

Integrated Management Systems: On the path to maturity and efficiency assessment

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ABSTRACT

The results from an online survey focusing Portuguese integrated management system (IMS) ruled companies are presented in the present article. These are partial results from an ongoing project aiming the maturity rating and assessment of IMS and companies where implemented. Surveyed companies match partially the national Portuguese profile, namely, on geographic location and company dimension characteristics. Results suggest that motivations, benefits and obstacles related to integration are internal or mainly internal. A sequential over a *step by step* or “all in” integration sequence as been reported as the most common one among the surveyed companies. Integrated audits seem to be the model adopted by the majority of the companies. Systems managers found implementation sub-systems standards easy or, at least, reasonably easy, to integrate. A major dividing point between surveyed companies is related to the identification of organizational items not susceptible of being integrated. Approximately 55% of the surveyed companies identified those items while 45% did not. Systems managers’ majority did not felt that an ultimate excellence level of integration had been reached by their companies but rather a high integration level corresponding to common organizational structure plus policies and goals, management tools and documental integration. All respondents felt that the overall company performance would be lower (79%) or at least equal (21%) if running through separate management sub-systems. Almost totally agreed that IMS is an add value to the company. Related to responsibility it seem that companies option rely on traditional pyramidal model with an IMS coordinator and a QMS, an EMS and/or an OHSMS sub-systems responsible providing feedback. Finally, process, operations and management monitoring was assessed by the survey. Almost all companies agreed that monitoring was performed by key process indicators (KPI’s), operations process indicators (OPI’s) or management process indicators (MPI’s). Similar results were found when asked about integrated indicators.

Keywords: IMS; Survey; Maturity.

1. INTRODUCTION

Integrated management systems (IMS) subject had been addressed by several authors since the early nineties of the last century, mainly due to the ISO 14001 release and the potential synergies that could be developed with ISO 9001 standard (published in middle eighties).

Recently, Asif *et al.* (2010) proposed a novel systematization scheme regarding IMS focused literature. On a national level, several papers have been published focusing IMS, namely those authored by Santos *et al.* (2011), Sampaio *et al.* (2010, 2011) and Domingues *et al.* (2010a,b, 2011a-e). Sampaio and Saraiva (2011) published the latest Portuguese data related to IMS (Figure 1 and 2). Those results show that the majority of the organizations with an IMS are located at the North, Centre and Lisbon regions. Regarding the IMS typology it seems possible to conclude that ISO 9001+ISO 14001 and ISO 9001+ISO 14001+OHSAS 18001/NP 4397 are the most reported options.

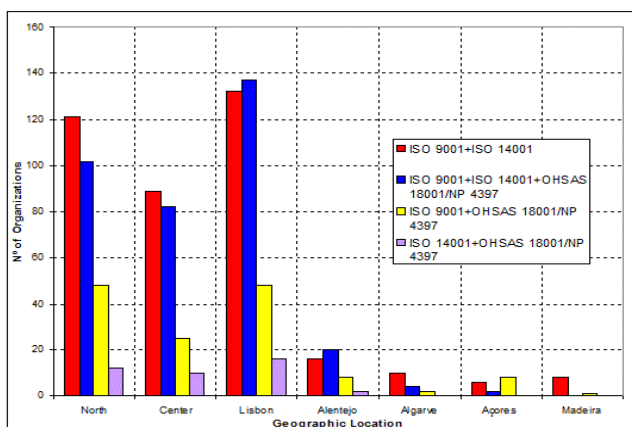


Figure 1- IMS data per NUT II Region and Typology

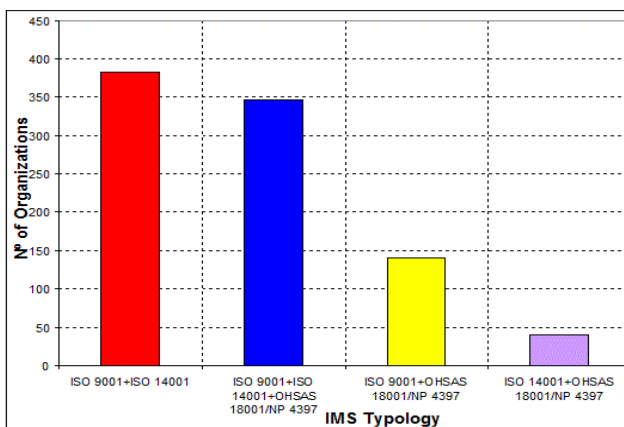


Figure 2- IMS typology data

Maturity assessment regarding products or systems had been described in several papers and it is currently a widely accepted methodology to comparatively ascribe an evolutionary level to the focus item. Thus, maturity models enable to

pinpoint the way to go (and which requirements should be complied) in order to achieve an ultimate and last excellence level. Khoshgoftar and Osman (2009) summarized the main characteristics of the most reported maturity models. Domingues *et al.* (2011e) reported a framework proposal regarding IMS maturity assessment based on published papers (Table 1) and Idrogo *et al.* (2011) a model focused on SMEs.

Maturity model development, due to its comparative and empirical nature, should rely mostly on data collected from the focus item. It is intended that the current paper report preliminary raw results from an ongoing project focusing the maturity and efficiency levels assessment of IMS.

Table 1- Framework proposal and key-process areas (KPA's) (adapted from Domingues *et al.*, 2011e)

Level 1 Uncertainty	Level 2 Awakening	Level 3 Enlightenment	Level 4 Knowledge	Level 5 Certainty
External motivations, non-integrated policies, solely documental integration, residual authority, lack of training to top management	Integrating factor, sequential audits, massive QMS, integrated objectives	Tools, methodologies and objectives alignment; Simultaneous audits; Integrated vision by Top Management; <i>Step by Step</i> implementation process.	Management procedures integration, internal motivations, overlapping audits, IMS responsible, <i>All-in</i> implementation process, CPI, OPI and KPI indicators, organizational interactions.	Integrated indicators, organizational interactions assessment, integrated audits, integration based on a guideline or framework.

2. MATERIALS AND METHODS

An online survey with 30 questions, based on a questionnaire, was held focusing Portuguese organizations with more than one certified management sub-system according to the following standards: ISO 9001, ISO 14001 and OHSAS 18001/NP 4397. The survey was conceptually supported on a Likert type scale, categorical and multiple option answers. A pre-test performed on three companies was used to validate the questionnaire (Table 2). The results reported in the present paper were supported on 52 validate answers given by management systems responsible during the period between 01-07-2011 and 01-11-2011.

Table 2- Questionnaire Scheme

Section	Main topics
Company Characterization	Q1-Q4: Activity sector, n° of employees, geographic location and IMS typology.
Likert Scale perceptions assessment regarding common sub-systems requirements	Q5-Q20: Policy, top management commitment, integration concept, bureaucracy, goals and methodologies alignment, vision, management procedures, sub-systems interactions, integration process guideline, documental integration, OHS and Environmental responsible authority, add-value IMS, integrated objectives, IMS authority, indicators and integrated indicators.
Perception assessment between non-integrated to integrated performance	Q21-Q23, Q25: Add-value, performance comparison, integration levels.
Specific company characterization regarding IMS	Q24: audits typology, Q26: Integration sequence
	Q27: Non-integrable items identification
Motivations, benefits and Obstacles	Q28-Q30: Motivations, benefits and obstacles

3. RESULTS AND DISCUSSION

3.1. Surveyed Organizations Characterization

Figures 3 to 6 summarize the parameters chosen to characterize the surveyed organizations. Geographic location of sampled organizations (Figure 3) matches Portuguese certified organizations reality (Figure 1). Regarding to IMS typology (Figure 5) the correspondence is not so clear considering data reported on Figure 2. Figure 4 report the results regarding to organizations dimension (n° of employees). Santos *et al.* (2011) reported that Portuguese industry consists mainly of SMEs, making up 75% of the total labour force. Thus, at the moment, the surveyed organizations do not match the Portuguese reality being organizations dimension, related to n° of employees, higher than 100 workers (Figure 4).

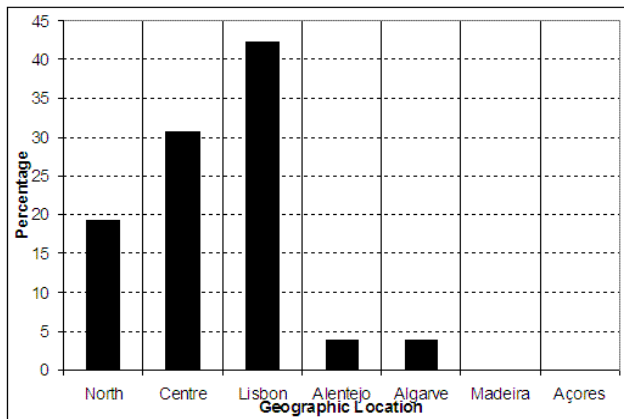


Figure 3- Location per NUT II Region

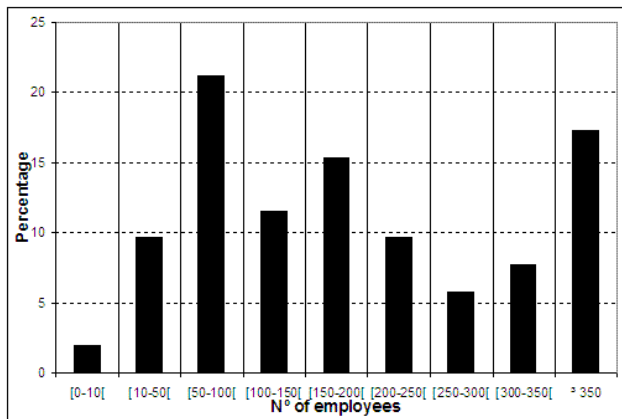


Figure 4- Organizations dimension (n° of employees)

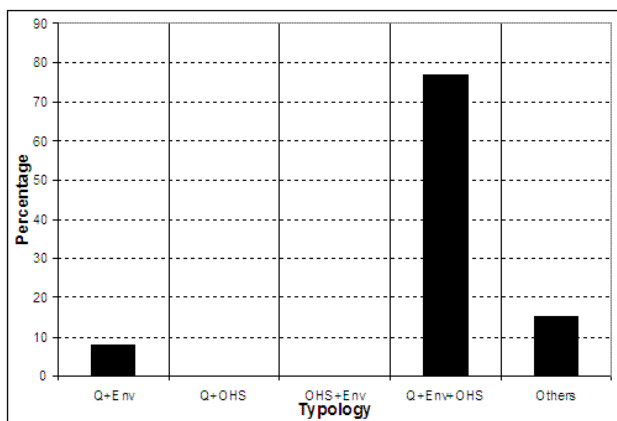


Figure 5- IMS Typology

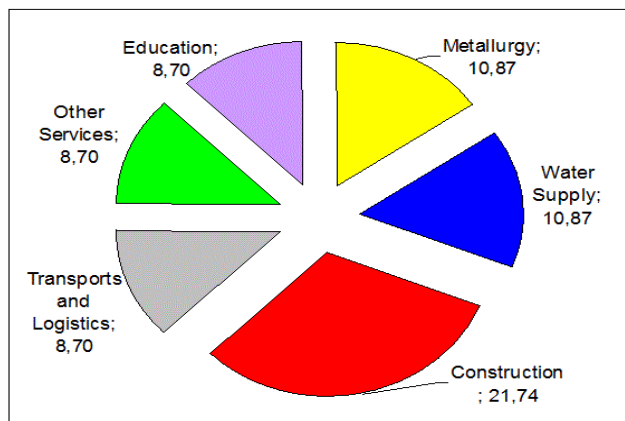


Figure 6- Main activity sectors surveyed

3.2. Motivations, Benefits and Obstacles

Internal or mainly internal motivations, benefits and obstacles were reported by organizations related to the integration process (Table 3). Several authors classified internal motivations as the *true* ones enhancing and promoting the most beneficial organizational outputs. Improvement of the organizational performance has been identified on companies mainly driven by internal motivations. Companies driven by external or mainly external motivations experienced higher external acceptance improvement and external requirements compliance but a positive correlation with internal improvement performance on their processes had not been reported.

Table 3- Motivations, Benefits and Obstacles regarding IMS implementation process

Type	Motivations	Benefits	Obstacles
Internal	23%	17%	44%
External	2%	4%	6%
Both, but mainly internal	52%	64%	42%
Both, but mainly external	23%	15%	8%

3.3. Integration Sequence and Audits Typology

An *All-In* or *Step by Step* (sequential) integration sequences were identified earlier in literature review. Results presented at Figure 7 suggest that a *Step by Step* integration sequence has been the option chosen by almost 65% of the sampled companies. This fact could be related to the company *life cycle*, that is the availability of management sub-systems standards at the moment when the decision to proceed with integration process was assumed. A *Step by Step* integration sequence and its organizational outputs have been addressed elsewhere (Domingues *et al.*, 2011d). Hence, decision degrees of freedom were lesser to companies which decided management systems certification when a single standard had been released.

When performing an audit under an IMS context several strategies could be followed, namely, sequential, overlapped, simultaneous or integrated. The nature of these strategies could be found in more detail at Domingues *et al.*, (2011c). Overlapped audits have not been reported by any of the sample companies as we may see in Figure 8. Reported audits typologies were integrated (75%), simultaneous (21%) and sequential (4%).

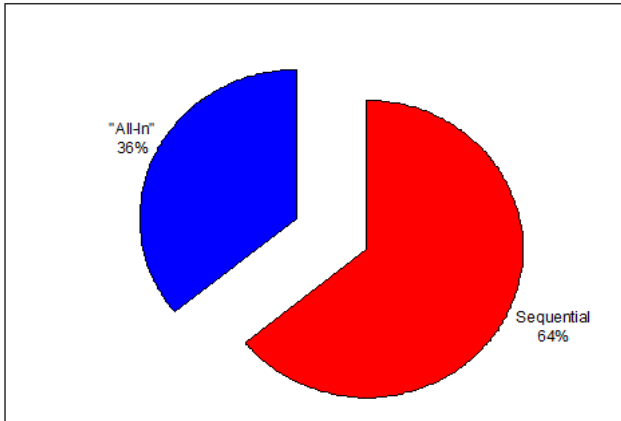


Figure 7- Integration sequence

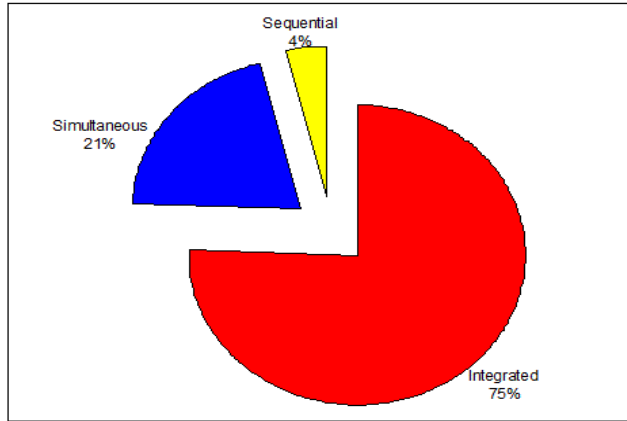


Figure 8- Audit typology

The analysis of Figure 9 shows that systems managers consider that standards integration, namely ISO 9001, ISO 14001 and OHSAS 18001 is easy or, at least, reasonably easy. In fact, noticeable efforts emphasising standards compatibility had been developed by ISO in last revisions. Regarding the identification of organizational items not susceptible of integration (Figure 10) a major division is detected. Nearly 55% of the companies identified items not susceptible of being integrated while almost 45% of the companies did not.

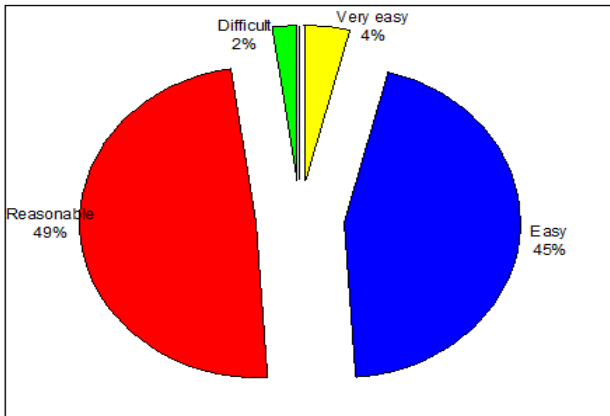


Figure 9- Sub-systems standards integration



Figure 10- Identification items not susceptible of integration

Figures 11, 12 and 13 relates with the perceived integration level achieved by companies. Only 4% of the surveyed companies considered a documental based integrated management system (Figure 12). This in accordance with results of Figure 11, that is, 4% of the respondents considered their management systems as low integration level. The common organizational structure (plus (1), (2) and (3)) option was chosen by 86% of the companies. Curiously, this model is not perceived by the companies as being the ultimate excellence integration model since just 6% of them thinks their management systems achieved the total/maximum integration level (Figure 11). Figure 13 suggests a reasonable relationship between IMS organization classification and integration level perceived, that is, results expressed in Figures 11 and 12.

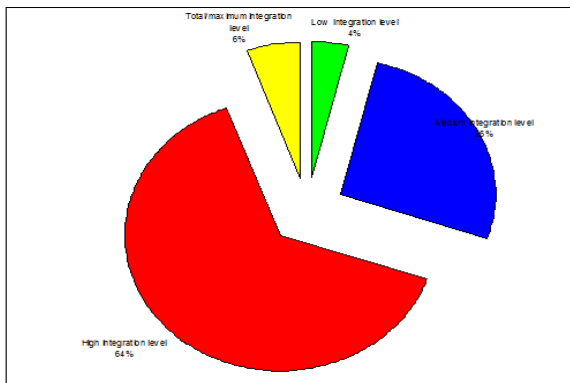


Figure 11- Integration level perceived

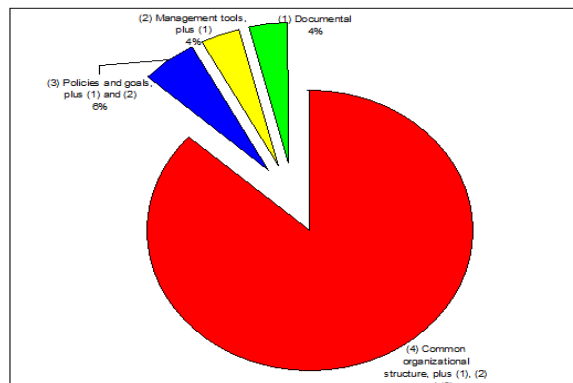


Figure 12- Integrated organizational structure

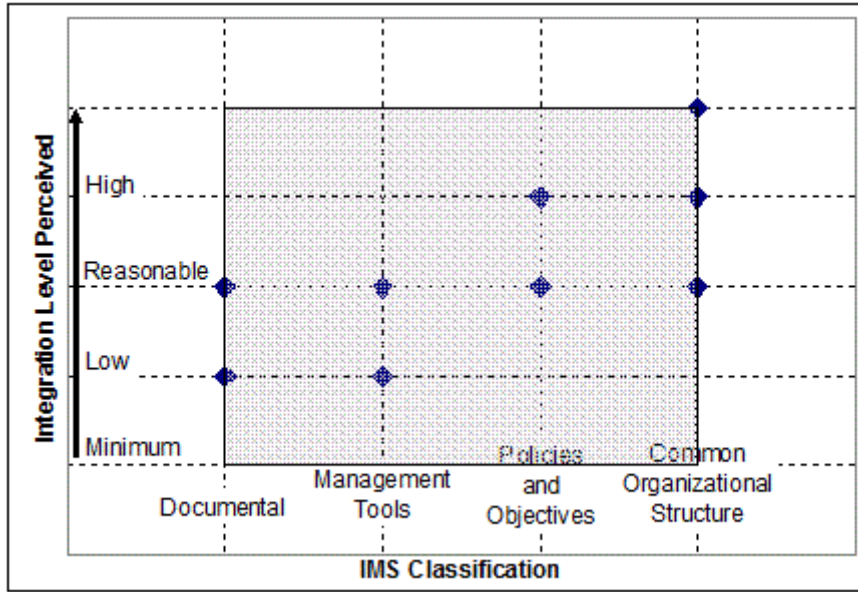


Figure 13- Correlation between IMS classification and classification level perceived

Performance comparison *pre* and *post* integration and IMS add value was surveyed and the analysis may be seen in Figures 14 and 15. Companies feel that its overall performance would be lower if a management system sustained on separated sub-systems ruled their organizational structure (Figure 14). Thus, almost every companies perceived the implemented IMS as an add value (Figure 15).

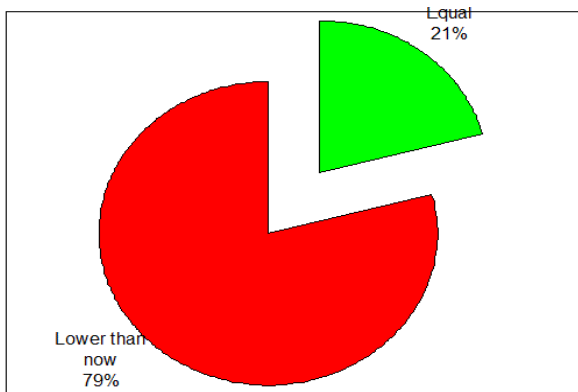


Figure 14- Management System Performance

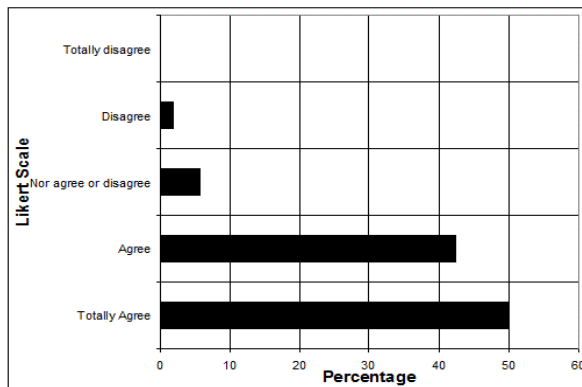


Figure 15- IMS perceived as add value

Authority and responsibility related to the IMS and the QMS, EMS and OHMS as been addressed in the survey (Figures 16 and 17). According to the analysis of Figure we may conclude that neither EMS and/or OHSMS responsible have a decorative functions on the companies surveyed. Also the analysis of Figure 17 suggests that an IMS responsible is clearly present coordinating all inputs from sub-systems, providing and rationalizing suitable outputs according the different sub-systems available.

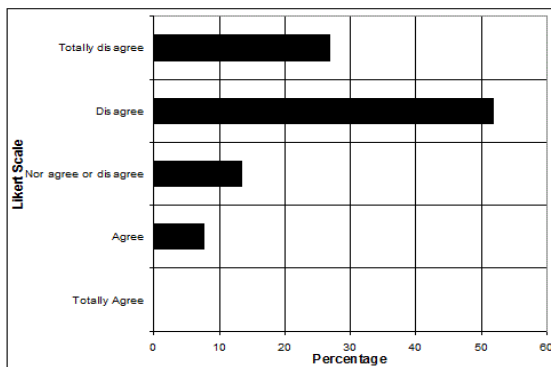


Figure 16- EMS and/or OHSMS responsible authority is residual

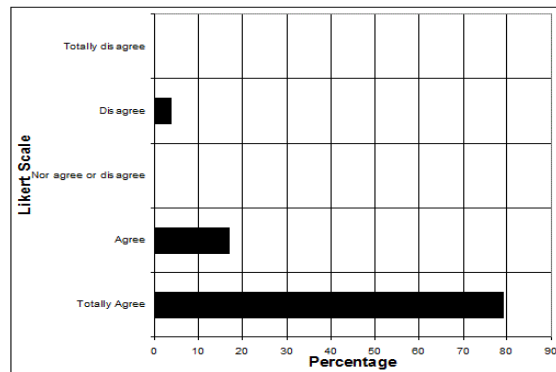


Figure 17- IMS responsible

Related to the definition of indicators (Figures 18 and 19), process, operation and management monitoring almost all companies agreed that monitoring was performed by key process indicators (KPI's), operations process indicators (OPI's) or management process indicators (MPI's). Similar results were found when asked about monitoring with integrated indicators, that is, indicators embedding quality, environmental and occupational and health and safety quantifiable issues.

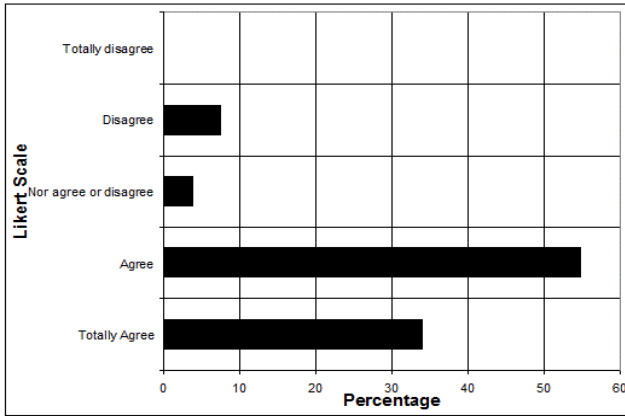


Figure 18– Integrated Indicators

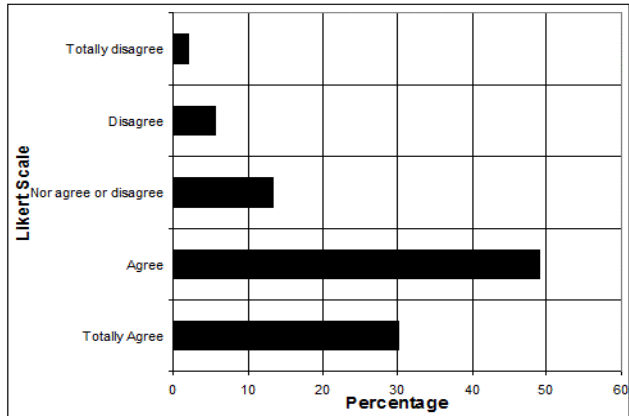


Figure 19– KPI's, OPI's and MPI's

Figure 20 relates two items assessed by the survey: the training provided to top managers and their integrated vision. Results suggest that companies where training related to integration have been provided to top managers improved and broaden their integrated vision.

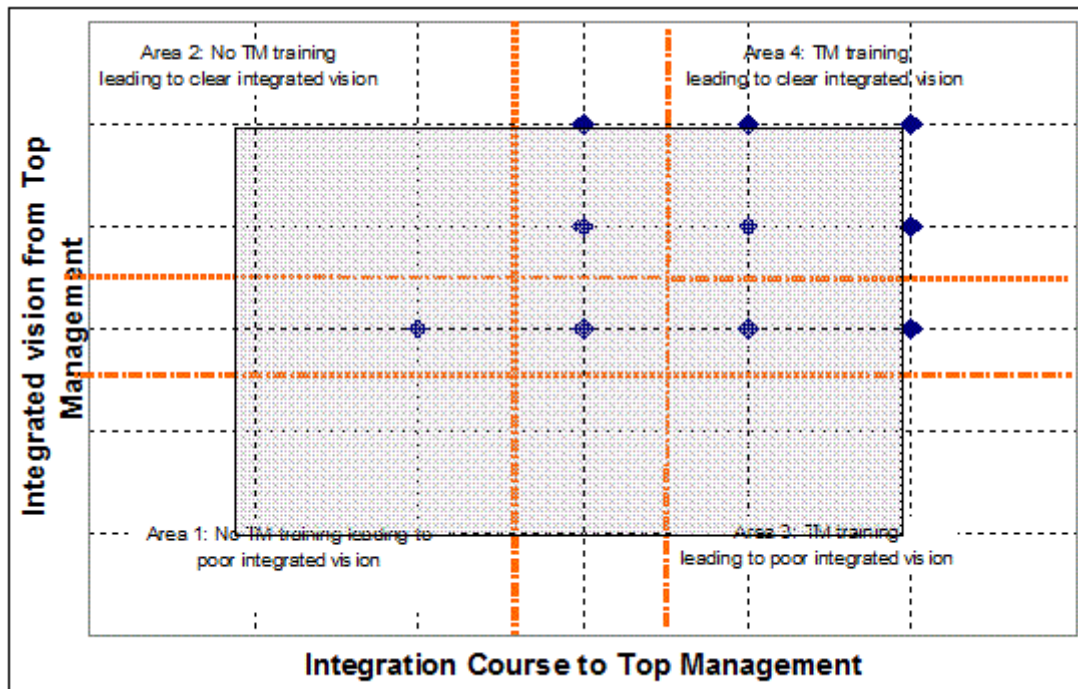


Figure 20- Training to top managers versus integrated vision

4. CONCLUSIONS

Methodologically supported on an online survey, the current study used a sample of companies that matches Portuguese geographical distribution organizations and IMS typology distribution. Company dimension (n° of employees) and activity sectors are partially reproduced by the surveyed companies comparing with the last available data. According to the obtained results, internal or mainly internal motivations, benefits and obstacles before, during and after integration process were reported by the majority of companies. A *Step by Step* integration sequence and integrated audits seem to be the current strategies followed by IMS ruled companies. Regarding first framework proposal (Table 1), some adjustment on relative level location of some KPA's should be considered.

A major groundbreaking dividing point between surveyed companies is related to the identification of organizational items not susceptible of being integrated. In fact, identification *per se* of such items suggests a high maturity level. Another possible question in order to sharpen the maturity notion could be focused on if those items were correctly identified or not.

Sub-systems implementations standards are found to be easy or reasonably easy to integrate among each other. This fact is certainly related with the efforts developed by ISO on emphasize compatibility between standards.

The majority of the responsables for the management systems feel that company performance would be lower if running though separate management sub-systems. Not surprisingly, IMS is seeing as an add value.

A traditional pyramidal structure seems to be the responsibility chain adopted by the surveyed companies. In fact, an IMS responsible is clear present at the surveyed companies and, at the same time; the authority of QMS, EMS and/or OHSMS is not residual suggesting that sub-systems responsible provide inputs to the IMS coordinator.

IMS monitoring is performed through key process indicators (KPI's), operations process indicators (OPI's) and management process indicators (MPI's). Integrated indicators including inputs from quality, environment and/or occupational and health and safety issues altogether seem to be often used by surveyed companies taking into account the available results.

Organizational structural level and integration level perceived have been compared and a noticeable correlation seems to emerge. Despite of this fact, systems managers do not feel that an ultimate and excellence integration level had been reached by their companies. Integrated vision from top management was surveyed and results suggest that training prior IMS implementation improve that item.

5. AKNOWLEDGEMENTS

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