Management Systems Standards: Diffusion, Impact and Governance of ISO 9000, ISO 14000, and Other Management Standards

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Management Systems Standards: Diffusion, Impact and Governance of ISO 9000, ISO 14000, and Other Management Standards[1]

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Contents

Abstract

Management systems standards have become ubiquitous, adopted by millions of organizations around the world. The ISO 9000 and ISO 14000 quality and environmental management systems standards are the most well-known, but standards exist or are emerging for many other aspects of management too. Such a widespread phenomenon invites many questions. Key among those are why organizations adopt these standards, what effect they have on organizations, and how the standards themselves are managed. Although the literature investigating these standards is vast, it is scattered across many disciplines, and largely disjointed. This monograph provides a comprehensive overview of the empirical research on ISO 9000, ISO 14000, and other management standards, revolving around the three key questions above.

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Highlights

- Scholars have brought a wide diversity of perspectives to bear in studying management systems standards, with the result that the literature is similarly diverse, scattered around a broad collection of journals, making it near-impossible to get an overview of what we do and don't know about the standards. (Page 8.)
- There is little formal knowledge about the early days of diffusion, where decisions by a few major players (firms, governments, or other stakeholders) can have an outsize influence on subsequent diffusion patterns. (Page 59.)
- The answer to the overarching question "does ISO 9000 or ISO 14000 improve performance" is a heavily qualified "yes," with the balance of evidence being stronger for ISO 9000 than for ISO 14000. (Page 106.)
- Implementation of the standards is not uniform, so research needs to take variations in degree of adoption into account. (Page 184.)

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Introduction

1.1 Introduction

Given how ubiquitous management standards such as ISO 9000 are today, it is hard to conceive that just a few decades ago the very concept of a management systems standard barely existed. When the quality management systems standard ISO 9000[1] was introduced around 1986, it did build on predecessor standards including the British Standard BS 5750 and various military specifications from the US Department of Defense. However, it is doubtful that many at the time expected ISO 9000 to end up being adopted by over 1.1 million organizations in over 180 countries, as has happened by December 2012.[2] The diffusion of

[1] Strictly speaking, there is no such thing as "ISO 9000." There are different versions of the standard, covering different scopes (such as the original ISO 9001, ISO 9002, and ISO 9003) or introduced at different points in time (such as ISO 9001:1994 and ISO 9001:2000). Similarly, the environmental counterpart consists of the original ISO 14001:1996 management systems standard with several other accompanying guidelines and standards, subsequently revised. Throughout this manuscript, we will usually refer to the shorthand "ISO 9000" and "ISO 14000" except where more precision is necessary.

[2] See "The ISO Survey of Management System Standard Certifications — 2012: Executive summary," available at http://www.iso.org/iso/iso_survey_executive-summary.pdf, last accessed November 18, 2013.

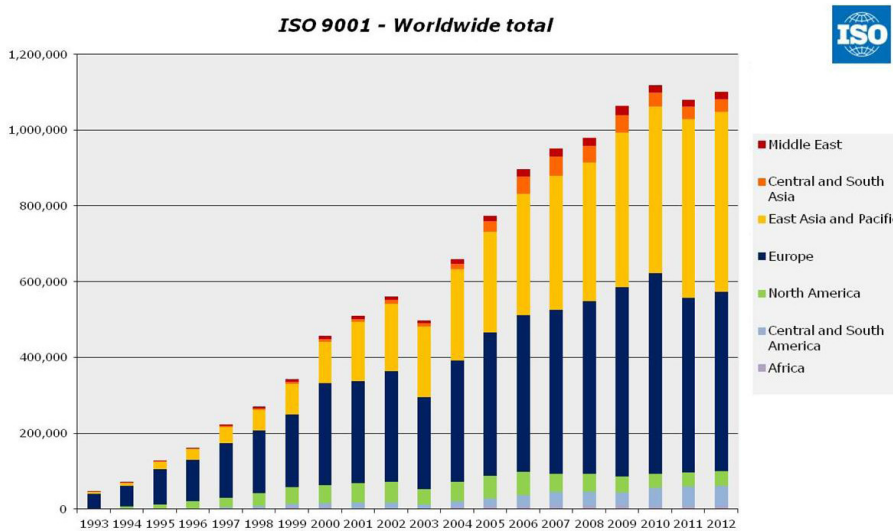

Figure 1.1: Evolution of ISO 9001 certificates over time (worldwide).
Source: http://www.iso.org/iso/iso-survey_2012.zip; last accessed April 15, 2014.

the environmental management systems standard ISO 14000 may not be quite as dramatic, but being adopted by over 280,000 organizations in over 160 countries by December 2012[3] is still a far greater adoption than many anticipated when the standard was first launched in 1997. Figures 1.1 and 1.2 show the global evolution of ISO 9000 and ISO 14000 certificates over time.

Moreover, the widespread acceptance of the concept of third-party certification of management systems (as opposed to physical products) owes much to the success of ISO 9000 and 14000. Numerous other standards have emerged for social accountability (AA 1000, SA 8000, ISO 26000), energy management (ISO 50001), and more. Many eco-labels, such as those by FSC (Forestry Stewardship Council), Fairtrade, and others, also borrow from the experience with ISO 9000 and ISO 14000.

[3]See "The ISO Survey of Management System Standard Certifications — 2012: Executive summary," available at http://www.iso.org/iso/iso_survey_executive-summary.pdf, last accessed November 18, 2013.

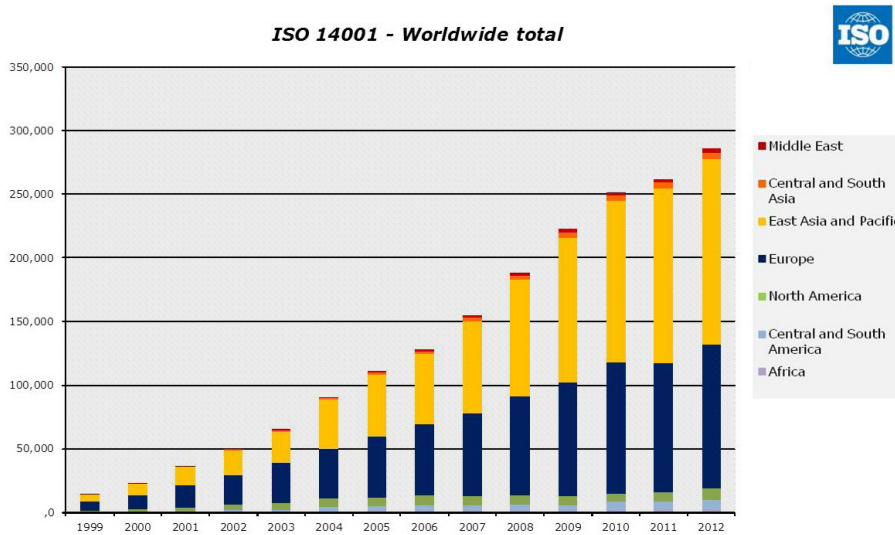

Figure 1.2: Evolution of ISO 14001 certificates over time (worldwide). Source: http://www.iso.org/iso/iso-survey_2012.zip; last accessed April 15, 2014.

In Article 2.1 of its statutes, the mission of ISO (the International Organization for Standardization) is stated as follows[4]:

> "The object of the Organization shall be to promote the development of standardization and related activities in the world with a view to facilitating international exchange of goods and services and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity."

One might view the widespread global adoption of the ISO 9000 and ISO 14000 as evidence that the standards are a success. At the same time, various reports, research studies, newspaper articles and individuals who have been directly involved with the standards, report a wide range of experiences with the effectiveness of ISO standards. Some report clear benefits from the adoption of ISO standards, including

[4]See "ISO Statutes," available at http://www.iso.org/iso/statutes.pdf, last accessed November 18, 2013.

increased sales, improved access to international markets, cost reductions, better communication with suppliers, as well as improved staff morale. The widespread adoption, including by many leading firms worldwide such as Bentley, Chrysler, DHL, DuPont, Fiat, Samsung, Nestlé, Royal Dutch/Shell, and many more, suggests that many firms do see benefits. Illustrations of positive experiences abound. The CEO of Samsung commented that they have achieved "operational benefits and effectiveness" with ISO 9000 certification.[5] DuPont reports that ISO 9000 and ISO 14000 provide "a reliable source of confidence in [their] supply chains."[6] The International Maritime Organization (IMO) recognizes the positive impact of ISO 28000 standards on supply chain security,[7] while the Wrigley Company acknowledges the positive impact of ISO 22000 on food safety in their supply chain.[8]

At the same time, the ISO 9000 and 14000 standards have been the subject of strong criticism: certified firms are said to adopt the standard in a ceremonial fashion and auditors are portrayed as biased profit-seeking entrepreneurs. The standards have also been the butt of many jokes, including several well-known Dilbert cartoons, such as the examples shown in Figure 1.3 and elsewhere in this monograph. These

Figure 1.3: Sample Dilbert cartoon illustrating skepticism of the ISO 9000 certification process.

[5]ISO Focus +, June 2012, Vol. 3. No. 6, pp. 3–5.
[6]ISO Focus +, July 2011, Vol. 2 No. 7, pp. 4–7.
[7]ISO Focus +, April 2012, Vol. 3. No. 4., pp. 3–5.
[8]ISO Management Systems, March-April, 2006, p. 25.

appear especially critical of the implementation of the standards (often done through mapping and documentation of unproductive processes) and of inefficiencies of external audits and consulting services.

Their widespread adoption, combined with these mixed reports of their effectiveness, make ISO 9000 and ISO 14000 fertile ground for researchers. Research into ISO management systems standards was not only sparked by these conflicting views, it was also fuelled by the relative transparency associated with the standards. This made it easier to identify adopters than is the case for many other management practices. By the standardized and externally verified nature of certification, it was easier to define unambiguously who has adopted. While many other management practices may also be widely diffused, such as Total Quality Management (TQM), Lean Production, Just-In-Time, Six Sigma, Enterprise Resource Planning (ERP) systems, matrix organizations, tele-commuting, performance-based compensation systems, etc., it is much harder to find out which organizations have purportedly adopted those practices, and the extent of adoption itself is also much more ambiguous.

Scholars from a multitude of disciplines have been inspired by the ISO standards, each bringing their own perspective. Scholars in the operations management (OM) community are particularly interested in finding out which firms adopt the standards why they do so, and what effect this has had on their performance, whether in operational or financial terms. Those in the strategy community ask similar questions but are more likely to ground their work in theories of competitive advantage or institutional theory. The accounting profession looks at ISO standards as one of many elements of a firm's activities that are externally verified and hence focuses more on the audit process.

A different angle comes from scholars in public policy and political science, who are often particularly interested in the extent to which standards can serve as de facto substitutes for government regulation, and how they affect the way in which firms and even countries compete with each other. Scholars whose main interests lie in environmental questions focus on whether the ISO 14000 standard helps to reduce firms' emissions.

An immediate consequence of this diversity of perspectives is that the literature on the ISO standards is similarly diverse, scattered around a broad collection of journals, making it near-impossible to get an overview of what we do and don't know about the standards. This monograph seeks to fill that gap, by providing an integrated perspective on the entire body of academic literature related to ISO 9000, ISO 14000, and related standards. Our aim for this monograph is:

> "To provide an overview of the academic empirical literature on ISO 9000, ISO 14000 and related management systems standards in order to improve the quality, relevance and coherence of that literature going forward."

The remainder of this introduction is used to describe the setting for this monograph. First, we provide an overview of the design, governance and evolution of the ISO 9000 and 14000 standards. We then offer a very short chronological overview of the evolution of research into ISO management standards. We conclude with a section "about this monograph," which provides details about the methodology we followed, intended audience, and novelty of the work.

1.2 Overview of ISO 9000 and ISO 14000 and other management standards

1.2.1 What are process standards or management standards?

Technical standards have existed for a long time, such as for voltage and frequency of electrical current, shapes and sizes of outlets and light bulbs, sizes of pallets and containers, etc. ISO alone has issued over 19,500 standards,[9] most of them technical. A physical test of the product is sufficient to determine whether it is compliant or not. In contrast, the process standards, or management systems standards, such as ISO 9000, do not concern the physical product, but rather the process by which the product is made. Over time, process standards

[9] See http://www.iso.org/iso/home/about.htm, last accessed November 18, 2013.

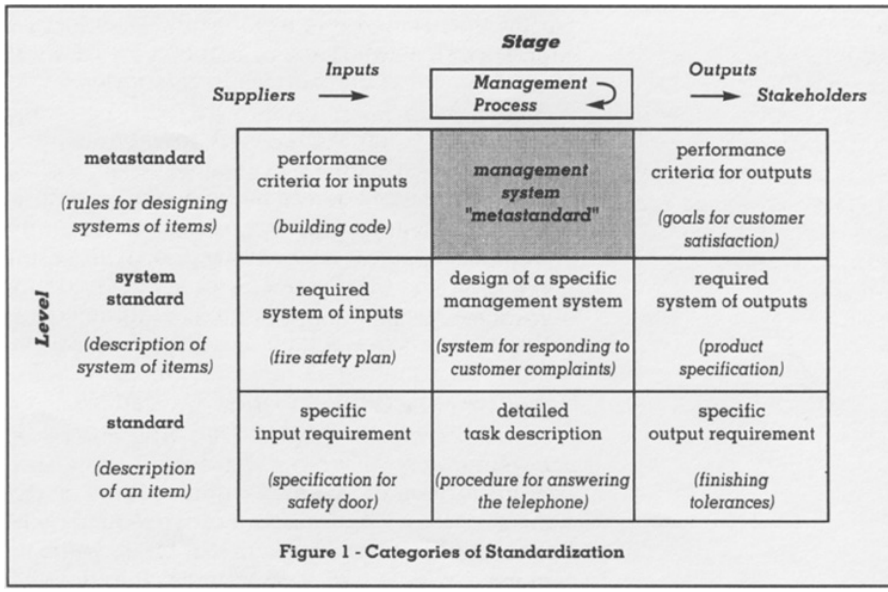

Figure 1.4: Categories of standards. Source: Uzumeri (1997), p. 22.

have started covering ever broader aspects of the management processes within which the physical transformation processes are embedded, leading to standards for areas such as energy management and risk management. These standards are also referred to as meta-standards. Figure 1.4, borrowed from Uzumeri (1997), shows how meta-standards compare to other types of standards. He refers to ISO 9000 as follows:

> "The key breakthrough in standardizing management practice came when standards-writers began to craft metastandards. The significance of this became evident when the first important example emerged to affect tens of thousands of companies around the world. ISO 9001, the metastandard document in the ISO 9000 family of quality standards, is arguably the most influential single metastandard so far." (Uzumeri, 1997, p. 23)

Regardless of their application domain, management standards share two key attributes. They rely heavily on *documentation* (of processes and performance) and are aimed at ensuring *consistency* (of outputs). The underlying assumption is that a firm that has defined best practices for its key processes and enshrined them in documentation, and actually follows those procedures in practice, will have good outputs, irrespective of what "good outputs" means in any specific instance. It does not mean that the firm will never produce a faulty output (whether a defective part or unintended toxic release) but that such errors will be relatively infrequent and that the firm has procedures to respond to such incidents and prevent recurrences.

Certification to a management standard then hinges on an auditor inspecting the firm's documentation and verifying whether the firm's employees actually follow the procedures laid out. Strictly speaking, certification says nothing about the actual output of the firm, but obviously the expectation is that when an external auditor confirms that a firm's documented procedures are adequate and that the firm follows them in practice, the output should meet expectations. Standards that aim to be equally applicable to steel mills and sandwich shops are necessarily generic and cannot include detailed specific performance standards. This indirect nature of the certification is a key reason for the skepticism surrounding management standards, but also what has enabled such a large body of academic literature to flourish.

1.2.2 ISO 9000 and ISO 14000

The most well-known and widely-adopted management standards are the ISO 9000 quality management systems standard and the ISO 14000 environmental management systems standard. ISO 9000 was developed during the 1980s. During that time, large firms (especially automotive assemblers such as Ford and Toyota) were increasingly adopting various forms of Total Quality Management (TQM), which engendered a shift away from inspecting quality of incoming parts to inspecting their suppliers' manufacturing processes. Suppliers were being audited repeatedly by each of their customers and were asked to keep separate sets of documents and metrics for each customer. The thought behind

ISO 9000 was to reduce the burden on suppliers by creating a single quality management standard that could be verified through a third-party audit. The standard has been revised a number of times since its introduction, for instance allowing a single company-wide certification (rather than requiring that certification be limited to specific product lines), and adding a stricter requirement to demonstrate continuous improvement.

Several years after the introduction of ISO 9000, global discussions were taking place related to GATT (the General Agreement on Tariffs and Trade, which was a predecessor to the World Trade Organization), aiming to remove as many obstacles as possible to international trade. A concern during those talks was that if trade were "too free," firms would move their polluting operations to countries with more lax environmental regulations. Harmonizing global environmental regulation through governmental mechanisms was considered out of the question, so the ISO community saw an opportunity to provide a non-governmental alternative, which became the ISO 14000 environmental management systems standard. This was released in 1996 and subsequently revised in 2004.

1.2.3 The governance system surrounding ISO 9000 and ISO 14000

The ecosystem surrounding ISO 9000 and ISO 14000 is quite complex. Though we discuss many aspects of the governance in more detail in Section 5, it is useful to highlight a few important features of the governance of ISO standards at this stage.

ISO itself is a non-profit organization. Its main members are the national standards bodies, "most broadly representative of standardization in their respective countries,"[10] such as the American National Standards Institute (ANSI) in the United States (US), the British Standards Institution (BSI) in the United Kingdom (UK), or the Japanese

[10]See "ISO Statutes," available at http://www.iso.org/iso/statutes.pdf, last accessed November 18, 2013.

Industrial Standards Committee in Japan.[11] Each of ISO's many standards are governed by a Technical Committee (TC), with representatives from relevant stakeholder groups. ISO/TC 176 oversees ISO 9000, while ISO/TC 207 is responsible for ISO 14000. The Technical Committees have many subcommittees which meet regularly to monitor how the standards are performing and to discuss possible modifications. [12] As the scope of the standards has increased, from quality to environmental impacts to social responsibility, the set of stakeholders involved in the technical committees has increased as well. All this effort is geared toward standards development and leads to the written documents, which are ISO 9000 and ISO 14000 and associated standards and guidelines.

The implementation and verification community is largely separate from the standards development effort. A firm seeking certification may start by contacting a consultant to assist with the necessary preparation and will hire a different certification body to perform the actual certification audit. Certification bodies vary from relatively small and local to large global firms such as BVQI, LRQA, ABS, DNV, and many others — some operating globally and some in just one or a few countries. The certification bodies themselves select one or more accreditation bodies to give them additional legitimacy. These accreditation bodies, such as the ANSI-ASQ National Accreditation Board (ANAB) in the US, the United Kingdom Accreditation Service (UKAS) in the UK, the Japan Accreditation Board (JAB) in Japan, and the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) inspect certification bodies and their auditors, including participating in the audits, to bring consistency to the audit process itself. Many of the accreditation bodies have mutual recognition agreements through the International Accreditation Forum (IAF). While this decentralized structure has its advantages, the absence of a single organization responsible for ensuring consistent implementation of the ISO standards is another factor

[11] See http://www.iso.org/iso/home/about/iso_members.htm for the full list of member bodies; last accessed November 18, 2014.

[12] The first author is a member of ISO/TC 176 nominated by Standards New Zealand and is a former nominated expert on ISO/TMB/WG SR for the development of ISO 26000 guidance standard on social responsibility.

that fuels many of the questions being raised in the academic literature regarding the effectiveness of the standards.

1.2.4 Other process-based standards

The ISO 9000 and ISO 14000 family of standards are the most widely adopted, and their success has given rise to numerous other standards. Some of those are within the ISO family, while others are modelled after the ISO standards but not directly connected to ISO. Soon after ISO 9000, several industry-specific quality management standards came along (QS 9000 and TS 16949 for the automotive sector, TL 9000 for telecommunications, and CMM for software), each using their narrower scope to be more prescriptive. Once the ISO 14000 series had demonstrated that management systems could cover performance dimensions other than quality, standards emerged for safety (OHSAS 18001) and social responsibility (AA 1000, SA 8000, and ISO 26000). ISO also continues to expand into other areas, recently including information security (ISO 27001) and energy management systems (ISO 50001). Though there are inevitably many differences between all these standards, in terms of their objectives, design, requirements, governance, and so on, they all still share the same basis of documentation and consistency.

1.3 Research into ISO 9000 and ISO 14000

Academic research on ISO 9000 and ISO 14000 is as old as the standards themselves, though the nature of that research has naturally evolved over time, drawing on a wide range of theoretical and methodological perspectives. The earliest research on ISO 9000, starting in the late 1980s, consisted either of conceptual discussions of ISO 9000 and how it related to other existing practices, or focused on case studies of implementation. Soon after, the first descriptive surveys started appearing, often reporting which firms were adopting, what motivations those firms mentioned for seeking certification and what benefits they claimed to experience. As data on adoption across countries became available, by the mid-1990s, more studies started to appear, which

examined national adoption levels. They either tried to explain variations in national adoption as a proxy for explaining variations in firm-level adoption, or genuinely tried to explain global diffusion of the standard. In parallel, studies started combining the adoption data with other databases, to measure the impact of ISO 9000 certification on firm performance using independent rather than self-reported measures. Survey research continued, often becoming more mature, with stronger theoretical foundations, larger samples, and more careful methodologies. As research continued to uncover mixed motivations and often positive, but still mixed results, on the impact of certification, more questions arose about the effectiveness of the system by which the ISO standards are implemented, leading to an emerging body of research on variations in auditing practice and other questions of governance. Some of this stream of work is quantitative, but the paucity of data on the audit process means that much of this work is still primarily conceptual or based on case studies.

The chronology for ISO 14000 is quite similar, with the difference that better adoption data and (environmental) performance data were available from the very beginning. This allowed the ISO 14000 literature to mature more quickly than that of ISO 9000. The literature on other management standards is still too sparse to be able to identify a clear chronology in their development.

What is it about ISO 9000 and ISO 14000 that makes so many scholars study them? The standards themselves are quite dry. Among the vast number of practitioners who have been involved with these standards, there are many who have found the process less than exciting. On the other hand, from a research perspective, the standards have much going for them. They have been more widely adopted than most other management practices, in terms of the number of adoptions and geographical spread. They also touch upon a wide range of aspects of management, including quality, operations, environmental management, safety, social responsibility, and more. As a result, more individuals in practice have been exposed to ISO 9000 and ISO 14000 than to many other management practices. At the same time, opinions about the value of the standards diverge widely, making this fertile

ground for research. Facilitating that research, data on certification are relatively available and unambiguous. This is unlike most other management practices, such as TQM, JIT, Six Sigma, adoption of ERP systems, or others, where surveys or interviews are usually needed to measure adoption. In contrast, "adoption" of ISO 9000 or ISO 14000 is a discrete phenomenon with third-party verification. (That said, we will see later that there is evidence that the quality of implementation does vary across firms.) While it is hard to imagine a subject matter drier than ISO 9000 and ISO 14000, it has proven an inexhaustible inspiration for academic research.

1.4 About this monograph

By first explaining the motivation behind this monograph, below, it will also become clear what the intended audiences are for this monograph. We will also explain how we selected the articles covered in this monograph, how it differs from existing books and reviews, and then outline the structure of the rest of the monograph and explain how different audiences can use it.

1.4.1 Motivation for this work

Both authors have conducted a number of studies on ISO 9000 and ISO 14000 and other standards. The first author also has first-hand experience working as an ISO 9000 consultant, as well as participating in several ISO-related committees. Both authors were regularly surprised at the number of academics studying the ISO standards, and the degree to which all that collective effort was scattered across disciplines and journals, often failing to have the cumulative effect it could. This monograph aims to integrate the scholarly literature on ISO 9000, ISO 14000 and similar standards that we have been able to find, in order to help future work in this area build more directly on what has already been done.

We were equally surprised by the wide range of opinions that managers have about ISO standards and their effectiveness. We regularly participate in discussion forums with practitioners and many of our students have shared with us their experience with various standards.

These exchanges revealed that managers often hold strong beliefs about the standards — some favorable, some skeptical — often based on a very limited sample of firms. Many practitioners show a genuine interest in having more evidence about the standards and their effectiveness.

1.4.2 Intended audience for this monograph

This monograph should be of interest to several audiences. It will serve an ever-growing number of academics and researchers who investigate various facets of ISO 9000 and 14000 and other voluntary standards, but also those studying other management practices (such as JIT, TQM, ERP) or voluntary regulation more broadly. Firstly, academics from any discipline who are working on or plan to work on questions related to management standards, whether ISO 9000, ISO 14000, or others, should find this monograph a useful guide to the literature so far. Not only do we provide an overview of the literature, we have also identified gaps in the research and provide suggestions for research needs in this area. We have also formulated a set of themes about management systems standards at the end of this monograph, in an attempt to provide a framework to guide future research in directions that are practically relevant. Secondly, academics with an interest in eco-labels, voluntary regulation or those interested in other management practices will find that there are many parallels between (certified) management systems and social and environmental labels (or other forms of voluntary regulation), so that some of our discussions of lessons learned from and methodological issues faced in management systems research also applies to eco-labels or voluntary regulation more broadly. Thirdly, academics whose main interest is in quality or environmental performance may find this a useful overview of literature on the two standards, which play such a big role in the quality and environmental movements.

We also hope that this monograph will be of interest to many of the practitioners in the communities surrounding management standards, including members of the various ISO Technical Committees, auditors, members of accreditation bodies, and other reflective practitioners. Although this monograph is written primarily for an academic audience, we have also made the monograph accessible for non-academic

audiences by visually separating the more detailed academic nuances from the main text. In the summary and discussion section, we also discuss implications for managers, certification bodies and researchers in separate sections. More specific details on "how to read" the monograph are provided in Section 1.4.5. We also envisage that this monograph would be useful to postgraduate students and emerging researchers. It provides a detailed scrutiny of a large pool of papers and discusses methodological issues, highlighting some examples of best research practice, as well as shedding light on some deficiencies and problematic areas.

1.4.3 Methodology: how we selected the articles

With the help of a research assistant, we searched several of our university databases for all articles containing keywords such as ISO 9000 (including ISO 9001 and other variations), ISO 14000, ISO 26000, management standard, process standard, and more. We initially identified 2,836 articles (up to the end of 2013) and undoubtedly we still missed some. This included scholarly articles, conference proceedings, and practitioner articles. We scanned all of them, excluded articles that did not have any empirical content (such as conceptual papers) and then selected several hundred for more detailed reading. These papers are the backbone of this manuscript. These are generally the articles that we found the best, or the most interesting, or representative of a larger stream of work. We do not necessarily agree with the methods used and conclusions drawn in each of the articles we selected; in fact, the ones we review here range from methodologically excellent to quite suspect. Given that our goal was to provide a comprehensive overview of the state of the literature and to be able to explain strengths and weaknesses, we opted to be inclusive rather than restrict ourselves to the best work.

1.4.4 How this monograph differs from other reviews and books in this area

There are hundreds of books on ISO 9000 and ISO 14000, almost all aimed at guiding practitioners through the certification process, hence

with a very different focus than ours. A few literature reviews have appeared, but (in part due to page limitations in traditional journals) none with the breadth and depth of this monograph. Psomas and Fotopoulos (2009) limit themselves to "recently published papers" and those concerned only with the 2000 version of ISO 9001. Their Table I (p. 133) summarizes the 18 studies covered, indicating whether they examine motives for certification, benefits, difficulties experienced, approaches taken, or links with TQM. The authors note that despite the already large literature on the ISO 9000 standards, many open questions remain. Sampaio et al. (2009b) include a wider set of 92 articles, structuring their review around 9 questions addressed in that literature: how the certification market is evolving, why firms get certified, what benefits they experience, how motivations and benefits are linked, how perceived benefits evolve over time, what obstacles and drawbacks are associated with certification, what impacts occur on organizational and financial performance, and what links exist with TQM. They also note that the literature contains significant contradictory results and that many questions remain open. Molina-Azorin et al. (2009) offer a review of over 50 empirical articles on the links between quality management, environmental management and firm performance, which includes several that use ISO 9000 or ISO 14000 certification as a measure of quality or environmental management. They conclude that the more extensive literature on quality management can inform research on the effects of environmental management.

Heras-Saizarbitoria and Boiral (2012) provide the most recent and comprehensive overview of the literature so far. They organized their review around seven research areas: the creation of meta-standards and implications for global governance, international diffusion of meta-standards, motivations to adopt, benefits of adoption and impacts on performance, differences in degree of adoption, integration of standards, and the consultancy and audit aspects. These authors also note that key knowledge gaps remain in the literature and lament that (p. 7): "In our opinion, however, the principal shortfall lies in the badly structured and insufficiently incremental manner in which academic research into the phenomenon has developed."

The current monograph adds to these existing reviews in several ways. We include a much larger set of articles than the previous studies were able to, in light of the page constraints they faced. We also include literature on "other standards" — a literature that is often tightly linked to ISO 9000/14000 articles and deserves to be studied in conjunction with the mainstream ISO 9000/14000 research. Our review consists of over 200 empirical studies on ISO 9000, ISO 14000, and other standards. We also provide more detail on each individual study in comparison to what was possible in those previous reviews: each commentary summarizes the aims of the article, its empirical setting, data sources, data analysis, findings and our critique.

1.4.5 Structure of the monograph and how to read it

The vast majority of literature on management standards focuses on the ISO 9000 and ISO 14000 series, so this monograph is structured accordingly. Section 2 covers adoption and diffusion, first of ISO 9000, then of ISO 14000. Section 3 covers the standards' impact on performance, again starting with ISO 9000, then ISO 14000. Section 4 reviews the more limited and generally more qualitative literature on various aspects of the governance of ISO 9000 and ISO 14000, including the process by which the standards are updated, the auditing process, and more. Section 5 addresses the same range of themes for several other standards, including QS 9000, TS 16949, CMM, EMAS, OHSAS 18001, AA 1000, SA 8000, and ISO 26000. The final section offers our overall conclusions about the state of the literature, and where we see the greatest need for additional research. We also include a section on implications of our work for managers and certification bodies.

To improve readability of what could otherwise be an excessively dry manuscript, we have visually separated the more detailed discussion of specific papers from our more general commentary, using indentation and smaller font. For each segment, we provide an overview of the key research question, the typical methods used, the main findings from the literature, and our commentary and critique of that literature. That is then followed by a more detailed description (indented and in smaller font), usually paper-by-paper, of the relevant work in that area. Our

intention is that readers can skip the text in smaller font and still get a good understanding of the literature, only delving into the more detailed paper summaries when desired. For some research questions, such as the effect of ISO 9000 on financial performance, we also provide tables summarizing the key studies and findings. In the final section, we identify several themes that we believe should be priority areas for future research to be practically relevant, and we have included several "Case boxes" to illustrate these themes.

In many places, particularly in our detailed descriptions, we deviate from the usual citing convention by including the journal name (in full or abbreviated) in the text, as above in "Heras-Saizarbitoria and Boiral (2012, *Int. J. of Management Reviews*)." We do this to highlight the range of scholarly disciplines across which this literature is dispersed. The journal where the work appears often already contains information about the nature and focus of the work cited.

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