

Abstract

This research aims to develop ISO₂, an approach for the joint development of information systems (IS) and ISO 9001 quality management systems (QMS). ISO₂ was initially outlined from 14 retrospective case studies that occurred between 2008 and 2012. We then validated and refined the approach through action research. We support the idea that IS and QMS synergies are more important than the perspective of one system merely supporting the other. The ISO₂ combines iterative development steps with a layered and incremental design framework. The run-time phase of the IS and QMS lifecycle also requires the creation of a shared IS quality culture. Over one million companies struggle to improve the IS and the QMS integration. Our findings will offer new insights for the joint design and run-time of these two organizational systems.

Introduction

ISO 9001 is a standard for quality management, adopted by more than one million companies worldwide. ISO 9001 requires the internal development of management procedures, work instructions, improvement plans and a demanding measurement system. The external information flows are just as important. Therefore, the QMS becomes a tool to manage the relations between the organization and its environment. The IS development (ISD) must consider the influence of the business environment and internal characteristics of the company, such as its politics and procedures. Moreover, the IS has a significant impact in quality management and performance. The IS and quality departments do not usually leverage the synergistic potential in combining their efforts. Grounded on narrow perspectives, quality experts view the IS as mere support, while the IS experts view the QMS as mere compliance. There is a need to create a shared organizational view of the IS and the QMS. A framework for researching synergies was based in a systematic literature review of 98 articles, summarized in the figure 1.

Table 1. Findings from the 14 retrospective case studies

Dev. Phase	IS and QMS separated development
Before	The development or acquisition of IT was a quality manager's decision in 11 cases. In 12 cases, the ISD was planned after the QMS project started, therefore, only at this stage the IS team was involved.
During	The IS team "supports" quality by developing or buying software – a <i>supplier</i> role. The QMS team establishes priorities, IS requirements and workflows. The QMS team has adopted a <i>customer</i> role. Independently, the QMS team creates documents and the IS team creates IT solutions, for the same processes and users. Lack of communication as a cause for delays in the IS implementation, late changes and misfit between quality procedures and the developed IS. The process model of the QMS was reported (12 cases) as useless by the IS team.
After	The IS manager only integrates the improvement teams in 4 cases. After 3 years of certification (4 cases), the IS interest in ISO 9001 seems to be on the part that directly concerns with IT (for the audit). Ten of the ISD projects were still ongoing by the time of the final audit. Due to this delay, some users started to develop their own tools (an IS problem). In 13 cases, surprisingly, the persons responsible for managing software validation (mostly the calculations) are the QMS managers. Nine QMS managers stated that the IS does not correspond to their information needs, and 7 prefer to build their own tools (e.g. spreadsheets, parallel records) than waiting for IS changes. The IS managers complains that QMS is a bureaucratic system (14), that does not correspond to practice (8).

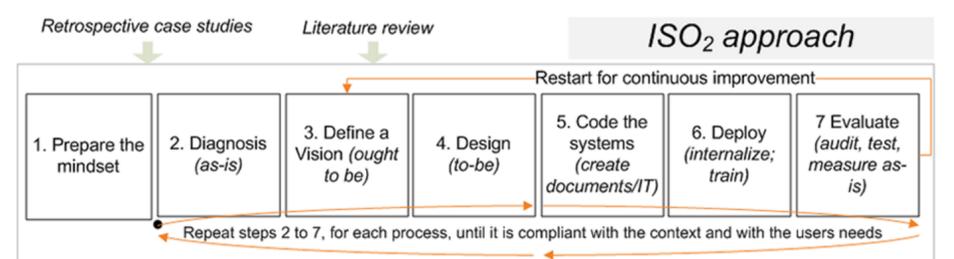


Figure 2. ISO₂ a joint development approach [2]

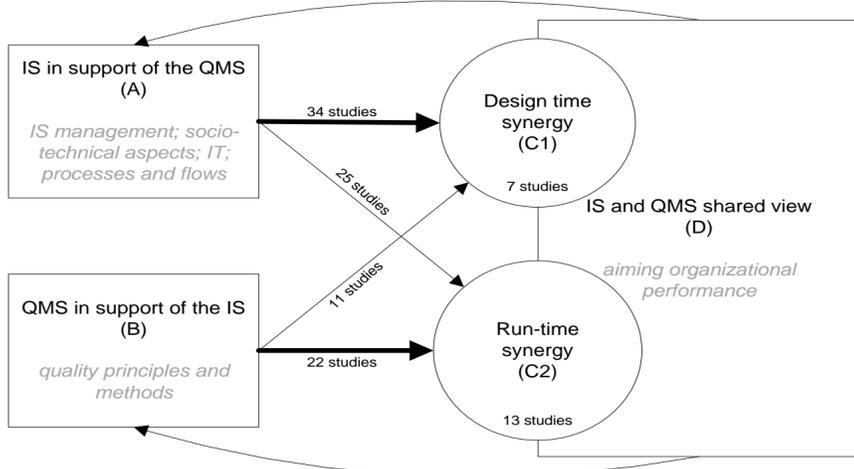


Figure 1. Research framework: IS and QMS synergies

Methods

This research adopts a dual methodology. In the first stage, we have performed 14 case studies [1, 2]. The data gathering techniques were the document collection and 28 semi structured interviews, carried out with the IS and the QMS managers. In the second stage, we have selected action research to develop, test and refine an approach to explore the design and run-time synergies of the IS and the QMS. The first cycle, in a technological institute, has guided the first proposal of the ISO₂ approach [2]. Three sequent cycles are now including additional standards and enforced regulations [3, 4, 5].

Design-time Synergies

The multiple case studies analysis have highlighted key issues in the disconnected development of the IS and the QMS. Table 1 summarizes what happened before, during, and after the IS and QMS development. An approach for the joint development was then created for the first action research cycle, presented in figure 2. The approach is under development and currently adopted in our action research cases (work in progress).

Run-time Synergies

After deploying and auditing the entwined IS and QMS, the organization needs to create a shared IS quality culture, to ensure the sustainability and continuous improvement of both systems. Our proposal suggests the mutual influence of IS quality and QMS principles, as illustrated in the figure 3.

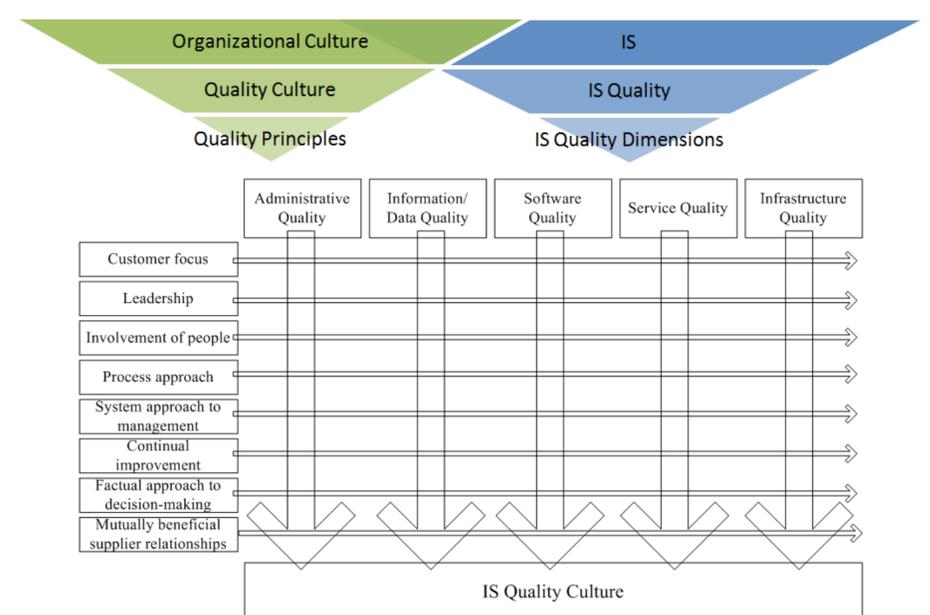


Figure 3. The foundations for an IS quality culture [4, 5]

Conclusions and Future Work

Our research contributes to the understanding and improvement of the IS – QMS interface in organizations. The proposal consists in (1) an approach to combine the development of both systems, eliminating redundancies and obtaining synergies, and (2) the foundations for a shared IS quality culture. We are currently working with action research to evaluate the impact of ISO₂ and to create practical tools that can help the organizations in the process.

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