

The management systems and the performance indicators - the integration way

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ABSTRACT

The last decade has seen the worldwide proliferation of management systems standards, preceded by a period of nearly twenty years where the quality assurance systems, which evolved later to quality management systems, were the only ones.

This diversity of standards accompanied the organizations changing needs in the optimization of its subsystems and systematization of management promoted by market imperatives, customer, statutory regulations, the dictates of regulators of the sector, as well as by concerns of efficiency improvements and operational control.

This implied a systematic orientation towards integration of the different management systems. However, in Portugal, after a decade of coexistence of various subsystems, the effective integration is not a current reality. In addition, overlapping and partial integration continues to prevail, either through lack of knowledge or incapacity of those who run the systems, either by structural difficulties of the organizations or even top management options.

However, stakeholders learning process - leaders of organizations, consulting, certification or normalization entities - although with rhythms and different approaches, led to a significant development, both in the aspect of regulatory harmonization and consolidation of intra-organizational practices, as well as use of monitoring tools and performance indicators from the perspective of systems optimization in the service of an appropriate response to the increasing demands of the dynamics of current management.

The data collection methodology used in this study was supported by a set of semi-structured interviews. The results obtained constitute the scope of the analyses and the conclusions of this publication, with crossing findings to other published studies in this domain.

Important findings of this study are that there is not a unique methodology for integration and that there is still an inefficient use of KPI systems for decision support, mainly within the integrated systems.

The critical success factors towards the integration of management systems are essentially inner motivation for the integration and top management commitment as well as competent and professional organization governance, regardless the sectors involved.

Keywords: Integrated management system (IMS); Key performance indicator (KPI)

1. INTRODUCTION

Through the last decade, the expected development of the various systems/subsystems in an organization points to their integration, what was recognized as a positive balance, between the advantages and disadvantages, in adopting this approach.

Given this trend it could be expected orientation of the International Standardization Organization on the development of regulatory frameworks oriented to the integration of management systems. However, the option was to evolve the various standards on its responsibility - determining that the other normalization bodies to do the same - towards the harmonization and alignment in terms of structure and requirements.

It is evidenced by the results of several studies published in this context – Karapetrovic, Willborn (1998), Jorgensen, *et al* (2006), Bernado, *et al* (2008), Sampaio, *et al* (2008), Wilkinson; Dale (2001), Wilkinson, Dale (1999), Zeng, Lou (2007), Zutshi; Sohal (2005), Karapetrovic (2002), Matthias, Coelho (2002) and Seghezzi (2000) – that one of the difficulties of organizations in integrate their management systems results from the understanding of the standards and a harmonized use between them. This explains the initiatives taken by national standards bodies of the United Kingdom, Denmark and Spain towards the development of guidelines for management systems integration (BSI, 2006; DS 8001:2005, AENOR, 2005).

Given this reality, it was identified to be relevant the development of this research project whose aim is to create knowledge in the integration of management systems, oriented to provide to the enterprises, self-assessment tools to evaluate their IMS maturity level and best practice's guide to implement and maintaining an integrated management system - quality, environment and safety (QES) - as well as the definition of guidelines for the establishment of systems performance indicators that support and drive their organizations towards the effectiveness and efficiency of its integrated management systems.

2. MATERIALS AND METHODS

The data collection methodology used was supported by a set of semi-structured interviews, was carried out in two distinct phases.

The first phase was oriented to professionals and entities that have an active and relevant role in QES's Integration Management Systems - third-party auditors, technical committees responsible of national and international standardization bodies for quality, environment and safety management systems, as well certification entities managers and academics with work developed and published in these domains.

The results of the first phase contributed to the selection of the companies with QES's integrated management systems. This selection constituted the second phase of data collection in this study.

As support tools for the mentioned interviews, have been developed checklists with open and oriented answer questions, related to the development of the systems as well as to the approaches to their implementation, including the use of key performance indicators and its support in decision-making.

The results obtained in the first phase constitute the scope of the analyses and the conclusions of this publication, with crossing findings to other published studies in this domain.

3. RESULTS AND DISCUSSION

The present study results and this discussion focus on twenty third-party auditor's interviews.

This first phase interviews survey covered the following aspects:

- Motivations for management system integration;
- Management system integration difficulties;
- Management systems integration strategy;
- Integrated Management System (IMS) responsibility structure
- Approaches to integration.
- Integrated elements
- Assessment tools;
- IMS maturity analysis;
- Levels of integration;
- Integration evolution;
- Obstacles to a better integration;
- Strategy to integration level improvement.

Data analysis focuses on open questions contents and descriptive statistics for closed ones.

3.1. Motivations for Management Systems Integration

The motivations identified, for integration, were of external nature but mostly of them have internal purposes.

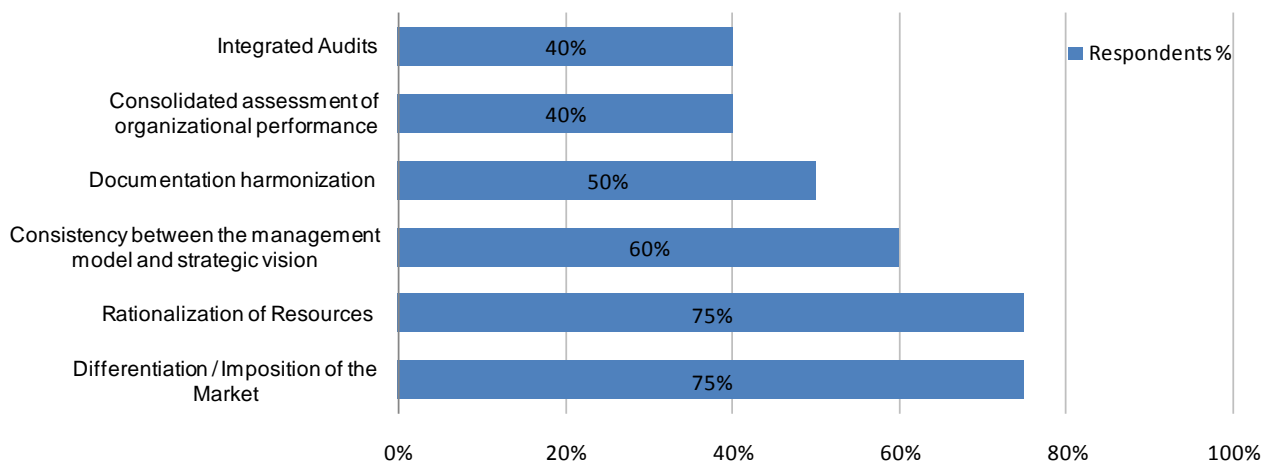


Figure 1 - Motivations for Management Systems Integration

Through the results represented above, can be concluded that the most important motivation of external nature was "Differentiation / Imposition of the Market") and the one of internal nature was "Rationalization of Resources". This fact is consistent with the study published by the authors Sampaio; *et al*(2009).

3.2. Management system integration difficulties

The most important factors related to this issue were: "Difficulty in obtaining multidisciplinary expertise to the various systems" and "Threat of loss of hierarchical power or loss of job".

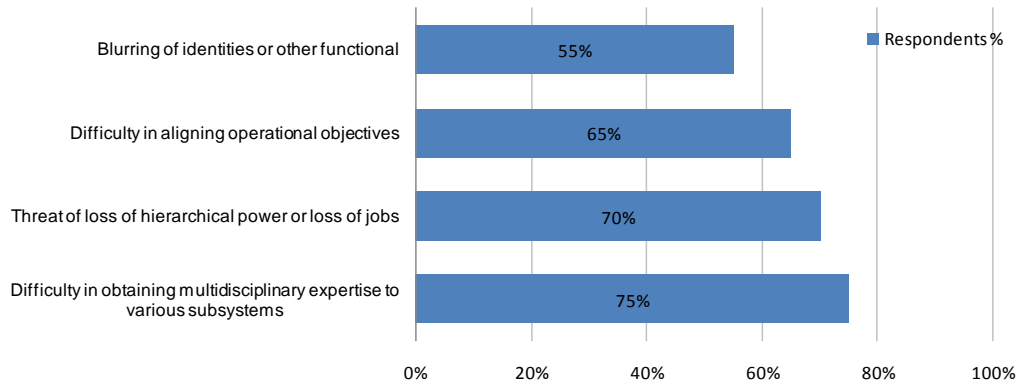


Figure 2 - Management system integration difficulties

The results presented here about the difficulties in integrating systems are converging with those published by Karapetrovic; Willborn (1998), Jorgensen, Remmen, Mellado (2006), Bernado, *et al* (2008), Sampaio, *et al* (2008), Wilkinson, Dale (2001), Wilkinson, Dale (1999), Zeng, Lou (2007), Zutshi; Sohal (2005), Karapetrovic (2002), Matthias, Coelho (2002) and Seghezzi (2000).

3.3. Management systems integration strategy

The reason for the integration to be phased or not, is due to multiple sources of constraints or priorities of the business and of the organization. The literature presents several studies on the sequence of systems integration, mainly Karapetrovic; Willborn (1998) and Labodova (2004) that confirm the diversity of approaches concerning this aspect.

3.4. IMS responsibility structure

Concerning IMS structure responsibility the results show a greater predominance to a single manager, allowing the structure to unfold in the management of each subsystem.

3.5. Approaches to integration

The majority of the respondents pointed out that the best path to integration is based on the process approach together with the PDCA methodology. This conclusion was also reached by Karapetrovic (2002), Karapetrovic; Jonker (2003), Karapetrovic (2003), Jorgensen, *et al* (2006), Zeng, *et al*(2006), Jorgensen (2008), Fresnes, Engelhard (2004), Matthias; Rabbit (2002), McDonald, *et al* (2003), Karapetrovic; Willborn (1998) and Holdworth (2003).

3.6. Integrated elements

The general opinion of respondents points to the possible integration of all IMS components, based on two major trends:

- Audits, Management Review, Policies, Documentation and Resources are considered with the greatest potential for integration,
- Processes and Indicators appear to be least integrated elements.

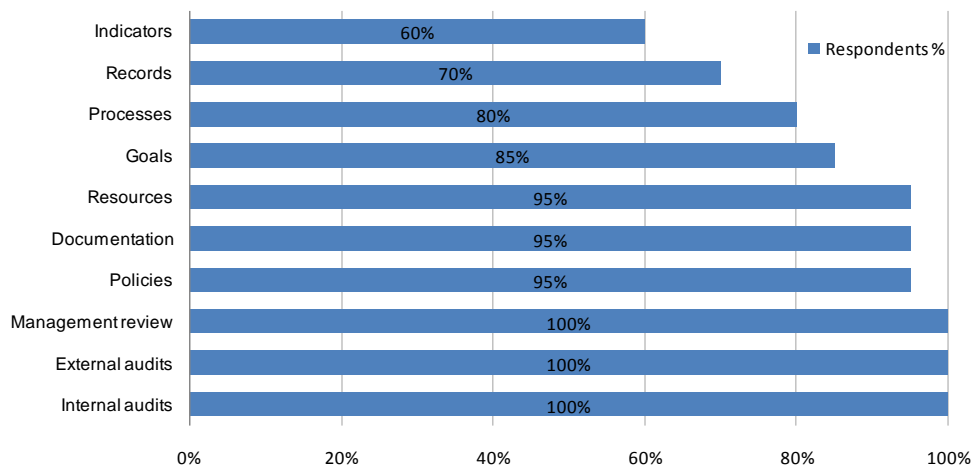


Figure 3 - Integrated elements

The references in the literature in the context of integration elements have very different studies that advocate, either the full integration of the system components, either the integration of a more or less restricted set of elements that the authors consider to be integrated. ISO Guide 72:2001 is a global regulatory framework for the development of management systems standards, which promotes the alignment of requirements and inter-systems elements. Studies published by Karapetrovic (2002), Karapetrovic (2003) and Karapetrovic; Willborn (1998) also highlight the need for such alignment and harmonization.

3.7. Assessment tools

The general opinion of the respondents indicates as assessment tools the key performance indicators, mostly applied in each subsystem for processes evaluation. Generally, they point to incipient integration practices in relation to key performance indicators. Even, some of them, put into question the feasibility and added value for organizations of such systematization.

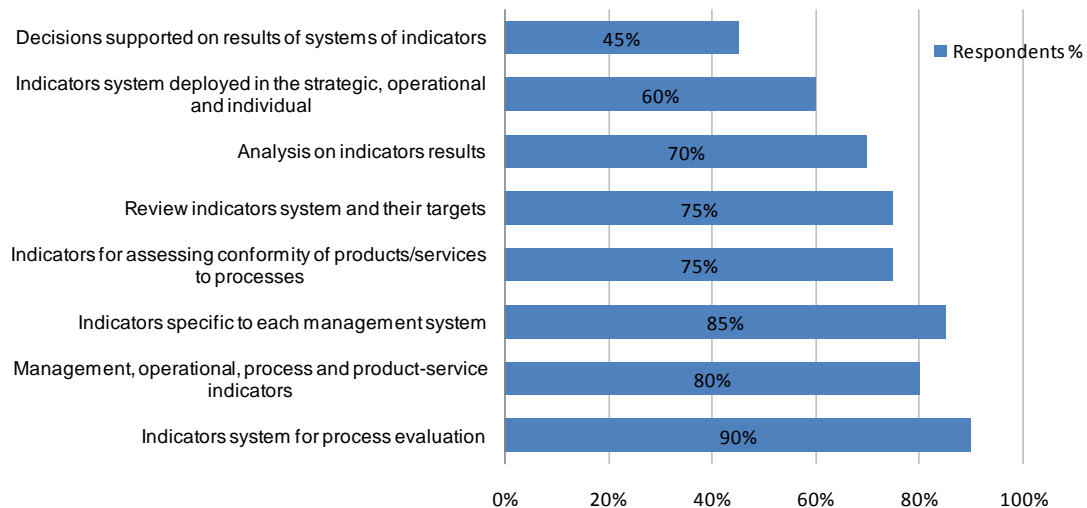


Figure 4 - Assessment tools

References in the literature about integration practices in relation to key performance indicators (KPI) are scarce. There are some normative guidance - AENOR (2003) and EN (2009) - whose are not on organizations knowledge and do not constitute a basis for their guidance. There are also studies that established methodologies for KPI's systems design and implementation: Sousa *et al* (1994), Macarthur (1996), Neely *et al* (1996), Gonçalves (2002), Zinber *et al* (2002), Rodrigues *et al* (2009), Searcy *et al* (2008 and 2009), Carlucci (2010) and still Neves *et al* (2011) which refers to the state of the art in this domain.

3.8. IMS maturity analysis

The evaluation on IMS's maturity level based on these elements showed great diversity of opinions.

3.9. Levels of integration

Concerning integration levels, the following options were proposed to the companies:

- "Management systems individualized" - considered as level zero.
- "Understanding / identification of common elements" - considered as level 1.
- "Partial integration of these same elements" - considered as level 2.
- "Full integration of all common elements, including KPI's systems" - considered as level 3.
- "Organization culture learning" - considered as level 4 (holistic view of management systems integration).

Respondents agreed with the proposed levels for integration, and some of them, merged levels 1 and 2. Regarding level 3, some of them accepted it with a short characterization review. Regarding level 4, some consider it, not as a level, but as a goal of integration. Studies published in the literature about integration levels, present several models with different approaches. References are: Karapetrovic (2002), Wilkinson, Dale (1999), Jorgensen, *et al* (2005), Sampaio, Saraiva (2010) and Zeng, *et al* (2007).

3.10. Integration evolution

Most opinions were towards a positive evolution of integration, although with different perspectives. Some respondents believe that evolution was intra-organizational, during each management system review cycle, while others consider it in an extra-organizational perspective. Results are in line with recommendations in several literature references, mainly Karapetrovic (2002), Zeng, *et al* (2007) and Wilkinson, Dale (1999).

3.11. Obstacles to a better integration

The main reasons pointed as obstacles to a better integration were: "Lack of knowledge/skills in respect to standards, concepts and management practices", "cultural and organizational aspects of company's management".

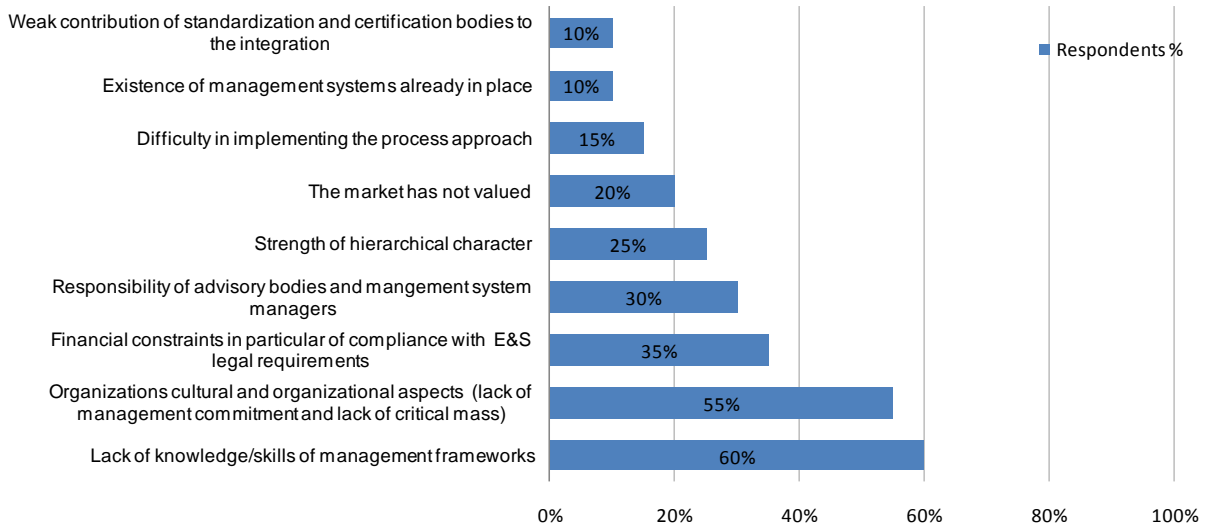


Figure 5 - Obstacles to a better integration

Those reasons determine the "lack of management commitment", constrained "internal critical mass" and emphasise "financial constraints, associated to the compliance with requirements for environmental and safety management systems standards".

3.12. Strategy to integration level improvement

The measures that were considered more relevant were: "More academic and professional training ", "Changing organization culture", "Management commitment" and "Professional management and innovation".

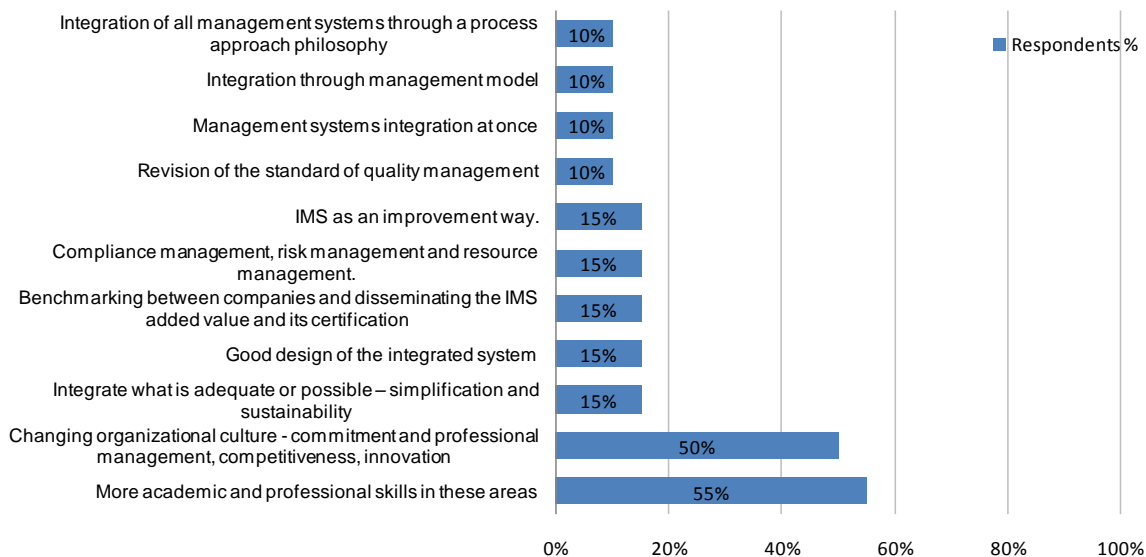


Figure 6 - Strategy to integration level improvement

The literature presents studies converging with these results, in particular, Zeng, *et al* (2007), Zutshi; Sohal (2005), Jorgensen, *et al* (2006), Wilkinson, Dale (1999), McDonald *et al* (2003), Rahim (1995), Zeng, *et al* (2007), Matthias, Coelho (2002), Zutshi; Sohal (2005) and Karapetrovic (2002), Pettigrew, Whipp (1991), Matthias, Coelho (2002) Crowe (1992), Fresno, Engelhard (2004), Holdworth (2003), Karapetrovic; Jonker (2003), Matthias, Coelho (2002), McDonald, *et al* (2003), Asif; *et al* (2008).

4. CONCLUSIONS

The results of this study at the level of motivations, difficulties, integration strategies and approaches to greater and better management systems integration are in line with the findings of several research works on this domain published in international reference journals and conference proceedings.

An important finding of this study is that there is not a unique methodology for integration. The IMS should be tailored to each organization, based on the model of the process approach together with the PDCA methodology. Top management commitment and involvement in IMS definition and implementation, as well as a competent and participated management through the various hierarchical and functional levels of the organization, are critical factors and/or facilitators to the success and added value towards an IMS.

The results of this study point to an inefficient use of KPI systems for decision support, either in each subsystem or within the integrated system. In addition, the results point to incipient integration practices in relation to key performance indicators, putting right into the question of the feasibility and the added value to companies with such systematization.

The great acceptance of respondents to the proposed empirical model levels of integration provides the necessary support for its use as one of the basis for the implementation of a self-assessment tool in organizations towards the IMS maturity.

The critical success factors towards the integration of management systems, as evidenced in this study, are essentially inner motivation for the integration and top management commitment - an integration motor - as well as a competent and professional organization governance, regardless the sectors involved.

5. REFERENCES

- AENOR (2003), "Guía para la implantación de sistemas de indicadores", Norma UNE 66175:2003
- AENOR (2005), UNE 66177: 2005. "Sistemas de gestión - Guía para la integración de los sistemas de gestión"
- Asif, Muhammad; Bruijn, Erik; Fisscher, Olaf; Searcy, Cory (2008), "Process Embedded Design of Integrated Management Systems", Proceedings of Production and Operations Management Society (POMS) 19th Annual Conference, La Jolla, California, U.S.A, May 9 to May 12, 2008.
- Bernado, M. Casadesus, M. Karapetrovic, S. e Heras, I. (2008), "Management Systems: Integration Degrees Empirical Study", Proceedings of the 11th Quality Management and Organizational Development Conference, Helsingborg, Sweden, Vol.33.
- BSI (2006), PAS 99:2006. "Publicly available specification - Specification of common management system requirements as a framework for integration"
- Carlucci, Daniela (2010), "Evaluating and selecting key performance indicators: an ANP-based model", *Measuring Business Excellence*, 14(02), pp 66-76.
- Crowe, T.J. (1992), "Integration is not synonymous with flexibility", *International Journal of Operations and Production Management*, 12(10), pp.26-33
- Fresner, J. Engelhard, G. (2004), "Experiences with integrated management systems for two small companies in Austria", *Journal of Cleaner Productions*, 12(06), pp. 623-631.
- Gonçalves, J. P.(2002) "Desempenho Organizacional", Seminário Econômico. São Paulo, n. 815, Ago/2002.
- Holdworth, R. (2003), "Practical applications approach to design, development and implementation of an integrated management system", *Journal of Hazardous Materials*, 104(01), pp.193-205.
- Jorgensen, T. Remmen, A. Mellado, M. (2006), "Integrated management systems – three different levels of integration", *Journal of Cleaner Production*, 14 (8) pp.713-722.
- Jorgensen, T. (2008), "Towards more sustainable management systems: through life cycle management integration", *Journal of Cleaner Production*, 16 (1) pp.1071-1080.
- Karapetrovic, S., Willborn, W. (1998), "Integration of quality and Environmental Management Systems", *TQM Magazine*, 10(3) pp. 204-213.
- Karapetrovic, S. (2002), "Strategies for integration of management systems and standards", *TQM Magazine*, 14(1) pp. 61-67.
- Karapetrovic, S., Jonker, J. (2003), "Strategies for integration of management systems and standards", *Total Quality Management*, 14(4) pp. 451-459.
- Karapetrovic, S. (2003), "Musings on integrated management systems", *Measuring Business Excellence*, 7(1) pp. 4-13.
- Labodova, A. (2004) "Implementing integrated management systems using a risk analysis based approach", *Journal of Cleaner Production*, 12(06), pp.571-580.
- Macarthur, John B. (1996) "Performance measures that count: monitoring variables of strategic importance." *Journal of Cost Management*, vol. 10, n. 3, p. 39-45,
- Matias, J. C. D. O.; Coelho, D. A. (2002), "The integration of the standards systems of quality management, environmental management and occupational health and safety management", *International Journal of Production Research*, 40(15) pp. 3857-3866.
- McDonald, M.; Mors, T.A., Philips, A. (2003), "Management system integrations: Can it be done?", *Quality Progress*, 36, pp.67-74
- Neely, A. et al. "Performance Measurement System Design: should Process Based Approaches be adopted", *International Journal Production Economics*, Amsterdam, v. 46-47, p. 423-431, 1996.
- Neves, A., Sampaio, P. (2011), "O uso de indicadores de desempenho nos sistemas de gestão integrados: estado da arte", Livro de Actas do Colóquio Internacional de Segurança e Higiene Ocupacionais, Universidade do Minho, Portugal, pp. 432-436, 2011.
- EN (2009), NP EN 15341:2009. "Manutenção – Indicadores de Desempenho da Manutenção"
- Pettigrew, A.M.;& Whipp,R. (1991) "Managing Change for Competitive Success". Oxford: Oxford:Blackwell.
- Rahimi, M. (1995) "Merging strategic safety, health and environment into total quality management", *International Journal of Industrial Ergonomics*, 16(02), pp.83-94.
- Rodrigues, Luis Henrique; Schuch, Cristiano; Pantaleão, Luis Henrique. (2003) "Uma abordagem para construção de sistemas de indicadores alinhando a teoria das restrições e o Balanced Scorecard", Encontro da Associação Nacional dos programas de pós-graduação em administração", 27, 2003, Atibaia. Anais. Atibaia: ANPAD, 2003

- Sampaio, P. Saraiva, P. (2010), "Integração ou adição de sistemas de gestão", Revista Qualidade – Primavera – Verão 2010, Edição 01, Ano XXXIX, pp. 36-40.
- Sampaio, P. Saraiva, P. Guimarães Rodrigues, A. (2009), "Desenvolvimento e validação de metodologias de classificação para as motivações subjacentes à obtenção da certificação ISO 9001 em Portugal", Revista Qualidade – Primavera, Associação Portuguesa para a Qualidade, pp. 23-32.
- Searcy, Cory; McCartney, Daryl; Karapetrovic, Stanislav (2008), " Identifying Priorities for Action in Corporate Sustainable Development Indicator Programs", Business Strategy and Environment, 17, pp. 137-148
- Searcy, Cory. McCartney, Daryl. Karapetrovic, Stanislav. (2009), " Designing Corporate Sustainable Development Indicadores: Reflections on a Process", Environmental Quality Management, Autumn 2009, pp. 31-42.
- Seghezzi, D. (2000) "Proceedings of 44 th European Quality Congress", Paper presented at the 44th European Quality Congress, Budapest.
- Souza, R, Mekbekian, G, Silva , M, Leitão, A; e Santos, M (1994). "Indicadores da qualidade e produtividade.", Sistema de gestão da qualidade para empresas construtoras. São Paulo.
- UNE 66174 "Guía para la evaluación del sistema de gestión de la calidad según la Norma UNE-EN ISO 9004:2000"
- Wilkinson, G.; Dale, B.G,(1999) " Integrated management systems: an examination of the concept and theory", The TQM Magazine, 11(2), pp. 95-104.
- Wilkinson, G.; Dale, B.G,(1999) " Integrated management systems: an examination of the concept and theory", The TQM Magazine, 11(2), pp. 95-104.
- Wilkinson, G.; Dale, B.G (2001), "Integrated Management System: A model based on total quality approach", Managing Service Quality, 11(05), pp.318-330.
- Zeng, S., Shi, J., Lou, G. (2007), "A synergetic model for implementing an integrated an integrated management system: an empirical study in China", Journal of Cleaner Production, 15(18) pp.1760-1767.
- Zinber, Moises Ari; Fischmann, Adalberto A. "Competitividade e a importância de indicadores de desempenho: utilização de um modelo de tendência" Encontro da Associação Nacional dos programas de pós-graduação em administração", 26, 2002, Atibaia. Anais. Atibaia: ANPAD, 2002.
- Zutshi, A., Sohal, A.S. (2005), "Integrated management system: The experience of three Australian organisations", Journal of Manufacturing Technology Management, 16(02), pp.211-232.