiro, Portugal

ABSTRACT: This paper intends to report the assessment of integrated management systems maturity in two companies adopting the IMS-MM. The companies targeted in this study develop their businesses in different activity sectors and are certified, at least, according to the ISO 9001, ISO 14001 and OHSAS 18001 standards. Results show that the selected companies are at different stages concerning the maturity of their integrated management systems. This seems to relate with the evolution and the ultimate purpose of their organizational structures, to the stakeholders to whom the companies align their management subsystems and to the fact that the IMS-MM is a generic tool (current version) that does not take into account the specific guidelines of each activity sector.

1 INTRODUCTION

1.1 *Integrated Management Systems (IMSs)*

Standardized Management Systems (MSs) are adopted by companies in order to address more efficiently and systematically the requirements from the stakeholders (Almeida *et al.*, 2014; Domingues *et al.*, 2012). In the early 80 s of the last century, companies were more prone to address the issues raised by the customers and the shareholders. Due to an increasing awareness of the context where companies operate, the notion of stakeholder encompasses today not just the customers and the shareholders but also the employees, the suppliers and the involving society amidst others (Sampaio *et al.*, 2012). To incorporate the requirements from these stakeholders, companies often implement and certify their MSs: according to the ISO 9001 standard to address the requirements of customers, according to the ISO 14001 standard to address the environmental requirements of the society and according the OHSAS 18001 to attend the health and safety requirements from the employees. Currently several companies are managed through an Integrated Management System (IMS) that usually encompasses (but is not restricted to) the quality, environmental and occupational health and safety issues that should be taken into account. Although the existence of some guidelines and frameworks the integration of these MSs into a single system of systems is often developed within each company constrained solely by the resources available. So, it is difficult for the responsible to assess and benchmark the resulting IMS against other IMSs from other companies. To fulfill this scientific gap, a maturity model was developed and proposed by the end of 2013- the IMS-MM (Domingues *et al.*, 2016). The current paper intends to report the adoption of this tool in two different companies each one with unique business and organizational peculiarities. This paper follows with an up to date revision of literature concerning the IMSs and the description of the IMS-MM. The following section describes the research methods adopted and in the "Results" section are compiled and listed the main achievements by the adoption of the tool. The last section summarizes the most relevant conclusions from the research conducted.

1.2 *Cases studies*

LIPOR activity is focused on the waste management (Landfill, sorting plant, energy recovery plant and composting plant) of several municipalities that comprise the greater Porto area (Northern Portugal), notably, Póvoa do Varzim, Vila do Conde, Matosinhos, Maia, Porto, Valongo, Gondomar and Espinho. Yazaki-Saltano produces electrical goods mainly for the automotive industry. The two companies adopted different strategies to proceed with the integration of their MSs into a single IMS. LIPOR has proceeded with the successive implementation of the quality MS (QMS—ISO 9001), the environmental MS (EMS—ISO 14001)

and the occupational health and safety MS (OHSMS—OHSAS 18001). The ISO/TS 16949 was the primordial subsystem from where the organizational structure of Yazaki-Saltano evolved to an IMS encompassing additionally the EMS (ISO 14001) and the OHSMS (OHSAS 18001). In this latter case, the audit function acted as an integrator concept due to the need to optimize their number and frequency thus avoiding excessive disruptions to the normal production process. A third company from the healthcare sector was contacted but a deeper research on the evolution of the IMS was not possible due to the information access constrains raised by top management.

2 LITERATURE REVIEW

2.1 *Integrated Management Systems (IMSs)*

The scientific topic of IMSs has been increasingly addressed by scholars and researchers throughout the last years. If one considers some of the contributions published solely throughout the year of 2016 (and late 2015) it is possible to collect a snapshot of the issues commonly targeted in this domain. It is possible to stress that this scientific domain is mature enough to enable some papers focusing literature review such as those published by Domingues *et al.* (2015) and Nunhes *et al.* (2016a). In this latter paper the authors identify the main scientific gaps in the literature and point out the open research paths to where future research should be directed. In a following paper, these same authors listed the functions suitable to integration in an IMS (Nunhes *et al.*, 2016b) and the conclusions converge with those of mainstream researchers that not all the MSs functions should be integrated. Meanwhile, Abad *et al.* (2016) listed the main difficulties arising during the implementation of IMSs and Bernardo *et al.* (2016) dissected the main peculiarities of IMSs in a non-leading country in certifications such as Greece. The work of Kafel & Casadesus (2016) and Domingues *et al.* (2016) should be stressed out. These latter authors proposed a maturity model to assess IMSs while the former described the changes during the time of the order and level of MSs standards implementation. The work authored by Tompa *et al.* (2016), highlighting the benefits of joint management practices on safety and operational outcomes, should be referenced similarly to the work authored by Hernández-Vivanco *et al.* (2016) that promotes the linkage between the concepts of innovation and integration of MSs. It should be noted that some papers, from other scientific domains, incorporate some references from the IMSs domain. Anholon *et al.* (2016), based in a case study at Embraer, and Bernal-Conesa *et al.* (2016) point out that the concept of corporate social responsibility relates with a proper integration of MSs and Aquilani *et al.* (2016) stress that a successful sustainability may be attained (or encompasses) a successful IMS. The work authored by Lindo *et al.* (2016) and Cook *et al.* (2016) address the audit function as a research topic and the current trend towards integrated audits. Several papers from the EMS and OHS backgrounds, such as those authored by Jilcha & Kitaw (2016), Kontogiannis *et al.* (2016) and Mustapha *et al.* (2016), implicitly address the issue of MSs integration.

2.2 *The IMS-MM*

The IMS-MM front-office component is presented in Fig. 1. This maturity model has a three-dimensional nature considering the following axes: the Key Process Agents (KPAs), externalities and the quality management principles. Integration excellence may be achieved throughout an itinerary encompassing six (5+1 base level) maturity levels. A more thorough, detailed and complete description of this model is available at Domingues *et al.* (2016).

To assess an IMS each question related to each KPA should be evaluated by selecting one of the multiple option answers (five options *Likert* scale) or, for some cases and in alternative, by categorical type answers. In the first case (five options *Likert* scale) to score the Weighing (W) ascribed to the KPA the answer should be "Agree" or "Totally Agree". In the second case the answer should be "Yes". The final score is attained by multiplication of the weighing of the KPAs that comply with the abovementioned. Moreover, the critical KPAs (KPA*) are *must be* characteristics, *i.e.*, both the score and the critical KPAs should be accomplished.

Finally, the ascribed externality to the level should be assessed as "Agree" or "Totally Agree" based on a five option agreement *Likert* scale. Table 1 displays the requirements to be fulfilled in order to an IMS evolve to an upper maturity level.

Table 2 presents the KPAs to be assessed and those that are critical (KPA*).

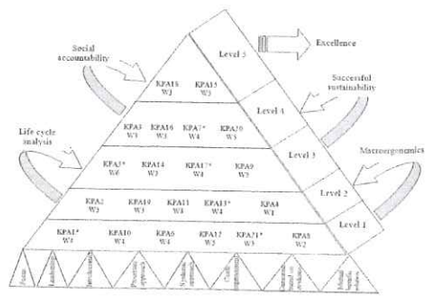

Figure 1. The front-office component of the IMS-MM.

Table 1. Assessment framework.

Level	Score	Requirements	Actions
5	...	KPA; KPA1518	Excellence
4	≥ 60	KPA7*; "Social responsibility" externality assessed, at least, as "Agree"	^ Level 5
3	≥ 72	KPA17*; "Successful sustainability" externality assessed, at least, as "Agree"	^ Level 4
2	≥ 60	KPA13*; "Life cycle analysis and management" externality assessed, at least, as "Agree"	^ Level 3
1	≥ 160	KPA21*; KPA1* "Macroergonomics" externality assessed, at least, as "Agree"	^ Level 2
Base	Assessment of all principles, at least, as "Agree"		^ Level 1

Table 2. KPAs and critical KPAs*.

KPA	Obs.
Policies integration.	KPA1*
Top management integrated vision.	KPA2
Implementation process supported on a guide or framework.	KPA3
Top management training concerning systems integration.	KPA4
Organizational tools, methods and objectives alignment.	KPA5*
Perception that the IMS originates organizational interactions.	KPA6
Non-residual authority by environmental and/or OHS managers.	KPA7*
At least, one integrating concept was considered during the integration process.	KPA8
System bureaucratization.	KPA9
Management procedures integration.	KPA10
Documental integration.	KPA11
Integrated objectives adoption.	KPA12
At the organizational structure there is an IMS manager.	KPA13*
Processes monitoring by KPIs, OPIs and MPIs.	KPA14
Integrated indicators adoption.	KPA15
Good correlation between the integrated organizational structure and the integrated level perception.	KPA16
Integrated audit typology.	KPA17*
Identification of organizational features not susceptible of integration.	KPA18
Integration strategy.	KPA19
MSs performance perceived better in an integrated context.	KPA20
The IMS perceived as an add value.	KPA21*

3 RESEARCH METHOD

The integration of MSs is being developed by an increasing number of companies in order to improve and optimize their organizational issues. A large stream of the available literature concerning this topic relies on quantitative methodologies, such as surveys, to identify and describe some of the issues that impact on the phenomenon. However, a deeper understanding of it asks for qualitative methodologies such as case studies in order to perceive the underlying relationships between these issues. Several research techniques (interviews, documental analysis and direct observation) were adopted to assure a proper data collection. The results reported were carefully scrutinized based on the convergence of the information collected from different sources. The assessment of maturity based on the IMS-MM took solely into account the axes "KPAs" and "Excellence Management Principles" (Level 0). Hence, the results presented later on do not consider the dimension "Externalities" (Macroergonomics; Life Cycle Analysis; Successful Sustainability; Social Accountability) due to the absence of suitable information.

4 RESULTS

The assessment of maturity was carried out according the assessment framework (Table 1) with the exception of the axis "Externalities" as described in the "Research Method" section. Concerning the base level (Level 0) it was possible to verify that both companies comply with the excellence management principles. In addition, both companies address the requirements of both EMS and OHSMS standards. The main purpose of the adoption of the IMS-MM was to determine at which extent integration was carried out.

4.1 *LIPOR*

Related to the Level 1 LIPOR rates with "Agree" or "Totally Agree" all the KPAs including the two critical KPAs: "Policies integration" and "The IMS perceived as an add value". LIPOR achieves a total score of 800 units which allow the access to Level 2 according to the assessment framework (160 units needed). Concerning Level 2, LIPOR achieves a total score of 60 units, *i.e.*, attains the minimum score to access to the following level. The critical KPA 13 is rated with the highest score but KPA 11 (Documental integration) is not rated at least as "Agree" (the minimum required). Although the access to level 3 is granted, a deeper documental integration seems to be necessary to prevent any future inconveniences related to this maturity level of the IMS. With respect to Level 3 all the KPAs

(based on the agreement Likert scale) were rated at least with "Agree". Concerning critical KPA 17 it was possible to check that "Integrated Audits" was the audit typology commonly adopted by LIPOR. LIPOR attains an overall score of 15 units in Level 4 which does not allow the access to Level 5 (60 units needed). KPA 3 and KPA 7 are rated "Not Agree" and "Totally Disagree", *i.e.*, the IMS would be more mature if an implementation guideline or framework was adopted and if an effective authority was ascribed to the MSs responsible.

4.2 *Yazaki-Saltano*

Concerning Level 1, Yazaki-Saltano achieves a total score of 25 units which does not allow the access to Level 2 according to the assessment framework (160 units needed). Moreover, critical KPA 1 is not assessed with "Agree" or "Totally Agree" although the other critical KPA (KPA 21) is indeed evaluated with the highest score. In addition, KPA 8 (Integration concept) and KPA 10 (Integration of management procedures) are not evaluated with the minimum requirements. It is possible to define a path or, at least, a set of activities in order to the IMS of Yazaki-Saltano reach highest maturity levels. Yazaki-Saltano should promote an effective integration of policies and, at least, comply with one of the following issues: to define an integration concept, *i.e.*, a common concept that may be included throughout all MSs that encompass the IMS and/or proceed with a deeper integration of management procedures.

4.3 *Overall analysis of the results*

It is possible to posit that the differences observed between the two companies are related with the evolution, the ultimate purpose of their organizational structures and to the stakeholders to whom the companies align their MSs. Figs. 2 and 3 present both the organizational structure of LIPOR and the organizational structure of the IMS.

Based on Figs. 3 and 4 it is possible to point out that LIPOR addresses simultaneously different stakeholders. From its conception, LIPOR took into account these stakeholders at the same level of the customers. In addition, the activity sector where LIPOR operates (with obvious linkages to the EMS) seems to facilitate the integration of the different MSs leading to higher maturity levels of the resulting IMS.

Fig. 4 presents the evolution of the multiple certifications achieved by LIPOR always supported and led by a strong commitment from top management.

Figure 5 presents the organizational structure of Yazaki-Saltano.

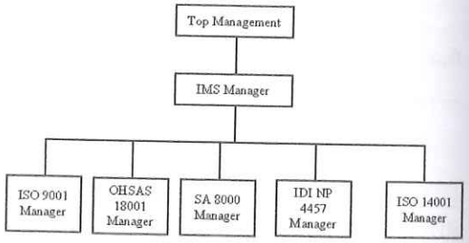

Figure 3. Organizational structure of the MSs that encompass the IMS of LIPOR.

Operating Unit	Year 2002	2003	2004	2005	2006	2008	2009	2012	2014
Sorting Plant	○ ◍				⊗				
Energy Recovery Plant		○	◍		⊗				
Landfill of Maia				○ ◍	⊗				
Composting Plant							○ ◍		
All the organization						●	⊗	◍	○

○ Certification of the QMS (ISO 9001)
◍ Certification of the EMS (ISO 14001)
⊗ Certification of the OHSMS (OHSAS 18001)
● Certification of the SRMS (SA 8000)
◍ Certification of the IDIMS (NP 4457)

Figure 4. Evolution of the IMS of LIPOR.

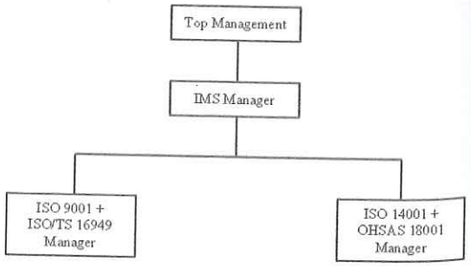

Figure 5. Organizational structure of Yazaki-Saltano.

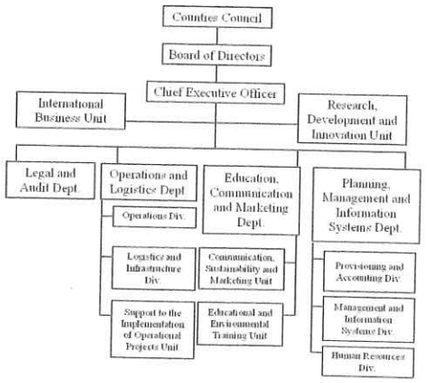

Figure 2. Organizational structure of LIPOR.

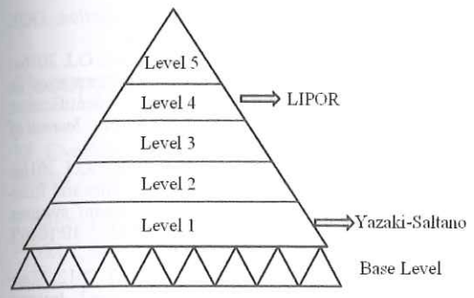

Figure 6. Position of LIPOR and Yazaki-Saltano according to the IMS-MM.

From its initial conception the main purpose of the MS of Yazaki-Saltano was to achieve the quality requirements from the customers and to address more prescriptive requirements related to environmental and OHS issues than those that comprise ISO 14001 and OHSAS 18001 standards. The audit function was paramount in the evolution of the IMS of Yazaki-Saltano since it was the need to optimize the number of audits (within the QMS) that "unveiled the path" to further optimization between the different MSs.

5 CONCLUSIONS

According to the IMS-MM, currently, LIPOR has a level 4 maturity and Yazaki-Saltano a level 1 (Fig. 6).

The evolution of the IMSs and its ultimate purpose considering the alignment to the requirements of the significant stakeholders seems to condition the maturity level that a company may attain. Yazaki-Saltano operates in an activity sector that is strongly impacted by the quality (customer) requirements. Yazaki-Saltano addresses environmental and OHS issues very specific from the automotive industry such as ROHS and ELV directives. This fact seems to be embedded in the culture of the company and efforts are done in order to assure that other requirements from less prescriptive documents (such as ISO 14001 and OHSAS 18001) be integrated through a systemic approach. On the other hand, the results achieved by LIPOR seem to be aligned with the notion that an IMS attains higher maturity when, from its original inception, all the MSs implemented are regarded as equal and supported by a top management with vision and effective leadership. Although both companies comply and proceeded with the integration of MSs adopting different approaches, the IMS-MM (due to its nature) seems to differentiate between those companies that operate in activity sectors with specific EMS and OHS requirements and those that adopted the less prescriptive approach pointed out by ISO standards. This fact may be interpreted as a shortcoming of the IMS-MM since this model is based solely on the integration of the ISO 9001, ISO 14001 and OHSAS 18001 standards.

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