Identification and valuation of success-determining factors for quality standards

Coen Hoogerbrugge

MSc. Complex Systems Engineering & Management, Delft University of Technology, Delft, The Netherlands
E-mail: c.v.a.hoogerbrugge@student.tudelft.nl

Abstract

This paper studies the factors that influence the probability of widespread adoption for a newly proposed standardized measurement and calculation methodology for corporate greenhouse gas inventories. A theoretical framework of factors that determine the adoption of quality standards was first established which contains 31 success-determining factors, divided over 6 categories. The weights of importance of each of the identified factors for the proposed standard were determined through interviews with experts in the field of greenhouse gas accounting. The interviews were structured by means of a survey, which was constructed based on the Best-Worst Method (BWM). This multi-criteria decision-making method was then used to determine the relative weights of importance for each of the factors. The results demonstrated great importance for the composition of the alliance and the involvement of stakeholders in the standardization process of a standardized calculation and measurement methodology for corporate greenhouse gas inventories. Chapter 1 will introduce the topic of this paper, chapter 2 will provide a theoretical background based on extant literature, chapter 3 will explain the methodology of the research that was performed, chapter 4 will outline the results and chapter 5 contains a discussion of the results.

Keywords: Quality standards, Standard adoption, Best-Worst Method

1. Introduction

The creation of the first calendar over 20.000 years ago, and the first alphabet mere centuries later are early examples of how embedded standardization is in our society and how it has shaped the world we live in. The increasing globalization and interconnection in our world has heavily expanded the demand for standardization in our technologies, products and lives.

Over the past decades compatibility standards, which 'define the interface between two or more mating elements that are compatible rather than similar, e.g., a plug and a socket, a transmitter and a receiver' [1], have seen an upsurge in relevance. This can be attributed to their strategic significance in the development and marketing of computer operating systems and software, value added data networks, local area networks, television, and optical disks [2]. With this surge in importance for compatibility standards came an increase of academic interest as well; much research was performed into the factors that influence the rate of adoption of compatibility standards [3-6].

Considering the extensive body of literature relating to compatibility standards, it is peculiar how little can be found about another type of standards; quality standards. Quality standards '*specify acceptable criteria along various dimensions, such as functional levels, reliability, efficiency, health and safety, and environmental impact, in order to improve their performances*' [7]. Quality standards have gained attention over the past years in many different sectors, from healthcare and tourism to food and water supplies [8-17]. This research will attempt to shed a light on the different factors that influence the adoption of private quality standards and how these can be influenced by standard setters through the creation of a theoretical framework of success-

determining factors for quality standards. The theoretical framework will be used to provide useful insights into the standardization process of a new quality standard to improve the way in which corporations keep track of their GHG emissions.

Global warming has the potential to bring about drastic and irreversible changes to our physical environment, our biosphere and our human systems. Scientists predict adverse effects on food and water supplies, global health and security and radical changes to livelihoods, industry and infrastructure related to the warming of our planet [18]. The largest contributor to anthropogenic (i.e. human induced) global warming is currently believed to be the elevated emission of greenhouse gasses. The United Nation's Intergovernmental Panel on Climate Change (IPCC) remarked that it was '*very likely´* that '*the observed increase in globally averaged temperatures since the mid-20th century is due to the observed increase in anthropogenic greenhouse gas concentrations'* [19].

Despite the knowledge about the adverse effects of greenhouse gas (GHG) emissions, global emissions keep on rising annually. The Global Carbon Project forecasted in December 2019 that the global GHG emissions for that year would have increased about 0,6% compared to 2018's emissions [20]. Even though this is lower than the 1,1% increase in 2018 and the 2,2% increase in 2017, it is well above the 7,6% annual reduction required every year for the next decade to reach the Paris Agreement target of limiting the global temperature rise to 1,5 °C [21].

One of the tools that is being employed to combat climate change through the reduction of emissions is GHG emissions accounting. As Cowie, et al. [22] indicate, *'we need to be able to quantify emissions in order to make informed decisions and monitor the success of these actions'*. Previous research into GHG accounting has exposed a lack of comparability and compatibility of the GHG inventories of companies [23-25]. This is attributable mainly to the use of different methodologies to measure, calculate and aggregate emissions data.

The proposed solution to this problem consists of a standardized methodology for the calculation and measurement of GHG emissions for corporate GHG inventories. This standard would function for GHG accounting similar to the way in which the International Financial Reporting Standard (IFRS) functions for financial reporting. The proposed standard provides guidance on the employment of approved methodologies, with critical characteristics for each of them, like resource-intensity, requirements and outcome-quality. This will help organizations to choose the methodology that is most appropriate for their situation and will facilitate communication regarding the quality of their inventory.

The main question that will be answered in this article is '*Which factors influence the widespread adoption of quality standards, and how can these factors be influenced in the process of creating a standardized methodology for corporate greenhouse gas emission inventories?'*. This question will be answered in three parts; (1) the creation of a theoretical framework of success-determining factors for quality standards, (2) the attribution of weights of importance to the factors in the theoretical framework and (3) the assessment of the practical implications of the results.

This research contributes to the existing body of literature in a number of ways. First of all it focusses on the previously underexposed topic of quality standards. A theoretical framework is created which outlines the most important factors that influence the widespread adoption of quality standards. This framework can be used in future research into quality standards and can provide insights to standard setters. Secondly, the Best-Worst Method (BWM), a recently developed MCDM model, is used to evaluate the importance of the factors in the theoretical framework for a proposed new standardized calculation and measurement methodology for. This can aid organizations seeking to develop the proposed standard in the future to make sure they address all critical aspects and prioritize their resources

appropriately. Finally, a new classification system for quality standards is proposed, in order to try and improve communication regarding quality standards in the future.

2. Theoretical perspective

Through the years, many academics have addressed the question of why some standards succeed in diffusing widely, sometimes even attaining market-dominance, and others fail to do so. Academic databases such as Scopus, Web of Science and Google Scholar were employed to explore the academic literature related to standard success. For this part of the research, studies accumulating prior research to create theoretical frameworks of factors that influence the success of standardization processes were considered. Search queries like '*standard success*', '*standard dominance*', '*standard battles*', '*dominant designs*', '*factors for success of standards*' and '*determinants for success of standards*' were used to collect articles.

In 1990 an evolutionary model of technological change was proposed by Anderson and Tushman [26]. It stated that a technological breakthrough leads to an era of ferment, in which there is a battle for dominance amongst competing designs or standards, and that the resulting dominant design is elaborated during an era of incremental change, until the next technological breakthrough presents itself. They recognized that dominant designs emerge from: market demand, the market power of a dominant producer, the market power of a dominant user, the authoritative power of an industry committee or government, or the formation of an alliance of a group of firms around a standard. This was the first paper that was found to accumulate the works of others to create a theoretical framework of factors that influence the success of standards.

Schilling [27] takes the framework proposed by Anderson and Tushman [26], and adapts it to focus on factors that that cause two types of lockout for companies; (type I) in which a company produces products according to a certain standard that is subsequently rejected by the market because the competing standard gains dominance, and (type II) in which a company is unable or barred from using the existing dominant standard in its products. Schilling combines literature from industrial organization economics, strategic management and marketing strategy to identify factors that determine which of the competing standards attains dominance. The idea being, that if you can predict which one of two competing standards will become dominant, you can prevent type I lockout. This provides a very good first step towards a framework that companies can use to improve the probability of success of a new standard.

Since Schilling several scholars have published work on standard success and the factors that influence it. A selection of the most pertinent standardization literature available relating to the subject of this research is listed in Appendix 1. As can be seen from the table in appendix 1, nearly all of the available literature is concerned with compatibility standards or technological developments in market-based situations. Market-based standardization occurs when the dominant standard results from competition between different standards [28]. For the proposed standard, it is difficult to determine a standardization mode, because there are no standards with a similar purpose yet. There are standards which fulfil similar objectives for specific sectors and industries, but no attempt has been made to harmonize GHG accounting across industries. It is therefore questionable whether literature regarding market-based situations will be relevant for this particular research.

To gain a better insight into the literature on quality standards, a targeted search was performed. When searching for "quality standard" on Scopus, nearly all of the returned papers relate to one of the following two topics:

1. Environmental quality standards
   Notably regarding air quality [29-37], and water quality [38-41]
2. Minimum quality standards for products
   Among others regarding cement [42], passenger trains [43], medicine [44, 45], food [14] and drinking water [15, 16].

Nearly all of the articles that were found fell within these two groups. Further investigation of the literature showed that a wide variety of standards are classified as quality standards; product quality standards, environmental quality standards, safety standards, service quality standards for sectors like healthcare [8] and standards to promote quality management. Despite the fact that all of these various types of standards do concern quality, they show significant dissimilarities regarding their subject, implementation and content. Despite the differences between the different types of quality standards, no further subclassification was found in extant literature. In the discussion of this paper such a system will be proposed to further specify the different types of quality standards and enable more specific research into the different classes of quality standards.

Due to the increasing importance of quality and the standardization thereof, it is strange that these topics almost only get attention in scientific literature based on case studies. Little to no meta-research into quality standards was found, and the adoption of quality standards was almost exclusively assessed for specific standards and geographical areas, leaving an interesting gap to fill with this and future research.

3. Methodology

A mixed method research approach, containing both qualitative and quantitative components, was employed to establish an answer to the research question.

3.1 Theoretical framework

The first step of the research, the creation of a theoretical framework of success-determining factors for quality standards, was performed through an extensive literature research. Papers containing case studies of various quality standards were collected through scientific databases like Elsevier's Scopus, Clarivate Analytics' Web of Science, and Google Scholar. Due to the broad and ambiguous definition of quality standards, it was chosen to cast the net wide and to investigate as many different types of quality standards as possible. This resulted in a list of 22 case studies, ranging from process-quality standards such as standards for health care [46], group care [9] and management-quality standards like ISO 9000 [47], ISO 14000 [48] and ISO 26000 [49, 50], to accounting- and reporting-quality standards [51-53], and food-quality standards [11, 54, 55]. An overview of the selection of empirical case studies regarding quality standard adoption that were investigated can be found in table 1.

All the factors that were elicited from the literature were categorized in one of the six identified categories, stemming from previous work on success-factors in standardization [5, 51, 56].

- Tangible standard characteristics
- Intangible standard characteristics
- Standard supporting alliance characteristics
- Standard creating process
- Standard support strategy
- Stakeholders

The preliminary theoretical framework contained approximately 90 factors, which was too much to evaluate. Three steps were therefore taken to reduce the framework to a workable number of factors.

1. Disregard Market characteristics.
2. Disregard the probability of success of the standard creation process.
3. Merge factors with high similarities.

The resulting theoretical framework of 29 factors, divided over 6 categories, will be presented later. The framework was verified with the Group and External HSSE Reporting Manager and the Project Lead of the Open Footprint Initiative at Shell in semi-structured interviews. They approved of the list as containing the most important factors for success of the proposed standard in their view, and added two that were previously not identified.

#	Subject	Title	Source
1	Greenhouse Gas Protocol	Private Standards in the Climate Regime: The Greenhouse Gas Protocol	[57]
2	CSR reporting	Determinants of CSR standards adoption: exploring the case of ISO 26000 and the CSR performance ladder in The Netherlands	[51]
3	IFRS	Advancing The Harmonisation of International Accounting Standards: Exploring an Alternative Path	[53]
4	IFRS	What factors are perceived to influence consideration of IFRS adoption by Vietnamese policymakers?	[52]
5	Standard Business Reporting	Adopting standard business reporting in Australia: are cfos persuaded by technology attributes?	[58]
6	Global Reporting Index	The worldwide diffusion of the global reporting initiative: what is the point?	[59]
7	Global Reporting Index	The rise of the Global Reporting Initiative: a case of institutional entrepreneurship	[60]
8	ISO 9001	The impacts and success factors of ISO 9001 in education: Experiences from Portuguese vocational schools	[61]
9	ISO 14000	Identifying the factors which affect the decision to attain ISO 14000	[48]
10	ISO 26000	ISO 26000 and supply chains—On the diffusion of the social responsibility standard	[50]
11	ISO 26000	Stakeholders' Influence and Contribution to Social Standards Development: The Case of Multiple Stakeholder Approach to ISO 26000 Development	[49]
12	Management standards	Management Systems Standards: Diffusion, Impact and Governance of ISO 9000, ISO 14000, and Other Management Standards	[47]
13	Food quality standards	Private voluntary standards in the food system: The perspective of major food retailers in OECD countries	[11]
14	Food Quality standards	Global Change in Agrifood Grades and Standards: Agribusiness Strategic Responses in Developing Countries	[55]
15	Food safety standards	Reasons and constraints to implementing an ISO 22000 food safety management system: Evidence from Spain	[54]
16	Water quality standards	Potable Water Quality Standards and Regulations: A Historical and World Overview	[62]
17	EUREPGAP food quality	The Compliance Decision with Food Quality Standards on Primary Producer Level. A Case Study of the EUREPGAP Standard in the Moroccan Tomato Sector	[10]
18	GlobalGAP food quality	Adoption of food safety and quality standards among Chilean raspberry producers – Do smallholders benefit?	[12]
19	Marine Stewardship Council	Controversy Over Voluntary Environmental Standards: A Socioeconomic Analysis of the Marine Stewardship Council	[63]
20	Forest quality certification	Confronting Sustainability: Forest Certification in Developing and Transitioning Countries	[64]
21	Group Care Quality Standards	The group care quality standards assessment: A framework for assessment, quality improvement, and effectiveness	[9]
22	Health-care quality standards	Standards for health care: a necessary but unknown quantity	[46]

Table 1. List of quality standard case studies used for the theoretical framework.

3.2 Weight attribution

After determining the factors that were to be evaluated, a stakeholder analysis was performed to identify the most salient stakeholders. The stakeholders identification and classification method proposed by de Vries, et al. [65] was performed to this end. Expert representatives from the different groups of stakeholders that were identified were approached for interviews. The experts that took part in this research are listed in table 2. During these interviews respondents were asked to fill out a survey in which they weighed the different factors against each other, and to substantiate their attributed weights.

(GROUP OF) STAKEHOLDERS	ORGANIZATION	PROFESSION OF RESPONDENT
Large MNC's	Royal Dutch Shell	Group and External HSSE & SP Reporting manager
Environmental accounting firms	KPMG Nederland	Senior Consultant Sustainability
ERP providers	SAP	Corporate sustainability at SAP and Fellow at the the Value Balancing Alliance
Governments	The Dutch Ministry of Economic affairs and Climate*	Policy Coordinator and Economist at the Climate Directorate*
Environmental NGO's	World Resources Institute & Greenhouse Gas Protocol	Senior Associate at the Climate Program
Environmental auditing/certification firms	DNV GL	Global Area Service leader, global head of R&D for Oil and Gas business area
Universities	University of Amsterdam	Professor at the Faculty of Economics and Business, Section Accounting
Consultancy firms	Ernst & Young Nederland	Associate Partner Climate Change & Sustainability Services

Table 2. The professions and employers of the interviewees for this research.
** The respondent from the Dutch Ministry of Economic Affairs and Climate participated on his own title, his answers and remarks do not necessarily reflect the position of his ministry.*

3.3 Best-Worst method

The method that was used to structure the surveys to determine the weights of the different factors was a Multi-Criteria Decision-Making (MCDM) method, called the best-worst method (BWM). This method, proposed by Rezaei [66] is based on pairwise comparisons between the extreme alternatives (so the most and least important/desirable criteria) and each of the other criteria. This method was chosen because (1) it has a high reliability and consistency when compared with other MCDM methods [66]; (2) it specifies a structured methodology for the respondents to provide the pairwise comparison data, through its use of the most and least important factors as reference points; (3) it requires less pairwise comparisons then using a full pairwise comparisons or other MCDM methods.

MCDM methods can be generalized to the matrix [*P*] shown below. $\{a_1, a_2 \ldots, a_m\}$ represent the different available alternatives, $\{c_1, c_2, \ldots, c_n\}$ correspond to the different criteria on which decisionmakers evaluate the alternatives and p_{ij} is the score that alternative *i* receives on criterion *j*. Because the different criteria are rarely perceived as equally important, the second component that is necessary is a vector of weights for the importance of the criteria called *w*, which is shown next to matrix [*P*].

$$P = \begin{array}{c} \\ a_1 \\ a_2 \\ \vdots \\ a_m \end{array} \begin{array}{c} \begin{array}{cccc} c_1 & c_2 & \cdots & c_n \end{array} \\ \begin{pmatrix} p_{11} & p_{12} & \cdots & p_{1n} \\ p_{21} & p_{22} & \cdots & p_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ p_{m1} & p_{m2} & \cdots & a_{mn} \end{pmatrix} \end{array} \quad w = \begin{matrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{matrix}$$

By combining the matrix [*P*] and vector *w* into eq. 1, the resulting utility values v_i for each of the alternatives can be calculated.

$$V_i = \sum_{j=1}^{n} w_j p_{ij} \qquad \textit{Eq. 1}$$

The crux of the best worst method is the optimization problem through which the weight vector *w* is calculated, presented in Eq. 2. The minimalization problem results in the optimal weight for the criterion and a value for ξ^*, which can be used as a measurement of the consistency of the attributed weights.

$$
\begin{aligned}
&Min\ \xi \\
&s.t. \\
&\left|w_B - a_{Bj} w_j\right| \leq \xi, for\ all\ j \\
&\left|w_j - a_{jW} w_W\right| \leq \xi, for\ all\ j \\
&\textstyle\sum_j w_j = 1 \\
&w_j \geq 0, for\ all\ j
\end{aligned}
\qquad \textit{Eq. 2}
$$

The five steps of the linear BWM are executed as follows [66]:

Step 1: Defining relevant criteria

This is done through the creation of the theoretical framework. Each of the factors in the framework are seen criteria in the decision for a GHG accounting standard.

Step 2: Identification of the best and worst criterion

The experts were asked which factors in a category they believed to be the most important and the least important.

Step 3: Pairwise comparisons between the "Best" criterion and the other criteria

The experts were provided a matrix in which they had to indicate the importance of each factor relative to the most important factor on a scale of 1 (equally important to the most important factor) to 9 (most important factor is extremely more important).

Step 4: Pairwise comparisons between the "Worst" criterion and the other criteria

Step 3 is repeated, but now each of the other criteria are compared to the least important factor on a scale from 1 (equally important to the least important factor) to 9 (Extremely more important than the least important factor).

Step 5: Weight determination

The weights of importance were determined through Eq. 2. This results in the weights of importance for each of the factors in a category.

These steps were repeated for all the categories, which resulted in relative weights of importance within each category, and were then repeated for the categories themselves, which resulted in relative weights of importance for the categories. By multiplication of the weight of each of the factors within a category with the weight of that category, a global weight was calculated. This made the weights of all the factors comparable, not only those in the same category.

4. Results

The theoretical framework that was established consists of 31 success determining factors, divided over 6 categories. A matrix indicating the sources that each of the factors derive from can be found in appendix 2. Appendix 3 contains a list with more elaborate explanations of the factors, which was provided to the experts before the interviews.

Tangible standard characteristics:
- Compatibility with incumbent practices
- Implementation costs
- Progressive adoption
- Possibility for certification
- Industry and sector specific guidelines
- Accessibility of information

Intangible standard characteristics:
- The ability to provide an organization with more structure
- The ability to improve an organization's reputation
- The possibility to get started without external guidance
- Applicability to different size organizations
- International acceptance of the standard
- The ability to open new markets or retain old markets

Standard supporting alliance characteristics:
- Financial strength and market position of the supporters
- Reputation of the standard supporters
- Diversity within an alliance
- The participation of an official SDO
- Perceived neutrality/independence

Standard creating process:
- Coordination within an alliance
- Stakeholders and third party involvement
- Substantive due process and rationale
- Transparent and open process
- Alignment of interests of participants

Standard support strategy:

- Financial support for the standard
- Periodical improvement of the standard
- Provision of operational support
- The presence of a community*
- Benefits tracking*

Stakeholders:

- Support by consultants and auditors
- Support by governmental bodies
- Support by NGO's related to the standard
- Pressure from customers

The first category of factors, the tangible standard characteristics, relates to the measurable and quantifiable features of a standard. Intangible standard characteristics are the more subjective features of a standard, they are therefore more difficult to measure or quantify. Standard supporting alliance characteristics refer to the collective aspects of the group of organizations that is establishing and diffusing a new quality standard. Standard creating process refers to aspects of the collaborative process that is employed to create the new standard. Standard support strategy is the category of factors that relate to the marketing and promotion of the standard during the diffusion phase. The category Stakeholders contains the four groups of stakeholders that were identified as having the largest influence on the widespread diffusion of a new quality standard.

The resulting weights from each of the experts for each of the factors can be found in Appendix 4, the mean weights are presented in Table 3. Figure 1 provides a visual representation of the weights of importance averaged over all of the respondents of the evaluated factors. The codes that are used to represent the factors can be found in Table 3.

Category	Factor	Code	Mean weight of importance
Tangible standard characteristics	Compatibility with incumbent practices	A1	0,049
	Implementation costs	A2	0,038
	Progressive adoption	A3	0,023
	Possibility for certification	A4	0,026
	Industry- and sector-specific guidelines	A5	0,029
	Accessibility of information	A6	0,020
Intangible standard characteristics	The ability to provide an organization with more structure	B1	0,017
	The ability to improve an organization’s reputation	B2	0,028
	The possibility to get started without external guidance	B3	0,017
	Applicability to different size organizations	B4	0,019
	International acceptance of the standard	B5	0,057
	The ability to open new markets or retain old markets	B6	0,019
Standard supporting alliance characteristics	Financial strength and market position of the supporters	C1	0,031
	Reputation of the standard supporters	C2	0,040
	Diversity within the alliance	C3	0,020
	The participation of an official SDO	C4	0,036
	Perceived neutrality/independence	C5	0,055
Standard creating process	Coordination within an alliance	D1	0,025
	Stakeholders and third party involvement	D2	0,049
	Substantive due process and rationale	D3	0,022
	Transparent and open process	D4	0,022
Standard support strategy	Financial support for the standard	E1	0,017
	Alignment of interests of participants	E2	0,032
	Periodical improvement of the standard	E3	0,017
	Provision of operational support	E4	0,021
	The presence of a community	E5	0,016
	Benefits tracking	E6	0,012
Stakeholders	Support by consultants & auditors	F1	0,037
	Support by governmental bodies	F2	0,069
	Support by NGO's related to the standard	F3	0,040
	Pressure from customers	F4	0,093

Table 3. The aggregated weights of importance of all factors averaged over all respondents, the codes correspond to the codes used in the graphs displaying the results

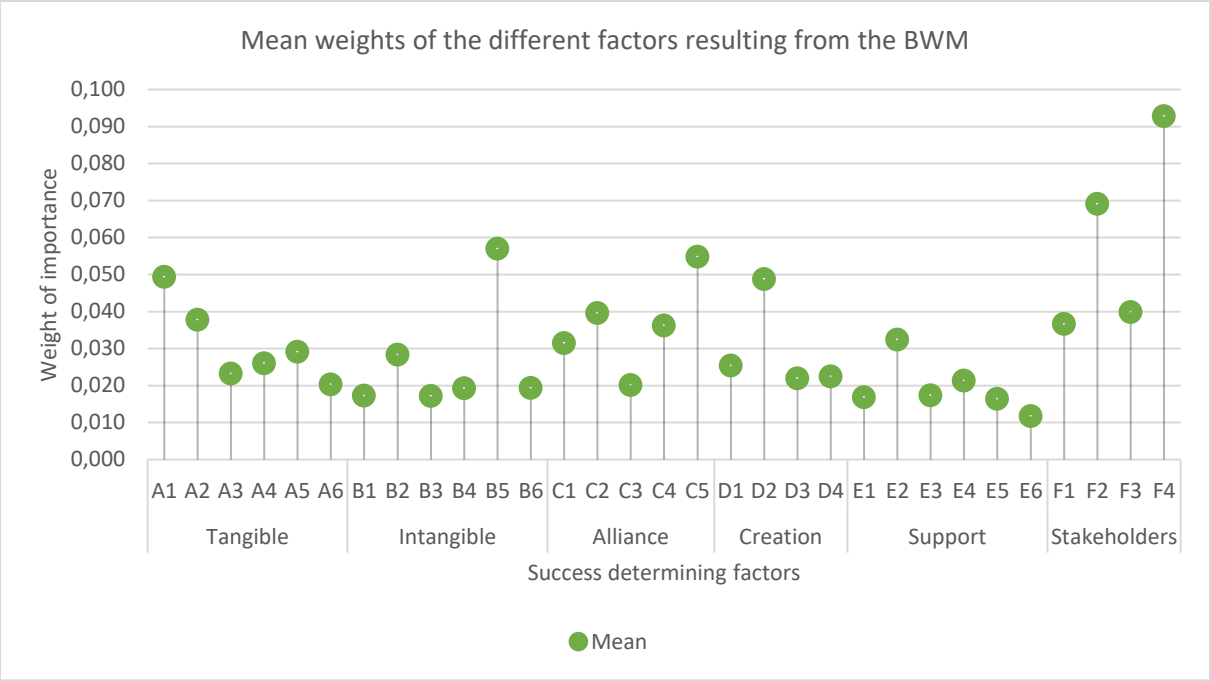

Figure 1. The mean weights of importance for all factors resulting from the surveys.

The consistency of the weights that were attributed by the experts can be calculated by means of the consistency ratio (CR).

As explained before, the resulting value of ξ* from the minimalization problem in Eq. 2 can be used as a measure for the consistency of the weights attributed by the respondent. From the ξ* it is possible to calculate the consistency ratio (CR) by means of Eq. 3, the required consistency indices (CI) can be found in Table 4 [66].

$$CR = \frac{\xi^*}{CI} \qquad \textit{Eq. 3}$$

The resulting Consistency Ratios for each of the respondents can be found in Table 5. A consistency ratio that is closer to zero indicates a higher consistency in the weights that were attributed by the experts. A recent article by Liang, et al. [67] proposes threshold values for the Consistency Ratios obtained from the BWM. These consistency ratios are dependent on the weight attributed to the comparison between the Best and Worst criteria (a_{bw}) and the amount of criteria that are being compared. The obtained values for CR were all beneath the maximum acceptable values, which are presented in Appendix 5. The weights that were provided by the experts are therefore deemed to be consistent enough for this research.

A_{BW}	1	2	3	4	5	6	7	8	9
CI	0,00	0,44	1,00	1,63	2,30	3,00	3,73	4,47	5,23

Table 4. Consistency indices corresponding to the weight attributed to the Best-Worst comparison.

	R1		R2		R3		R4		R5		R6		R7		R8	
	ξ*	CR	ξ*	CR	ξ*	CR	ξ*	CR	ξ*	CR	ξ*	CR	ξ*	CR	ξ*	CR
TANGIBLE	0,069	0,018	0,171	0,033	0,111	0,037	0,049	0,049	0,140	0,047	0,067	0,022	0,064	0,017	0,054	0,033
INTANGIBLE	0,096	0,018	0,159	0,043	0,059	0,059	0,098	0,019	0,085	0,023	0,094	0,031	0,050	0,017	0,050	0,011
ALLIANCE	0,053	0,012	0,338	0,147	0,090	0,030	0,081	0,049	0,109	0,021	0,054	0,033	0,071	0,044	0,041	0,025
CREATION	0,111	0,025	0,448	0,149	0,130	0,080	0,063	0,063	0,091	0,056	0,031	0,014	0,048	0,029	0,053	0,018
SUPPORT	0,077	0,047	0,085	0,028	0,071	0,031	0,053	0,032	0,114	0,031	0,050	0,017	0,064	0,021	0,143	0,048
STAKEHOLDERS	0,088	0,024	0,162	0,054	0,032	0,032	0,052	0,032	0,099	0,019	0,000	0,000	0,105	0,023	0,125	0,042
CATEGORIES	0,086	0,023	0,109	0,036	0,071	0,031	0,051	0,031	0,091	0,024	0,033	0,014	0,057	0,057	0,026	0,026

Table 5. values for ξ and Consistency Ratios for each of the categories that were evaluated for all the respondents.*

The first two components of the research are fulfilled by the results presented thus far, the third component relies on the practical interpretation of the resulting weights of importance. Figure 2, which shows the weights of importance of the different factors ordered from high to low, can be used to elicit practical lessons from the results.

One of the first things that stands out, is that the four factors relating to stakeholders; '*support by governmental bodies*', '*support of consultants and auditors*', '*support by NGO's*' and '*pressure from customers*', all rank in the top 10 of highest valuated factors. This leads to the conclusion that it is paramount to involve these groups at an early stage in the standard setting process and to keep them committed throughout. Strategies for stakeholder involvement and engagement and the creation of participant buy-in and perceived ownership should be worked out in order to increase the probability that this important aspect of the standardization process is successful. It would be wise to make sure this is managed properly before contacting potential participants.

Another recommendation on the basis of the results relates to the importance of international acceptance. In order to increase the chance of the standard being recognized and approved worldwide, it will be important to ensure a global coverage of participants in the standardization process. Involvement of companies, NGO's, regulators and other organizations from different parts of the world will increase the chance of reaching a worldwide accepted standard.

The results also indicate the importance of perceived neutrality and independence of the standard setters. This can be reached by only involving organizations which are independent, but in view of the required resources and critical mass for the standard, this is an improbable option. The other way to reach this perceived neutrality is by involving enough respectable independent organizations to compensate for the organizations which do have commercial interests. Through the involvement of highly regarded NGO's and governmental organizations, and by providing these with demonstrable authority in the process, the public opinion of the standard is more probable to lean towards neutral and independent.

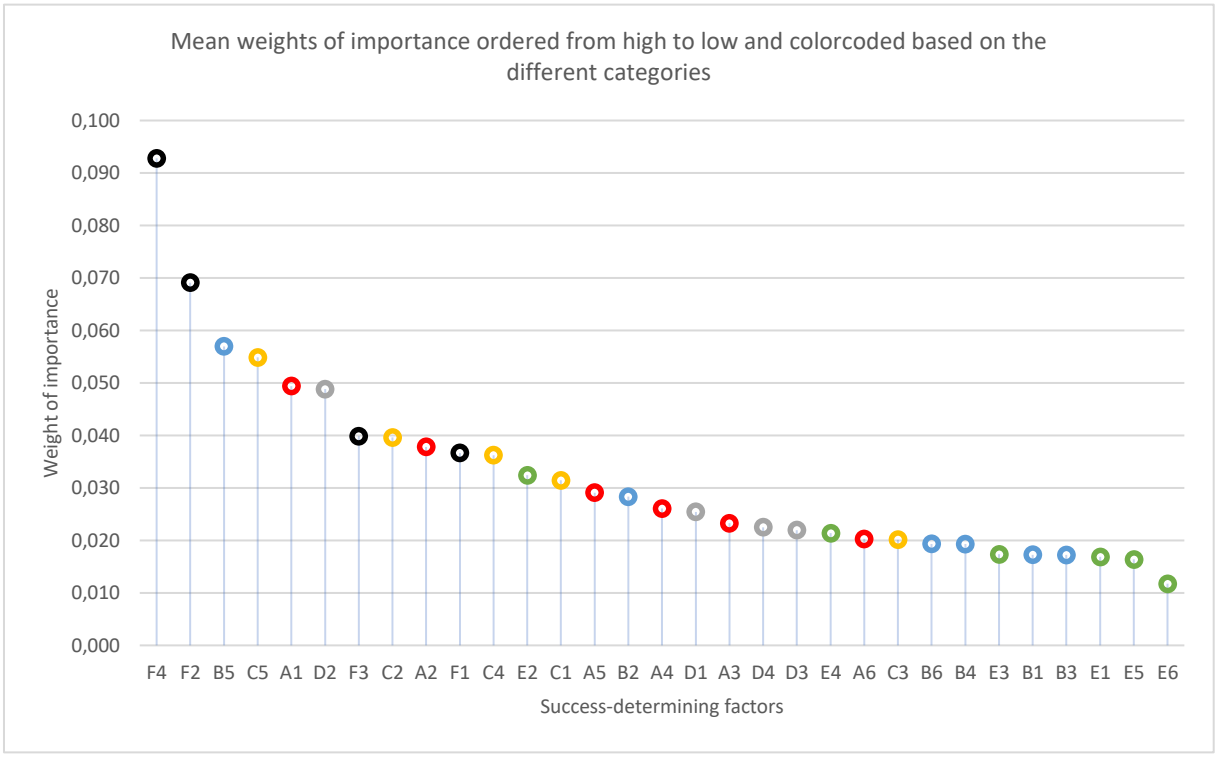

Figure 2. The mean weights of importance of all the identified factors, ordered from high to low.

Factor	Code
Compatibility with incumbent practices	A1
Implementation costs	A2
Progressive adoption	A3
Possibility for certification	A4
Industry- and sector-specific guidelines	A5
Accessibility of information	A6
The ability to provide an organization with more structure	B1
The ability to improve an organization's reputation	B2
The possibility to get started without external guidance	B3
Applicability to different size organizations	B4
International acceptance of the standard	B5
The ability to open new markets or retain old markets	B6
Financial strength and market position of the supporters	C1
Reputation of the standard supporters	C2
Diversity within the alliance	C3
The participation of an official SDO	C4
Perceived neutrality/independence	C5
Coordination within an alliance	D1
Stakeholders and third party involvement	D2
Substantive due process and rationale	D3
Transparent and open process	D4
Financial support for the standard	E1
Alignment of interests of participants	E2
Periodical improvement of the standard	E3
Provision of operational support	E4
The presence of a community	E5
Benefits tracking	E6
Support by consultants & auditors	F1
Support by governmental bodies	F2
Support by NGO's related to the standard	F3
Pressure from customers	F4

Table 6. Codes and colours used to present the results in Figure 2.

5. Discussion

5.1 Proposed new classification of quality standards

Through the literature research that was performed, many different types of quality standards were identified. To reiterate, quality standards are defined as standards which "specify acceptable criteria along various dimensions, such as functional levels, reliability, efficiency, health and safety, and environmental impact, in order to improve their performances, expanding market share through performance assurance and reduction in transaction costs." [7]. This is a well-formulated, but rather broad definition. Meaning that it defines many different types of standards as quality standards. This may lead to misinterpretation of articles regarding 'quality standards', since it is unclear what type of quality standards are considered. To improve the way in which the academic community communicates regarding quality standards, this section will propose a subject-matter based subclassification of quality standards.

The identified standards which fell within the definition for quality standards of Ho and O'Sullivan [7] could all be allocated to one of the four categories listed below.

1. Product quality standards
2. Service quality standards
3. Process quality standards
4. Environmental quality standards

Product and service quality standards are basically the same type of standard with the difference being that one relates to the quality of a product and the other to a service. Product quality standards are often minimum quality standards which are required by law or by another type of regulator to sell, ship or use the related products. Product quality standards are defined as '*a set of objective, measurable specifications along various dimensions of a product that determine its quality*'. Examples of product quality standards can be created for any type of product and range from drinking water quality standards [15, 16] and food quality standards [14], to cement quality standards [42] and passenger train quality standards [43].

Service quality standards are defined as '*a set of objective, measurable specifications along various dimensions of a service that determine its quality*'. Service quality standards are more difficult to establish due to the subjective aspect of the quality of services. Despite this difficulty, more and more service quality standards are emerging in public utilities industries like electricity, telecommunication and water [68, 69], healthcare [8] and tourism [17].

Product and service quality standards are related to the final product or service which is being provided, process quality standards, on the other hand, are concerned with the execution of a process rather than the final product. Process quality standards are '*guidelines describing various dimensions for the appropriate execution of a specific part of a process'*. Accounting standards, like the IFRS, are examples of process quality standards, they don't specify the outcome of the process, but dictate the proper execution of the process.

Environmental quality standards are a slightly different type of standards compared to the previous three classes. Environmental quality standards are defined as '*acceptable parameters for specific elements of our environment to ensure the wellbeing of humans, animals and plants*'. The EU Directive 2008/105/EC, titled '*Setting environmental quality standards in the field of water policy*', is described to '*set[] out environmental quality standards (EQSs) concerning the presence in surface water* of certain substances or groups of substances identified as priority pollutants because of the significant risk they pose to or via the aquatic environment*' [70]. This is just one example of the many quality standards worldwide depicting the acceptable concentration of pollutants in our air, ground, and water.

Another type of standard which was mentioned often in relation to quality, were safety standards. This is a specific subgroup of product, service or process standards which are not merely established to guarantee the quality of a product, service or process, but which are established to ensure the safety of those

involved. Since all the safety standards which were found can be classified as product-, service- or process quality standards, it was chosen not to create a separate class for them, but rather to make them a subclass of the three mentioned classes of quality standards.

Another possible subclassification which arose from the literature was the division between minimum quality standards and best-in-class quality standards. Minimum quality standards are often prerequisites for the provision, utilization or execution of a product, service or process, whereas best-in-class standards are voluntary standards which are adopted with the goal of improving an already sufficient product, service or process. Best-in-class standards are often connected to certification programmes, through which organizations can communicate their adoption of the standard.

5.2 Theoretical contribution

This research has contributed to the existing body of standardization literature in a couple of ways.

- First of all this is the first known research into the factors that influence the adoption of quality standards in general. The creation of a theoretical framework containing factors that influence the widespread adoption of quality standards can inspire new research and provide new insights into the topic.
- The extant literature on quality standards is combined to propose a new classification system for quality standards. Through the literature analysis that was performed, it became clear that there was dissensus in the standardization community regarding the meaning of quality standards, and that the term is used for widely different types of standards. The new classification scheme can be used to improve the way in which quality standards are discussed in literature, by enabling more precise definitions of the type of quality standards considered.

4.3 Practical contribution

This research has provided organizations seeking to create a quality standard with a checklist of aspects that should be considered in the standardization process. Certain components might be irrelevant based on the subject of the standard or the situation, but the framework does capture a generally accepted list of success-determining factors.

For organizations seeking to create a standardized calculation and measurement methodology for corporate GHG inventories, this research provides an expert-verified theoretical framework of success-determining factors. It furthermore gives insight into the relative importance of these different factors which can be used for strategizing and coordination of the standardization process. Recommendations regarding aspects which deserve extra attention, based on the resulting weights of importance, are provided in this research as well.

The stakeholder analysis that was performed can be a helpful tool for the stakeholder strategy of the standardization process for the proposed standard. The stakeholder identification provides insights into the different actors that are related to the standardization process, and the stakeholder classification provides information on the position of these actors in relation to the standardization process. The classification can be used to determine how different actors should be approached; which should be actively pursued, which should be tolerated and which should be restrained from participating.

4.4 Limitations

Little is known about the form that the standard might take if it is ever established, and the different factors about which the respondents were questioned influence the characteristics of the resulting standard to a large extent. It was therefore a difficult compromise between providing the respondents with enough information so they would be able to assess the factors correctly, but not too much as to influence their opinion. The resulting broadness of the framework and the factors in it

does come at a cost, it introduces ambiguity in the interpretation of the meaning of the factors. For example, during the creation of the framework it was chosen to merge all the factors relating to governmental and regulatory interference in the diffusion of the standard into one factor, *'support by governmental bodies'*. This tremendously reduced the amount of factors that would need to be assessed by the respondents, but it also made differences in interpretation possible. Support by governmental bodies can be defined as making the standard mandatory, as making sure the government's regulation is aligned with the standard, as providing financial support or know-how on the matter to the standard setters, or simply as an endorsement which legitimizes the standard. These different interpretations could lead to widely different weights of importance.

The choice was made to collect the data for this research through interviews, this reduced the amount of respondents that could be involved considerably. The results are based on the opinion of only 8 experts, which creates doubt regarding to the accuracy of the resulting weights with regards to the "true" weight, if it exists. Even though the experts are selected based on a elaborate stakeholder analysis and all of them had extensive experience with regards to environmental accounting and/or standardization, the resulting weights should be regarded with a critical eye.

Due to the high number of factors that were evaluated, it was deemed impractical to make pairwise comparisons between all of the factors. To make comparisons between the resulting weights possible, the weights for each of the factors within each category were multiplied by the weight attributed to that category. This process allowed comparison of factors which were never compared by the respondents. It is difficult to say if these multiplied weights are an accurate representation of the weights respondents would have attributed if they had made pairwise comparisons.

4.5 Areas for future research

Building on the content of this research, numerous directions for future studies can be contemplated. Some of these have already been discussed throughout this discussion, but two additional propositions will be made in this section.

First of all it would be valuable to examine the validity of the theoretical framework for other quality standards. This could be done by evaluating the weights of the criteria for different quality standards, predicting the rate of adoption of a standard and assessing if this corresponds to empirical adoption rates of that standard. One of the main subjects that comes to mind is the standard battle between ISO 26000 and the CSR performance ladder in the Netherlands, described by Moratis and Widjaja [51]. This would be a valuable case study to assess the validity of the framework, because the characteristics of both quality standards are available and the adoption rates are fairly well known.

One of the perspectives which was difficult to incorporate in this research and therefore regrettably had to be omitted, was the perspective of SME's. Due to the current insignificance of environmental accounting and reporting to smaller companies, little is known about how more stringent environmental requirements will influence these companies, which make up 95% of companies in OECD countries [71]. The increased demand for environmental data from these companies doesn't necessarily need to come from more stringent governmental regulations, but can also result from increased demands for environmental information by large industry players, trying to gain insights into their supply chain. Additional research into the influence on smaller companies of growing environmental demands and their perspective towards environmental accounting and reporting makes an interesting topic for future research.

When considering the proposed standardized measurement and calculation methodology for corporate GHG inventories, many directions for research come to mind. As proposed earlier in this report, it would be valuable to elaborate more on the specific categories of factors, to determine how aspects that are deemed important for the widespread

adoption of the standard can be incorporated in the standard or standardization process. Furthermore it would be relevant to assess the feasibility of complying with the different factors that were identified. This could take the theoretical recommendations taken from this research and assess their practicability. Is it even possible to compel governmental bodies into supporting a new private standard? Can the new standard be made compatible with all incumbent practices and standards, or will compromises have to be made? All of these are new researches in themselves and would contribute greatly to the development of the proposed standard.

6. Main results

The first outcome from this research is the theoretical framework that is established, containing factors that influence the adoption of quality standards. This framework was verified by experts and proven to be accurate in the case study of a new environmental accounting standard. It contains 31 aspects of standardization processes which determine the probability of widespread adoption for a standard.

The importance of the factors in this theoretical framework were assessed for the standardization process of a new standardized measurement and calculation methodology for corporate GHG inventories. From the results it became clear that stakeholder management is one of the most important aspects of the standardization process; all four of the factors in the category "*Stakeholders*" were listed in the top 10 most important factors and eight of the 10 highest ranked factors (F4, F2, B5, C5, D2, F3, C2 & F1) were related to stakeholder management and the composition of the alliance.

International acceptance of the standard was regarded as a highly important advantage for the widespread adoption of the standard. This related to a general perception of the experts that the adoption will mostly be driven by large multinationals and that smaller organizations will be forced to follow suit in order to remain relevant. All the experts indicated that they believed that the diffusion pattern for the proposed standards would be top-down, rather than bottom-up.

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Appendix 1: Selection of papers related to standard adoption

Title	Source	Subject	Focus	Standard type	Situation
Technological Discontinuities and Dominant Designs: A Cyclical Model of Technological Change	[26]	Technical standards	General	Technological development	Market-based
Technological Lockout: An Integrative Model of the Economic and Strategic Factors Driving Technology Success and Failure	[27]	General	General	Technological development	Market-based
Innovation and competition in standard-based industries: a historical analysis of the US home video game market	[72]	Home video gaming	General	Compatibility	Market-based
Battles for technological dominance: an integrative framework	[4]	Information & telecommunication	General	Compatibility	Market-based
The influence of marketing communications on the dominance of standard	[3]	General	General	Compatibility	Market-based
Factors for winning interface format battles: a review and synthesis of the literature	[5]	Interface formats	General	Compatibility	Market-based
The battle of the blue laser DVDs: The significance of corporate strategy in standards battles	[73]	Data storage format	Corporate strategy	Compatibility	Market-based
Investigation and evaluation of key success factors in technological innovation development based on BWM	[74]	Remotely-Piloted Helicopters	General	Technological development	
Supporting Decision Making in Technology Standards Battles Based on a Fuzzy Analytic Hierarchy Process	[75]	Technology standards		Compatibility	Market-based
Determinants of success in setting standards coalition: empirical evidence from the standard war of the blue laser DVDs	[6]	Data storage format	Alliance	Compatibility	Market-based
Selection of biomass thermochemical conversion technology in the Netherlands: A best worst method approach	[76]	Biomass conversion technologies	General	Compatibility	Market-Based
Standards battles for business-to-government data exchange: Identifying success factors for standard dominance using the Best Worst Method	[77]	Business-to-government data exchange	General	Compatibility	Market-based

Table 7. Selection of the literature focussed on standard success.

Appendix 2: Sources of the different identified factors in the theoretical framework

Factor \ Source	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Tangible standard characteristics																								
Compatibility with incumbent practices		X																	X					
Progressive adoption	X				X						X								X		X	X		
Implementation costs	X	X				X						X	X	X		X	X	X	X	X	X			
Possibility for certification		X										X		X			X		X	X				
Industry and sector specific guidelines	X	X					X													X				
Accessibility of information		X	X				X	X							X		X							
Intangible standard characteristics																								
The ability to provide an organization with more structure		X						X				X			X									
The ability to improve an organization's reputation	X	X		X		X		X		X			X	X	X									
The possibility to get started without external guidance		X													X									
Applicability to different size organizations		X	X				X							X						X				
International acceptance of the standard		X	X		X		X																	
The ability to open new markets or retain old markets						X			X		X	X			X		X	X	X	X				
Standard supporting alliance characteristics																								
Financial strength and market position of the supporters		X					X							X					X					
Reputation of the standard supporters	X	X																	X	X				
Diversity within an alliance	X						X												X	X				
The participation of an official SDO												X												
Perceived neutrality/independence							X												X					
Standard creating process																								
Coordination within an alliance			X				X																	
Stakeholders and third party involvement	X	X	X				X				X								X	X		X		
Substantive due process and rationale			X																					
Transparent and open process							X																	
Alignment of interests of participants							X												X					
Standard support strategy																								
Financial support for the standard																				X		X		
Periodical improvement of the standard	X	X					X												X		X	X		
Provision of operational support	X	X																						
The presence of a community																							X	
Benefits tracking																							X	
Other stakeholders																								
Support by consultants and auditors		X		X									X	X				X						
Support by governmental bodies	X		X	X	X	X						X	X	X				X		X		X		
Support by NGO's related to the standard																X			X	X				
Pressure from customers																								

Table 8. Sources of the factors that were incorporated in the theoretical framework.

#	Title	Source
1	Private Standards in the Climate Regime: The Greenhouse Gas Protocol	[57]
2	Determinants of CSR standards adoption: exploring the case of ISO 26000 and the CSR performance ladder in The Netherlands	[51]
3	Advancing The Harmonisation of International Accounting Standards: Exploring an Alternative Path	[53]
4	What factors are perceived to influence consideration of IFRS adoption by Vietnamese policymakers?	[52]
5	Adopting standard business reporting in Australia: are cfos persuaded by technology attributes?	[58]
6	The worldwide diffusion of the global reporting initiative: what is the point?	[59]
7	The rise of the Global Reporting Initiative: a case of institutional entrepreneurship	[60]
8	The impacts and success factors of ISO 9001 in education: Experiences from Portuguese vocational schools	[61]
9	Identifying the factors which affect the decision to attain ISO 14000	[48]
10	ISO 26000 and supply chains—On the diffusion of the social responsibility standard	[50]
11	Stakeholders' Influence and Contribution to Social Standards Development: The Case of Multiple Stakeholder Approach to ISO 26000 Development	[49]
12	Management Systems Standards: Diffusion, Impact and Governance of ISO 9000, ISO 14000, and Other Management Standards	[47]
13	Private voluntary standards in the food system: The perspective of major food retailers in OECD countries	[11]
14	Global Change in Agrifood Grades and Standards: Agribusiness Strategic Responses in Developing Countries	[55]
15	Reasons and constraints to implementing an ISO 22000 food safety management system: Evidence from Spain	[54]
16	Potable Water Quality Standards and Regulations: A Historical and World Overview	[62]
17	The Compliance Decision with Food Quality Standards on Primary Producer Level. A Case Study of the EUREPGAP Standard in the Moroccan Tomato Sector	[10]
18	Adoption of food safety and quality standards among Chilean raspberry producers – Do smallholders benefit?	[12]
19	Controversy Over Voluntary Environmental Standards: A Socioeconomic Analysis of the Marine Stewardship Council	[63]
20	Confronting Sustainability: Forest Certification in Developing and Transitioning Countries	[64]
21	The group care quality standards assessment: A framework for assessment, quality improvement, and effectiveness	[9]
22	Standards for health care: a necessary but unknown quantity	[46]
23	Interview 1	
24	Interview 2	

Table 9. Sources corresponding to the numbers referred to in Table 8.

Appendix 3: Elaboration of the theoretical framework

Factor	Description
Tangible standard characteristics	
Compatibility with incumbent practices	Compatibility of a new standard with related national, sector-specific or other standards and protocols currently applied by organizations reduces the resources necessary for implementation and therefore has a positive influence on standard adoption.
Implementation costs	The costs, resources and time associated with implementing the standard, getting certified and maintaining the standard is proposed as a restricting factor for standard adoption.
Progressive adoption	An incremental path of implementation in which companies can choose if, when and how to implement components of the standard will promote higher adoption than an all-or-nothing standard that is highly disruptive.
Possibility for certification	The possibility to receive recognized third-party certification of the standard is proposed by some scholars as an extra motivation for adoption, leading to a higher chance of success for the standard. This could also include the possibility for a harmonized certification spanning multiple countries, replacing different certificates in each country.
Industry- and sector-specific guidelines	The presence of industry and sectors specific guidelines/appendices to supplement the standard comes up in literature as a decisive factor for the widespread diffusion of quality standards. It is suggested to diminish the chances of competing (sector-specific) standards arising.
Accessibility of information	The accessibility and comprehensibility of the content of the standard and the information about it for companies and organizations of all sizes and sectors and from all countries and languages. For example: it helps adoption in areas where English is not commonly spoken if the content of a standard is available in different languages, and it helps adoption by smaller companies if the standard content is written in a terminology understandable to relative laymen.
Intangible standard characteristics	
The ability to provide an organization with more structure	The ability to provide added structure to a company's practices and procedures is mentioned as an important benefit of adopting quality standards. Adoption will therefore be promoted if a standard is able to do this.
The ability to improve an organization's reputation	The ability of a standard and/or certification to increase the perceived reputation of the company is suggested to be a reason for companies to adopt a quality standard.
The possibility to get started without external guidance	The necessity to hire a (consulting) company, NGO, governmental organization or other company can be seen as a barrier to implementation of a standard. Absence of this barrier will help to reach different kinds of companies across the sector and size spectrum.
Applicability to different size organizations	The applicability of the standard to companies of all sizes, from small local shops to large MNC's will help the global uptake of a standard. Standards focussed on large MNC's are often too complex and demanding for SME's and standards for SME's don't provide enough guidance for MNC's. A standard that is able to cater to the entire spectrum will promote adoption.
International acceptance of the standard	The acceptance of a standard by countries from all over the world despite differing levels of development will promote adoption. Adopting multiple different standards for different geographical areas increases the (transaction) costs involved, an internationally recognized and accepted standard therefore increases adoption.
The ability to open new markets or retain old markets	Countries, areas and companies can demand specific quality standard certifications for goods to be traded. Organizations will be more prone to adopt a standard if it is required to retain their current market, or opens up new markets for them to trade in.
Standard supporting alliance characteristics	

Factor	Description
Financial strength and market position of the supporters	Organizations will be more prone to adopt a standard from an alliance with a high collective financial strength, market size and buying power, because they trust that sufficient resources have been attributed to the development of the standard for a good quality and scalability. Standards require a critical mass of support that will accelerate adoption of the standard.
Reputation of the standard supporters	Organizations will be more prone to adopt a standard from an alliance with a good collective brand reputation in a certain field, because they trust more in the standard content.
Diversity within an alliance	A standard that has a high diversity of different kinds of supporters (companies, NGO's, governmental organizations) and supporters from different sectors and industries is perceived to better incorporate the different stakes of all these parties, resulting in a less biased or opportunistic standard, leading to higher adoption.
The participation of an official SDO	The participation of an official Standards Developing Organization (such as the NEN) in the alliance can promote adoption by providing legitimacy to the standard.
Perceived neutrality/independence	The perceived independence from commercial interests of the standard supporters will take away the suspicion from potential adopters that a standard is a tool to increase a standard developing organization's or alliance's to increase their market control. This way, perceived independence of the supporters can promote the adoption of a standard.
Standard creating process	
Coordination within an alliance	A clear coordination of the collaborative standard creation process within the alliance, and communication thereof will lead to an improved perceived quality of the standard, increasing the adoption of the standard.
Stakeholders and third party involvement	Openness to- and involvement of all stakeholders and other relevant parties in the standard creation process leads to a standard in which the interests of different stakeholders are represented as good as possible. Also, allowing stakeholders to contribute to a standard often turns them into active supporters of the standard leading to higher adoption.
Substantive due process and rationale	Substantive rules and principles determined up front to protect the lawful course of the standard creation process and the standard and which prevent disputes lead to a more legally robust standard and improve adoption.
Transparent and open process	An open and transparent standard creating process that is available for review by anyone who wishes to verify the process, will increase the credibility of the standard and its creators and increase adoption.
Standard support strategy	
Financial support for the standard	Financial support for the creation of the standard will lead to a qualitatively superior standard, whereas financial support for the diffusion of the standard will make it possible to reach a larger market, both increasing the adoption of the standard.
Alignment of interests of participants	A previously established goal statement, in which the interests of the different participants/stakeholders are aligned will lead to a more consistent and qualitatively superior final standard, which will promote adoption.
Periodical improvement of the standard	Continuing reviews of the standard content and periodical updates by the standard creating alliance, also after diffusion, will lead to a higher quality standard that is adaptive to changing requirements from the market. Organizations noticing that their feedback is incorporated in a standard will feel more engaged with the standard promoting adoption by others.
Provision of operational support	The possibility for operational support for the implementation of the standard in an organization will decrease barriers for companies that lack the know-how to implement the standard or that lack experience with standards at all. This will promote adoption by smaller companies.
The presence of a community	The presence of an active community of adopters around the standard that is informed regularly on developments of the standard and can be used to review the standard content will promote standard adoption.
Benefits tracking	The tracking and communication of clear evaluation criteria and benefits gained through adoption of the standard will provide proof of the standards effectiveness and will help to retain adopters who become aware of improvements and increase the attractiveness to potential adopters.
Stakeholders	
Support by consultants and auditors	Support by organizations that can assist companies, that lack the resources to implement a standard themselves, to implement and maintain a standard will help increase adoption of the standard. Support

Factor	Description
	by auditors means that external verification of the standard becomes possible and increases the legitimacy of the standard.
Support by governmental bodies	Support of a government or governmental regulatory bodies for the standard will lead to an increased sense of legitimacy of the standard and gives potential adopters a form of assurance that the standard aligns with potential future regulations.
Support by NGO's related to the standard	Support by Non-Governmental Organizations that are related to the subject of the quality standard (e.g. WWF for environmental) gives potential adopters the feeling that the standard is not just created to support the adopting organizations, but is also effective in reaching it's other (e.g. societal or environmental) goals, which will promote adoption.
Pressure from customers	Pressure from the consumers of your product or service to comply with a certain quality standard will lead to increased adoption rates of the standard.

Table 10. Explanation of the factors in the theoretical framework, as supplied to the respondents.

Appendix 4. Resulting weights of all experts for each of the factors and categories

		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Mean
Tangible standard characteristics	Compatibility	0,083	0,075	0,031	0,057	0,074	0,022	0,042	0,011	**0,049**
	Costs	0,049	0,017	0,071	0,034	0,033	0,045	0,026	0,028	**0,038**
	Progressive	0,016	0,006	0,046	0,057	0,008	0,030	0,017	0,006	**0,023**
	Certification	0,033	0,014	0,023	0,034	0,025	0,009	0,042	0,028	**0,026**
	Sector-specific	0,033	0,017	0,008	0,034	0,020	0,073	0,026	0,023	**0,029**
	Accessibility	0,010	0,017	0,019	0,015	0,016	0,073	0,005	0,009	**0,020**
Intangible standard characteristics	Improve structure	0,004	0,014	0,044	0,017	0,002	0,024	0,018	0,014	**0,017**
	Improve reputation	0,008	0,005	0,044	0,006	0,020	0,059	0,048	0,037	**0,028**
	Get started without external	0,015	0,011	0,032	0,022	0,006	0,039	0,007	0,005	**0,017**
	applicability to size	0,020	0,017	0,044	0,020	0,008	0,012	0,018	0,014	**0,019**
	International acceptance	0,050	0,051	0,114	0,053	0,008	0,095	0,048	0,037	**0,057**
	Ability to open new markets	0,015	0,011	0,044	0,022	0,005	0,024	0,018	0,014	**0,019**
Standard supporting alliance characteristics	Financial strength	0,050	0,022	0,021	0,026	0,013	0,012	0,055	0,053	**0,031**
	Reputation of the supporters	0,029	0,034	0,021	0,065	0,066	0,031	0,018	0,053	**0,040**
	Diversity within the alliance	0,005	0,034	0,032	0,021	0,006	0,015	0,037	0,011	**0,020**
	Participation official SDO	0,015	0,095	0,007	0,046	0,027	0,031	0,055	0,015	**0,036**
	Perceived neutrality	0,050	0,034	0,051	0,085	0,020	0,054	0,092	0,053	**0,055**
Standard creation process	Coordination	0,002	0,073	0,016	0,018	0,029	0,003	0,017	0,045	**0,025**
	Stakeholder & third party	0,022	0,147	0,052	0,044	0,048	0,016	0,017	0,045	**0,049**
	Substantive due process	0,009	0,049	0,010	0,053	0,010	0,009	0,031	0,006	**0,022**
	Transparent and open	0,007	0,059	0,021	0,026	0,019	0,015	0,007	0,026	**0,022**
Standard support strategy	Financial support	0,009	0,023	0,008	0,019	0,014	0,015	0,030	0,018	**0,017**
	Alignment of interests	0,017	0,057	0,003	0,047	0,045	0,017	0,020	0,053	**0,032**
	Periodical improvement	0,043	0,017	0,006	0,009	0,011	0,004	0,030	0,018	**0,017**
	Provision of support	0,017	0,023	0,019	0,028	0,019	0,002	0,050	0,012	**0,021**
	Presence of a community	0,013	0,017	0,008	0,047	0,011	0,009	0,020	0,006	**0,016**
	Benefits tracking	0,013	0,007	0,008	0,028	0,005	0,009	0,007	0,018	**0,012**
Stakeholders	Consultants & auditors	0,068	0,007	0,045	0,030	0,024	0,036	0,026	0,057	**0,037**
	Governmental bodies	0,172	0,003	0,025	0,017	0,050	0,072	0,137	0,076	**0,069**
	NGO's	0,020	0,028	0,045	0,007	0,101	0,072	0,023	0,024	**0,040**
	Customers	0,102	0,015	0,083	0,011	0,259	0,072	0,014	0,185	**0,093**
Categories	Tangible	0,224	0,145	0,197	0,231	0,175	0,252	0,157	0,105	**0,186**
	Intangible	0,112	0,109	0,324	0,141	0,049	0,252	0,157	0,123	**0,158**
	Alliance	0,149	0,218	0,132	0,244	0,131	0,143	0,257	0,184	**0,182**
	Creation	0,040	0,327	0,099	0,141	0,105	0,044	0,071	0,123	**0,119**
	Support	0,112	0,145	0,051	0,179	0,105	0,057	0,157	0,123	**0,116**
	Stakeholders	0,363	0,055	0,197	0,064	0,434	0,252	0,200	0,342	**0,238**

Table 11. Resulting weights of each of the factors and categories of factors.

Appendix 5. Threshold Consistency Ratios

		NUMBER OF CRITERIA						
		3	**4**	**5**	**6**	7	**8**	**9**
A_{BW}	**3**	0.209	0.209	0.209	0.209	0.209	0.209	0.209
	4	0.158	0.235	0.274	0.293	0.310	0.315	0.327
	5	0.211	0.285	0.302	0.331	0.348	0.361	0.374
	6	0.216	0.292	0.357	0.392	0.406	0.417	0.423
	7	0.209	0.331	0.373	0.393	0.404	0.411	0.430
	8	0.227	0.341	0.403	0.423	0.438	0.454	0.460
	9	0.212	0.365	0.406	0.423	0.445	0.459	0.475

Table 12. Threshold values for the Consistency Ratios of the BWM, proposed by Liang, et al. [67]