



Factors influencing firm propensity for ISO 9001 withdrawal: Evidence on decertification tendency and antecedents

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ABSTRACT

There are approximately 1,000,000 ISO 9001 certified companies worldwide. Every year, one third of these companies must decide whether to renew, or not, their certificate. The number of companies that abandon or lose the certificate has been growing and reached an average of 60,000 per year. Considering that there is currently no theory or model to explain this propensity of firms to decertify (18%), the aim of this study is to identify the underlying factors influencing firm propensity for ISO 9001 withdrawal and to analyse the relationships between these factors. In order to achieve these aims, the research develops a structural equation model (PLS-SEM), from extant literature, and estimates the model with survey data from a sample of 221 ISO 9001 certified companies. Results show that the main antecedents to decertification propensity are barriers to the initial certification, (absence of) external certification benefits, decertification motivations, and expected performance after decertification. This is the first study to address decertification from a systemic and comprehensive perspective and to present a structural equation model of the phenomenon. The study makes an integrated contribution to explain decertification propensity with the help of novel research variables. Results suggest several contributions to theory, and practice, and contribute to clarify a major contradiction in the field.

1. Introduction

There are approximately 1,000,000 ISO 9001 certified companies worldwide (ISO, 2015, 2019). This number justifies the quantity of studies conducted on various aspects of certification, including certification motivations, barriers, benefits, performance impacts and others. Most of these studies focus on the period before certification or during the certification validity period; almost none after the certification period (Wahid and Corner, 2009; Castka, 2018). Despite the 330,000 companies that must decide whether to renew the certificate every year and the 60,000 companies that lose it yearly (18%; ISO, 2015), studies on ISO 9001 certification withdrawal remain particularly scarce. According to a search on scientific databases, there are only eight studies on decertification: Lo and Chang (2007), Alič (2014), Kafel and Nowicki (2014), Sansalvador and Brotons (2015), Cândido et al. (2016, 2019), Simon and Kafel (2018), and Chiarini (2019). These studies address two basic issues: the reasons for ISO 9001 decertification, and the withdrawal consequences. Regarding the reasons for decertification, there is no consensus among researchers. Lo and Chang (2007) and Kafel and

Nowicki (2014) suggest, as main reason, the time consumed with the certification and its cost; Alič (2014), the negative effects of improper implementation of the standard; Sansalvador and Brotons (2015), the results below expectations; Cândido et al. (2016), the complete internalisation of the certification benefits in the company processes, and Chiarini (2019), the lack of customers' interest in the certification. Similarly, there is also a lack of consensus in the literature regarding the consequences of decertification. Alič (2014) concludes that ISO 9001 certification loss can lead to a decrease in business performance and survival difficulties, and Sansalvador and Brotons (2015) suggest that abandoning ISO 9001 decreases the value of the firm. In opposition, Cândido et al. (2016) conclude that surviving decertified companies do not exhibit any loss of performance nor competitiveness. These studies are scarce, largely contradictory and seem to agree mostly on the lack of research on decertification (Lo and Chang, 2007; Alič, 2014; Cândido et al., 2019). A significant gap in the literature is that current research does not establish relationships between the relevant variables (Chiarini, 2019). There is currently no model relating the variables involved in decertification and, specifically, no theory or model to explain the

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propensity of firms to decertify (Chiarini, 2019). This study contributes to closing this research gap by developing and analysing a comprehensive model of decertification. While existing studies address only the motivations or the consequences of decertification, this study links these two decertification aspects with other factors related to the ISO 9001 implementation process, namely, certification motivations, barriers, benefits and performance. In accordance with this purpose, the study aims to answer the research question of what are the factors that lead to decertification propensity and how do these factors relate to each other. In particular, the study asks whether the initial ISO 9001 certification motivations, the certification barriers felt during implementation of the standard, and the (lack of) certification benefits have any influence on the propensity for decertification. Similarly, the research asks whether the expected firm performance after decertification has any impact on decertification propensity. In line with these research questions, the research objectives are to identify the factors affecting decertification propensity, and to study the relationships between them. Achieving these objectives should uncover some of the underlying reasons for decertification, help to predict decertification propensity, and

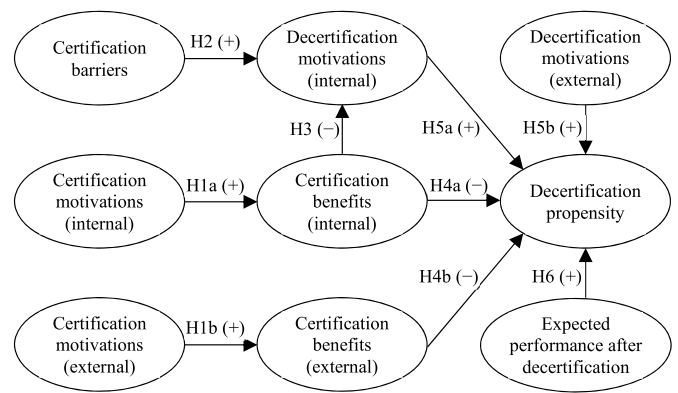


Fig. 1. Conceptual model and research hypotheses.

Table 1
Research on ISO 9001 withdrawal.

Study	Aim	Method	Reasons for decertification	Consequences of decertification
Lo and Chang (2007)	Explore the certification benefits and reasons for failing to maintain it	Multivariate analysis of variance, survey data	Time consumed and costs Paperwork load ISO 9001 is a minimum requirement No contribution to financial performance	Not addressed
Alic (2014)	Study the 'future functioning and financial performance' of organisations that lost their certificate	Longitudinal survey and secondary data	Negative effects of improper ISO 9001 implementation Lower marketing attractiveness of ISO 9001	The study finds evidence of a relationship between certificate withdrawal and declining performance. Many organisations were already in difficulties before decertification.
Kafel and Nowicki (2014)	Identify the withdrawal reasons and the consequences to QMS	Case study	Certification cost Absence of benefits Customers no longer demand ISO 9001	In most decertified organisations, the QMS (or part of it) continues operating
Sansalvador and Brotons (2015)	Assess the value of the real option to abandon certification	Fuzzy real options approach, convenience sample	Results below what was expected from certification Savings that abandonment would generate No assimilation of the quality management philosophy	If the option to abandon ISO 9001 is exercised, the company value decreases.
Cândido et al. (2016)	Assess the impact of certification loss on the decertified firms' performance	Event study, secondary data	Company has already internalised the benefits of certification Renewal costs are higher than the benefits Belief that the certification body will not renew the certificate	No significant statistical differences in performance (ROA, ROS and sales growth) between companies that lost the certificate and control firms.
Simon and Kafel (2018)	Explore the motives behind the withdrawal decision	Descriptive, survey data	Financial problems within the company No added value, no competitive advantage Customers no longer demand ISO 9001 Change to other standards or systems Other reasons	Not addressed
Cândido et al. (2019)	Investigate whether decertification is contingent on the economic performance that follows the initial certification.	Event study, secondary data	Economic underperformance is not a reason for ISO 9001 abandonment Company has already internalised the benefits of certification ISO registration is not perceived as a rare and inimitable resource	Not addressed
Chiarini (2019)	Investigate why firms cancelled certification	Delphi panel followed by survey	Customers do not demand certification Lack of measurable certification benefits Lack of top commitment Cost of internal resources committed to certification	Not addressed

Table 2
Measurement instrument.

Construct	Items (reflective)	Studies
Certification motivations (Internal and external reasons why organisations may wish to become ISO 9001 certified)	<p>INTERNAL</p> <p>Improvement of internal processes (MOT1)</p> <p>Productivity increase (MOT2)</p> <p>Product/Service quality improvement (MOT3)</p> <p>Reduction of costs with customer complaints (MOT4)</p> <p>Economic and financial performance improvement (MOT7)</p> <p>Improvement of customer satisfaction (MOT10)</p> <p>EXTERNAL</p> <p>Company image improvement (MOT5)</p> <p>Market share increase (MOT6)</p> <p>Competitive pressure brought about by certification of competitors (MOT8)</p> <p>Customers required certification (MOT9)</p>	<p>Gotzamani and Tsiotras (2002), Bhuiyan and Alam (2005), Boiral and Roy (2007), Martínez-Costa et al. (2008), Sroufe and Curkovic (2008), Nair and Prajogo (2009), Prajogo (2011), Sampaio et al. (2012), Heras-Saizarbitoria et al. (2015), Djofack and Camacho (2017).</p>
Certification benefits (Organisational benefits that result from ISO 9001 certification)	<p>INTERNAL</p> <p>Organisational improvement (BEN1)</p> <p>Decrease in non-conformities (BEN2)</p> <p>Increase in productivity (BEN3)</p> <p>Improvement of product/service quality (BEN4)</p> <p>Increase in competitiveness (BEN8)</p> <p>Improved internal communication (BEN9)</p> <p>Improvement of the document system (BEN10)</p> <p>EXTERNAL</p> <p>Increase in customer satisfaction (BEN5)</p> <p>Improvement in company image (BEN6)</p> <p>Increase in market share (BEN7)</p>	<p>Gotzamani and Tsiotras (2002), Bhuiyan and Alam (2005), Boiral and Roy (2007), Lo and Chang (2007), Martínez-Costa et al. (2008), Sroufe and Curkovic (2008), Wahid and Corner (2009), Gotzamani (2010), Sampaio et al. (2012), Bernardo et al. (2015), Djofack and Camacho (2017), Siltori et al. (2020).</p>
Certification barriers (Obstacles that organisations may encounter and that prevent or hinder progress towards ISO 9001 certification)	<p>Adaptation to the standard during implementation (BAR1)</p> <p>Cost of the certification process (BAR2)</p> <p>Employee resistance to change (BAR3)</p> <p>Qualification of human resources (BAR4)</p> <p>Employees' available time (BAR5)</p> <p>Quantity of documentation required (BAR6)</p> <p>Top management involvement (BAR7)</p> <p>Compatibility of the standard with the activity sector (BAR8)</p>	<p>Bhuiyan and Alam (2005), Boiral and Roy (2007), Sroufe and Curkovic (2008), Wahid and Corner (2009), Gotzamani (2010), Cândido and Santos (2011), Sampaio et al. (2014), Sfakianaki and Kakouris (2020).</p>
Decertification motivations (Internal and external reasons why organisations may lose the ISO 9001 certificate)	<p>INTERNAL</p> <p>Certification maintenance costs (DM1)</p> <p>Certification costs higher than benefits (DM2)</p> <p>Difficulties of continuous improvement (DM3)</p> <p>Failure to comply with the standard requirements (DM4)</p> <p>Documentary burden (DM5)</p> <p>EXTERNAL</p> <p>Results of maintenance audits (DM6)</p> <p>Belief the certification body will revoke the certificate (DM7)</p> <p>Existence of alternative certifications (DM8)</p> <p>ISO 9001 competitive and differentiative value in the industry (DM9)</p>	<p>Lo and Chang (2007), Alič (2014), Cândido et al. (2016, 2019), Chiarini (2019).</p>
Expected performance after decertification (Organisational performance level that can reasonably be expected in case of certificate cancelation)	<p>Operational Results (EPAD1)</p> <p>Productivity (EPAD2)</p> <p>Customer satisfaction (EPAD3)</p> <p>Competitive Advantage (EPAD4)</p> <p>Revenue (EPAD5)</p> <p>Net Profit (EPAD6)</p> <p>Value of the company (EPAD7)</p> <p>Benefits from certification (EPAD8)</p>	<p><i>No research on expected performance after decertification. Items adapted from ISO 9001 certification impact: Corbett et al. (2005), Naveh and Marcus (2005), Rahman and Bullock (2005), Benner and Veloso (2008), Nair and Prajogo (2009), Prajogo (2011), Chatzoglou et al. (2015), Cândido et al. (2016, 2019).</i></p>
Decertification propensity (Tendency of the organisation towards ISO 9001 certification loss)	<p>Probability that the company will lose the certificate at the end of the certification period (PRO1)</p> <p>Anticipated difficulty to renew the certificate (PRO2)</p> <p>Anticipated external audits' demands (PRO3)</p> <p>Company intention not to renew the certificate (PRO4)</p>	<p><i>No research on decertification propensity. Items based on: Lo and Chang (2007), Sansalvador and Brotons (2015), Cândido et al. (2016, 2019).</i></p>

Notes: Rating scale: very weak (1), weak (2), average (3), strong (4), very strong (5), don't know/not applicable (n/a). Rating scale for EPAD items: much worse (1), worse (2), no change (3), better (4), much better (5), don't know/not applicable (n/a).

contribute to clarify the contradictions in previous research.

To achieve the research objectives, a structural equation model was developed with the aid of PLS-SEM. PLS-SEM is a second generation multivariate statistical method that can be used to develop models or theories in exploratory research and in prediction making (Hair et al., 2017, 2019). PLS-SEM estimates the magnitude of the relationships between exogenous and endogenous variables (structural coefficients) and assigns significance levels to these coefficients, which can then be used for hypotheses testing and prediction (Hair et al., 2017). The data for the study was collected through a survey of certified companies, from service and manufacturing industries, in Portugal. This specific country was chosen because of the number of ISO 9001 certificates issued nationwide (approximately 7000; ISO, 2019), and the hundreds of ISO 9001 withdrawals every year (ISO, 2015).

2. Literature review and hypotheses development

Introduced in 1987, the ISO 9001 standard grew quickly in popularity (Boiral and Roy, 2007) and became the most widely adopted standard for quality management systems (QMS) in the world (ISO, 2019). The standard was so successful that it was considered an indispensable 'passport' for global trade (Boiral and Roy, 2007). In fact, the standard was designed as a tool to reduce information asymmetry, reduce transaction costs, improve coordination between international players, and promote business development (Heras-Saizarbitoria and Boiral, 2013; Blind et al., 2018). However, the recent maturity (massification) of the standard (Marimon et al., 2009; Alič, 2014) appears to have led to a decrease in the certification interest (Lo and Chang, 2007; Karapetrovic et al., 2010; Lo et al., 2013; Su et al., 2015; Djofack and Camacho, 2017). Many companies abandoned the certificate after the massification resulted in a dilution of the competitive advantage that the standard provided (Nair and Prajogo, 2009; Cândido et al., 2019), or after reaping the benefits of internalising the standards into their processes (Cândido et al., 2016) or, in general, after perceiving that the costs outweighed the certification benefits (Lo and Chang, 2007; Djofack and Camacho, 2017; Cândido et al., 2019; Chiarini, 2019). Whilst certification benefits depend on the company motivations for certification (Terziovski et al., 1997; Boiral and Roy, 2007; Nair and Prajogo, 2009; Prajogo, 2011; Sampaio et al., 2012) and on how management conducts the implementation process after the go-ahead decision (Naveh and Marcus, 2005; Boiral, 2011; Esgarrancho and Cândido, 2020), recent research suggests that subsequent ISO 9001 withdrawal also depends on several motivations (Table 1) and that the withdrawal might even be linked to the motivations for the initial certification (Cândido et al., 2019). This study takes these ideas a step forward to suggest that the decertification propensity can depend on a set of conditions that include the initial reasons for certification, the barriers felt during implementation of the standard, the benefits achieved (or not achieved), and the performance that the company might reasonably expect in case it decides to abandon the certification. These ideas are represented in Fig. 1, which illustrates the research conceptual model, together with the relevant latent variables and research hypotheses. The research hypotheses are carefully explained next, and the latent variables are succinctly defined in Table 2. As far as the authors are aware, this is the first model attempting to explain the loss of ISO 9001 certification, and the hypotheses H1a and H1b are the only ones for which there is any previous research.

2.1. Certification motivations and benefits

Most literature on ISO 9001 addresses the motivations for the adoption of the standard (Table 2) and the resulting certification benefits (Table 2). This literature is (almost) unanimous in the existence of two types of motivations (internal and external) and in the effects of these motivations on the type and level of certification benefits attained (Gotzamani and Tsiotras, 2002; Bhuiyan and Alam, 2005; Boiral and

Roy, 2007; Martínez-Costa et al., 2008; Sampaio et al., 2012; Djofack and Camacho, 2017). Companies with external motivations achieve external benefits such as competitive advantage, meeting customer requirements, entering new markets, and gaining and retaining new customers, while companies with internal motivations achieve internal benefits such as improvement in operations, cost reductions, and product quality improvement (Gotzamani and Tsiotras, 2002; Martínez-Costa et al., 2008; Sampaio et al., 2012; Yaya et al., 2014; Heras-Saizarbitoria et al., 2015; Djofack and Camacho, 2017). Current research also suggests that companies seeking certification based on internal motivations have a more positive perception of benefits than those seeking certification based on external motivations (Terziovski and Power, 2007; Martínez-Costa et al., 2008; Prajogo, 2011; Sampaio et al., 2014). Organisations externally motivated make a marketing use of certification, but show less commitment to process improvement and as a result achieve lower benefits than expected (Lo and Chang, 2007; Boiral and Roy, 2007; Sampaio et al., 2014) or no significant benefits at all (e.g., Terziovski et al., 1997; Lo and Yeung, 2018). To attain greater benefits, companies need adequate policies, top management commitment and personnel involvement (Rahman and Bullock, 2005; Castka, 2018). Companies need a policy and a practice of continued efforts to improve performance (Naveh and Marcus, 2005; Terziovski and Power, 2007; Castka, 2018) instead of taking for granted the benefits of the certification award (Wahid and Corner, 2009; Terziovski and Guerrero, 2014; Djofack and Camacho, 2017). The reasons for deterioration of certification benefits lie also in the type of certification motivations (Martínez-Costa and Martínez-Lorente, 2007). In short, the extant literature suggests that certification can have a positive effect on the benefits attained, depending on the extent and type of the motivations. Thus, the hypotheses:

H1a. Internal certification motivations positively affect the internal certification benefits attained during the certification validity period.

H1b. External certification motivations positively affect the external certification benefits attained during the certification validity period.

2.2. Certification barriers and internal decertification motivations

Organisations can face several barriers during implementation of the ISO 9001 standard (Table 2). These barriers may however be minimized with a careful planning and preparation for the certification process (Esgarrancho and Cândido, 2020). Companies that carefully plan and prepare for ISO 9001 certification, can analyse organisational needs in advance and decide on proper initiatives to minimize implementation drawbacks (Briscoe et al., 2005; Naveh and Marcus, 2005; Cai and Jun 2018; Sfakianaki and Kakouris, 2020; Esgarrancho and Cândido, 2020). Such initiatives can include barrier anticipation, adoption of basic quality procedures, change management and cultural adaptation (Briscoe et al., 2005; Esgarrancho and Cândido, 2020). Unfortunately, some organisations ignore part or all of these preparations and face stronger implementation difficulties (Esgarrancho and Cândido, 2020). These implementation barriers faced during certification can lead to a subsequent loss of the certificate. In fact, according to the strategic management literature, implementation barriers tend to persist, intensify, accumulate, interact and, in some cases, generate other problems, thus making it harder for a successful implementation or, even, leading to full reversion to the original organisational state before the implementation (Beer and Eisenstat, 2000; Cândido, 2005; Cândido and Santos, 2019). As such, it is reasonable to assume that certification barriers may also behave in a similar manner, creating additional problems that can become motivations for subsequent decertification in organisations that had previously obtained the certificate (Table 2).

One of the obstacles to ISO 9001 certification (and maintenance) most often referred to in the literature is the cost of the QMS (e.g.: Sfakianaki and Kakouris, 2020). Not all companies are willing to bear this cost, especially if the cost continues to grow beyond the moment of

the certification award. This growth occurs as a result of the systematic and continuous efforts of quality measurement, quality control and quality improvement initiatives (Corbett et al., 2005; Wahid and Corner, 2009; Sampaio et al., 2014; Bernardo et al., 2015). With the increase in certification costs (barrier), managers may increasingly believe that recovering the investment in quality may become improbable (motivation for decertification) and that certification costs may outweigh the benefits, thus becoming a motivation for subsequent decertification (Cândido et al., 2016).

Other important obstacles to certification are lack of involvement of top management, insufficient personnel qualifications, and employees' resistance to change (Gotzamani, 2010; Sampaio et al., 2014; Sfakianaki and Kakouris, 2020; Esgarrancho and Cândido, 2020). The involvement of top management and the active participation of all employees are key factors for certification renewal, in the absence of which the company may not be able to renew its certificate (Wahid and Corner, 2009; Sampaio et al., 2014). Therefore, the persistence of these obstacles *after certification* can act per se as a set of motivations for subsequent decertification or contribute to generate additional decertification motivations (Table 2). For instance, lack of employee training and misunderstanding of ISO 9001 requirements (barriers) can originate resistance to change which can prevent compliance with certification requirements, thus becoming a motivation for subsequent decertification. This means that implementation obstacles can persist after certification, can intensify and can give rise to new problems, which may constitute further internal motivations for decertification.

Similarly, companies that do not pay the necessary attention to certification maintenance, and do not perform internal corrective measures, can have persistent nonconformities (Wahid and Corner, 2009). Persistent nonconformities can then become internal motivations for ISO 9001 withdrawal (Marimon et al., 2009; Cândido et al., 2016).

In summary, organisations face certification barriers that can accumulate and grow in intensity, even beyond the moment of registration, leading them to other internal problems (decertification motivations) and, possibly, to subsequent ISO 9001 withdrawal. So far, the literature did not establish any relationship between certification barriers and decertification motivations. Thus, the second research hypothesis:

H2. Certification barriers positively affect internal decertification motivations.

2.3. Certification benefits, internal decertification motivations and decertification propensity

Decertification propensity is defined, in this study, as the organisational tendency towards ISO 9001 certification loss (Table 2). According to this definition, and the research model in Fig. 1, certification withdrawal can be motivated by internal and external reasons. In particular, this study suggests that the relationships between certification benefits, decertification motivations and propensity to decertify can be traced back to the original internal and external reasons why the company decided to achieve the ISO 9001 certificate.

Certification motivations are frequently external. Many companies adopt certification to expand markets and promote the quality of their products internationally (Sampaio et al., 2011, 2012, 2014; Djofack and Camacho, 2017). However, this strategy does not guarantee any external benefits and, as a result, the maintenance costs of certification can outweigh the benefits (Lo and Chang, 2007). In this case, the company propensity for decertification can be high. Therefore, it can be hypothesised that the lower the external certification benefits, the greater the propensity for decertification.

In contrast, companies internally motivated towards certification achieve greater internal certification benefits (e.g., Boiral and Roy, 2007; Terziovski and Power, 2007; Sampaio et al., 2012; Djofack and Camacho, 2017) and their decertification motivation should be weak. However, if top management is not sufficiently involved in the process

and there is no sustained improvement, the expected benefits may not be achieved (Lo and Chang, 2007; Sampaio et al., 2014; Esgarrancho and Cândido, 2020). In that case, a lack of interest in the certificate may arise (internal motivation), due to the lower than expected certification benefits (Lo and Chang, 2007; Sansalvador and Brotons, 2015; Cândido et al., 2016, 2019). Thus, it can be hypothesised that the lower the internal benefits, the higher the internal decertification motivations and the greater the decertification propensity. This relationship holds even for organisations that have internalised the ISO 9001 standard. Once the standard is internalised, certification benefits can persist over time (Corbett et al., 2005; Benner and Veloso, 2008; Hernandez-Vivanco et al., 2019) and are not dependent on formal ISO 9001 registration (Karapetrovic et al., 2010; Cândido et al., 2016; Cai and Jun 2018). Certification 'is not a requirement of the standards themselves, which can be implemented without certification for the benefits' that they provide (ISO, 2012; Siltori et al., 2020). From this perspective, it is reasonable to admit that certified companies that have already internalised the standard (Nair and Prajogo, 2009), whose customers do not demand an ISO certificate, and have had weak (or even moderate) benefits from certification, may consider not to renew the certificate (Cândido et al., 2016). Thus, weak or moderate benefits from ISO 9001, which can be maintained without a certification renewal, especially in the presence of high certificate costs, can motivate decertification and increase propensity to abandon the certification. In general, these arguments suggest that the lower the benefits, the stronger the reasons for decertification, and the greater the propensity for ISO 9001 withdrawal. Thus the following hypotheses:

H3. Internal certification benefits negatively affect internal decertification motivations.

H4a. Internal certification benefits negatively affect decertification propensity.

H4b. External certification benefits negatively affect decertification propensity.

2.4. Decertification propensity and motivations

Decertification propensity can depend on several factors, including certification cost, economic performance, competitive advantage, alternative standards and other aspects. This means that there are several motives for decertification, some of which are internal and some external. Internal motivations include the cost of maintaining certification, the time consumed with (re)certification, effects of improper implementation, and others (Table 2). In spite of these internal decertification motivations, many companies may remain certified because of external factors such as image enhancement and customer requirement, which are the main reasons for the initial certification of many companies (Sampaio et al., 2011, 2012). However, companies are unlikely to maintain certification if they fail to obtain a clear contribution to performance from certification, or if they have financial difficulties (Lo and Chang, 2007; Alić, 2014; Sansalvador and Brotons, 2015). In these cases, companies may consider the option to abandon certification (Cândido et al., 2016, 2019), which would allow them to avoid recertification costs. In other words, the higher the internal motivations for decertification (high costs, low benefits, and others), the greater the propensity for companies to decertify. Since, as was already noted, the loss of the ISO 9001 certificate does not make a significant impact on competitive advantage (Cândido et al., 2016), by opting for decertification, companies cease to bear certain costs and may continue to benefit from quality management processes that contribute to maintaining competitiveness (Cândido et al., 2016). This suggests that the higher the certification costs (and the stronger the other internal motives for decertification), the more likely companies are to decertify, as decertification may have no negative impact on processes and competitive advantage.

In addition to the internal reasons, there are also external motives. One important external motivation is the loss of ISO 9001 competitive and differentiation value (Nair and Prajogo, 2009; Cândido et al., 2016) due to the high number of companies that, in some economy sectors, have achieved certification (Marimon et al., 2009; Sampaio et al., 2011, 2014; Su et al., 2015). A high number of certified companies, in the same industry, dilutes the certification competitive advantage effect for all companies in that industry (Benner and Veloso, 2008; Marimon et al., 2009; Nair and Prajogo, 2009; Lo et al., 2013; Su et al., 2015; Cândido et al., 2019), which reduces the value of their current certificates and of future certificate renewals. Thus, the loss of competitive differentiation value is an external motivation that may increase the propensity for decertification. Similarly, the more demanding or more suitable alternative certifications in the market, such as, for instance IATF 16949:2016, can also diminish the attractiveness of ISO 9001 certification and can lead to the adoption of other standards (Laskurain-Iturbe et al., 2020). Alternative offerings are an external motivation to move away from ISO 9001 certification and increase the propensity for ISO 9001 decertification. In addition, other reasons for decertification can also contribute to decertification propensity (see Table 2). Thus, the following hypotheses:

H5a. Internal decertification motivations positively affect decertification propensity.

H5b. External decertification motivations positively affect decertification propensity.

2.5. Expected performance after decertification and decertification propensity

There are only three studies on performance after ISO 9001 withdrawal (Alić, 2014; Sansalvador and Brotons, 2015; Cândido et al., 2016) and no studies linking expected performance after withdrawal to decertification propensity. Developing a research hypothesis with these variables and the little that is currently known on ISO decertification, is challenging, but, as for the previous hypotheses, feasible. Indisputably, performance after decertification depends on the withdrawal impact on costs, earnings, company image and competitive advantage. Costs can be influenced by savings from non-renewal of the certificate, including savings in payments to the registration body and savings in expenses with personnel, materials, energy, and other resources that would be consumed in the recertification effort. Cost savings may also be achieved by dispensing with practices required by the standard, such as those related to risk management and others. Earnings, in turn, may be influenced by the loss of customers due to non-renewal of the certificate, the impact on company image, and the impact on competitive advantage. The final balance of all these effects may be positive, negative or null, and the loss of the certificate must depend to some extent on this balance.

A significant part of the literature suggests that competitiveness, quality, costs, sales and profitability are positively influenced by ISO 9001 certification (for reviews see Cândido et al., 2016; Siougle et al., 2019; or Hernandez-Vivanco et al., 2019). Indeed, a significant part of the literature suggests that certification improves firm performance (e.g., Chatzoglou et al., 2015) and that the benefits may last for long periods of time (Corbett et al., 2005; Benner and Veloso, 2008; Djofack and Camacho, 2017). Karapetrovic et al. (2010) further suggests that the benefits of ISO 9001 are identical, both for certified companies and for companies that comply with the standard but are not registered. Cândido et al. (2016) also suggest that companies may continue to reap the benefits from certification, even after the loss of the certificate, and that the benefits achieved with ISO 9001 are not dependent on maintaining formal registration with an official registration body. Given the results of these researchers, companies can continue to meet the requirements of the standard, and continue to benefit from it, without having to pay the price of certification renewal. In light of this argument,

it is reasonable to admit that some companies may have a performance expectation after decertification not much different, possibly even higher, than that they would have with certification. The higher this expectation, the higher the propensity for decertification.

Another significant part of the literature on ISO 9001 suggests that certification does not improve company performance (e.g., Dick et al., 2008; Cândido et al., 2019) and, consequently, many firms abandon the certificate (approximately 60,000 every year, according to ISO, 2015). Some of these companies are in financial difficulties, and part of them go bankrupt after decertification (Alić, 2014). It is, thus, reasonable to assume that some companies that did not benefit from certification might have a performance expectation after decertification that is similar to (or better than) that which they would have if they kept the certificate; otherwise, thousands of companies would not move towards decertification. It is, therefore, reasonable to propose that an expectation of performance after decertification that is identical to (or higher than) the current performance may contribute to a high propensity for decertification. It is also reasonable to admit that some companies might have an expectation of performance after decertification that is lower than that which they would have if they kept the certificate. In this case, their decertification propensity should be low. Thus, the following hypothesis:

H6. Expected performance after decertification positively affects decertification propensity.

3. Methodology

3.1. Population, sample and statistical power

The target population comprised 6623 Portuguese companies certified according to the ISO 9001:2015 standard (ISO, 2019). From this population, the sample was obtained with the aid of the complete database of registered organisations, provided by the Portuguese Institute of Accreditation (IPAC), and of a systematic random sampling method. The minimum sample size for PLS-SEM applications is 10 times the maximum number of arrows pointing at the dependent variables in the research model, in this case $10 \times 5 = 50$ observations. However, the sample size was determined with a tool based on the power of the statistical test for the PLS-SEM model's R^2 (Hair et al., 2017:22). According to this tool, in order to detect an R^2 value of at least 0.10 (≥ 0.10), with a power of 80% and a significance level of 1%, the sample size required was 145 (Hair et al., 2017:22). Considering that the average response rate to email enquiries is low, 10%–20%, the researchers conservatively decided to send 1500 online questionnaires. Thanks to this decision, the total number of responses received was 361. Of these, 140 had incomplete answers to one or more measurement items and were excluded. The remaining 221 responses that were complete (or only had incomplete answers to respondent characteristics questions) were retained as the final sample.

3.2. Questionnaire and variable measurement

The questionnaire comprised seven groups of questions. The first six groups collected data for the latent variables in the research; each group composed of several measurement items (indicators) with responses provided on five-point rating scales. The measurement scales were developed by the researchers from previous studies and are shown in Table 2, along with latent variables definitions, measurement items, relevant studies, and rating scales. The seventh group of queries were meant to characterise the respondents.

All questions were formulated in neutral language, with simple instructions, and clear wording to facilitate interpretation. Ex-ante precautions were taken to avoid common-method bias (Podsakoff et al., 2003; Chang et al., 2010). These included informing respondents that their responses would be kept anonymous, that there were no right or

wrong answers, and that respondents should answer as honestly as possible. A pre-test conducted with twelve managers of ISO 9001 certified companies permitted some minor improvements in the wording of the questions. The pre-test data was further used to calculate Cronbach alphas, which ranged from 0.853 to 0.940, and are indicative of good internal consistency reliability (Hair et al., 2014). Removal of items was also analysed with the pre-test data, but did not improve the scales reliability. Finally, single-item measures were avoided to allow for removal of measurement error (Hair et al., 2017:51).

3.3. Data analysis

Data analysis included: (1) descriptive statistics to characterise the respondents and sample data; (2) bias tests to further assess the data, (3) PLS-SEM conducted with SmartPLS (Ringle et al., 2015) to determine the coefficients of the relationships between research variables, (4) heterogeneity analysis to assess the differences between subgroups of observations, and (5) analysis of control variables.

3.4. PLS-SEM

PLS-SEM is a total variance-based method that estimates a measurement model and a structural model by combining principal components analysis with ordinary least squares regression (Hair et al., 2017, 2019). This method is appropriate for analysing composite-based path models (Henseler et al., 2013; McIntosh et al., 2014; Hair et al., 2019), for testing theoretical frameworks from a prediction perspective (Henseler et al., 2013; Rönkkö and Everman, 2013; Hair et al., 2019), for exploratory research and theory development when there is limited or no theory available (Henseler et al., 2013; Rönkkö and Everman, 2013; McIntosh et al., 2014; Hair et al., 2019), and when the data is not normally distributed (Hair et al., 2019). In this research, the authors propose a theoretical explanation for the ISO 9001 abandonment phenomenon for which there is no previous explanatory quantitative model. The approach is explanatory and predictive, as the model suggests variables that explain the propensity for ISO 9001 abandonment and can be used to predict the propensity for ISO 9001 withdrawal.

Table 3 Sample descriptive statistics.

Demographics	Frequency	Percentage
Respondent position		
Quality director/manager	127	61.7
Other management position	54	26.2
Other	25	12.1
Total (n ₁)	206	100.0
Respondent years in position		
<2	24	10.9
2-5	45	20.5
6-10	46	20.9
>10	105	47.7
Total (n ₂)	220	100.0
Employees number		
<10	24	10.9
10-49	92	41.8
50-249	68	30.9
≥250	36	16.4
Total (n ₂)	220	100.0
Activity sector		
Industry	85	55.6
Services	68	44.4
Total (n ₃)	153	100.0
Market(s)		
National	87	39.6
International	8	03.6
National and international	125	56.8
Total (n ₂)	220	100.0

Note: Differences between totals (n₁ to n₃) and sample size (n = 221) are missing values (See Section 3.1).

Table 4 Measurement model statistics.

Latent variables	Items	n	Mean	SD	Loadings
Certification motivations (internal)	MOT1	221	3.959	0.914	0.813***
	MOT2	221	3.353	0.923	0.847***
	MOT3	221	3.733	0.880	0.868***
	MOT4	221	3.195	0.981	0.736***
	MOT10	221	3.692	0.880	0.716***
Certification motivations (external)	MOT5	221	3.493	0.987	0.751***
	MOT8	221	3.077	1.149	0.827***
	MOT9	221	3.398	1.171	0.836***
Certification benefits (internal)	BEN1	221	3.828	0.839	0.855***
	BEN2	221	3.412	0.828	0.770***
	BEN3	221	3.158	0.849	0.848***
	BEN9	221	3.339	0.921	0.796***
	BEN10	221	3.900	0.871	0.678***
Certification benefits (external)	BEN5	221	3.575	0.851	0.846***
	BEN6	221	3.855	0.822	0.828***
	BEN7	221	2.950	0.980	0.817***
Certification barriers	BAR2	221	3.534	0.930	0.774***
	BAR3	221	3.493	1.049	0.650***
	BAR6	221	3.828	0.891	0.749***
Decertification motivations (internal)	DM1	221	3.172	1.129	0.802***
	DM2	221	2.900	1.145	0.831***
	DM3	221	2.765	1.050	0.815***
	DM4	221	2.321	0.998	0.694***
	DM5	221	2.968	1.163	0.795***
Decertification motivations (external)	DM7	221	2.136	1.133	0.873***
	DM8	221	2.258	1.118	0.894***
	DM9	221	2.742	1.208	0.749***
Expected performance after decertification	EPAD2	221	2.910	0.706	0.839***
	EPAD5	221	2.810	0.673	0.845***
	EPAD8	221	2.756	0.909	0.872***
Decertification propensity	PRO1	221	1.507	0.870	0.850***
	PRO2	221	1.801	0.964	0.869***
	PRO3	221	2.661	1.137	0.556***
	PRO4	221	1.932	1.359	0.658***

Notes: All items measured on a five-point Likert scale. *** Significant at the 1 percent level. Bilateral p-values.

PLS-SEM has a high degree of statistical power compared to CB-SEM, which is important for theory development and exploratory research (Hair et al., 2017, 2019). Furthermore, the available data is not normal, which per se is not a sufficient condition to adopt PLS-SEM (Hair et al., 2019), but together with the previous reasons, makes PLS-SEM a reasonable choice for this research.

4. Results

4.1. Sample data

According to Table 3, the respondents are mainly quality managers/directors (61.7%), with six or more years of experience in the position (68.6%), from small and medium-sized enterprises (72.7%), competing in industry (55.6%) or services (44.4%), and in the national (39.6%) or international markets (60.4%).

Table 4 shows additional descriptive statistics for measurement items and Table 5 for unstandardized latent variables. A quick analysis of the unstandardized construct means (Table 5) shows that internal certification motivations are, on average, moderate-high (3.586) and are stronger than external motivations (3.323), internal certification benefits are moderate-high (3.528) and stronger than external benefits (3.460), internal decertification motivations are weak-moderate (2.825) and stronger than external motivations (2.379), certification barriers are moderate-high (3.618), expected performance after decertification is slightly worse than that under certification (2.825), on average, and decertification propensity is weak (1.975), in the five-point rating scale adopted.

Table 5
Measurement model statistics, correlation matrix, HTMT, VIF, R², and Q².

Latent variable	Mean	SD	Composite reliability	AVE	MOT INT	MOT EXT	BEN INT	BEN EXT	BAR	DM INT	DM EXT	EPAD	PRO	R ²	Q ²
Certification motivations (internal, MOT INT)	3.586	0.730	0.897	0.637	0.798	[1.000]									
Certification motivations (external, MOT EXT)	3.323	0.895	0.847	0.649	0.341 (0.443)	0.806	[1.000]								
Certification benefits (internal, BEN INT)	3.528	0.684	0.893	0.627	0.741 (0.848)	0.297 (0.382)	0.792	[1.015]					[1.814]	0.549	0.333
Certification benefits (external, BEN EXT)	3.460	0.737	0.870	0.690	0.596 (0.753)	0.635 (0.831)	0.665 (0.825)	0.831					[1.828]	0.403	0.267
Certification barriers (BAR)	3.618	0.700	0.769	0.527	0.148 (0.254)	0.148 (0.254)	0.123 (0.208)	0.070 (0.134)	0.726						
Decertification motivations (internal, DM INT)	2.825	0.869	0.892	0.623	0.078 (0.144)	0.038 (0.123)	-0.069 (0.097)	-0.004 (0.115)	0.565 (0.777)	0.789			[1.776]	0.339	0.202
Decertification motivations (external, DM EXT)	2.379	0.972	0.878	0.708	-0.006 (0.149)	0.062 (0.106)	0.047 (0.097)	0.107 (0.129)	0.281 (0.402)	0.653 (0.809)	0.841		[1.834]		
Expected performance after decertification (EPAD)	2.825	0.653	0.888	0.726	-0.019 (0.065)	-0.025 (0.101)	-0.011 (0.068)	-0.055 (0.097)	0.131 (0.181)	0.164 (0.192)	0.224 (0.282)	0.852	[1.063]		
Decertification propensity (PRO)	1.975	0.799	0.829	0.555	-0.209 (0.271)	0.033 (0.085)	-0.086 (0.125)	-0.108 (0.191)	0.261 (0.406)	0.464 (0.589)	0.488 (0.600)	0.268 (0.329)	0.745	0.317	0.152

Notes: Mean and standard deviations are for unstandardized data. Mean is the arithmetic mean of all construct items. Values above the diagonal, and in square brackets, represent VIF values. Values in the diagonal, and in bold, represent the square root of AVE. Values below the diagonal, represent correlations, and in parentheses, represent the HTMT. n = 221.

Table 6

Total indirect effects, specific indirect effects, and total effects.

Path	Indirect effect	Total effect
Panel A: Effects on decertification propensity		
Certification motivations (int)→ Decertification propensity	-0.017 ^{n.s.}	-0.017 ^{n.s.}
Certification motivations (ext)→ Decertification propensity	-0.089**	-0.089**
Certification barriers→ Decertification propensity	0.135***	0.135***
Certification benefits (int)→ Decertification propensity	-0.032**	-0.023 ^{n.s.}
Certification benefits (ext)→ Decertification propensity		-0.140**
Decertification motivations (int)→ Decertification propensity		0.232***
Decertification motivations (ext)→ Decertification propensity		0.318***
Expected performance after decertification→ Decertification propensity		0.151**
Panel B: Effects on decertification motivations		
Certification motivations (int)→ Decertification motivations (int)	-0.104**	-0.104**
Certification barriers→ Decertification motivations (int)		0.582***
Certification benefits (int)→ Decertification motivations (int)		-0.140**
Panel C: Effects on certification benefits		
Certification motivations (int)→ Certification benefits (int)		0.741***
Certification motivations (ext)→ Certification benefits (ext)		0.635***
Panel D: Specific indirect effects		
Certification motivations (int)→ Certification benefits (int)→ Decertification propensity	0.007 ^{n.s.}	
Certification motivations (int)→ Certification benefits (int)→ Decertification motivations (int)→ Decertification propensity	-0.024**	
Certification motivations (ext)→ Certification benefits (ext)→ Decertification propensity	-0.089**	
Certification barriers→ Decertification motivations (int)→ Decertification propensity	0.135***	
Certification benefits (int)→ Decertification motivations (int)→ Decertification propensity	-0.032**	
Certification motivations (int)→ Certification benefits (int)→ Decertification motivations (int)	-0.104**	

Notes: ^{n.s.} Not significant, ** Significant at the 5 percent level, *** Significant at the 1 percent level. Unilateral p-values.

4.2. Data distributions and bias tests

Statistical tests, symmetry and flatness are indicative of non-normal data distributions for most measurement items. Non-normal data, however, is common in management research and constitutes no problem in this research because the statistical method adopted (PLS-SEM) does not require normality (Hair et al., 2017). Only extremely non-normal data may be harmful. Effects of extremely non-normal data are inflating standard errors and precluding structural coefficients from being considered statistically significant (Hair et al., 2017:61). Nevertheless, given that the large majority of the coefficients are significant (Tables 4, 6 and 7), it can be safely concluded that the data is not extremely far from normal.

Randomness, however, is a basic condition for PLS-SEM and was assessed with runs tests for all measurement items. Ninety percent of the p-values are higher than 0.05, suggesting that the null hypothesis of sample randomness should not be rejected for the large majority (90%) of the items. This evidence, and the random sampling method adopted by the researchers, suggest that the sample is random.

Non-response bias was examined with the Kruskal-Wallis test. The sample was divided into two groups. One group was composed of the early respondents to the questionnaire (75%) and the other group was composed of later respondents (25%). For the large majority of the research items (98%), there are no significant differences (Kruskal-

Table 7
Structural model statistics and hypotheses.

Hypothesis	Expected effect	Original sample (O)	Sample mean (M)	Standard deviation (SD)	t statistic (O/SD)	p-values	Hypothesis
H1a Certification motivations (Internal)→ Certification benefits (Internal)	+	0.741***	0.743	0.034	21.514	0.000	Supported
H1b Certification motivations (External)→ Certification benefits (External)	+	0.635***	0.639	0.039	16.302	0.000	Supported
H2 Certification barriers→ Decertification motivations (Internal)	+	0.582***	0.587	0.053	10.902	0.000	Supported
H3 Certification benefits (Internal)→ Decertification motivations (Internal)	-	-0.140**	-0.143	0.072	1.944	0.026	Supported
H4a Certification benefits (Internal)→ Decertification propensity	-	0.010 ^{n.s.}	0.003	0.077	0.126	0.450	Not supported
H4b Certification benefits (External)→ Decertification propensity	-	-0.140**	-0.137	0.080	1.753	0.040	Supported
H5a Decertification motivations (Internal)→ Decertification propensity	+	0.232***	0.231	0.066	3.533	0.000	Supported
H5b Decertification motivations (External)→ Decertification propensity	+	0.318***	0.320	0.072	4.441	0.000	Supported
H6 Expected performance after decertification→ Decertification propensity	+	0.151**	0.152	0.068	2.213	0.013	Supported

Notes: ^{n.s.} Not significant, ** Significant at the 5 percent level, *** Significant at the 1 percent level. Unilateral p-values. n = 221.

Wallis $p > 0.05$) between groups, which suggests that there is no evidence of non-response bias (Wagner and Kemmerling, 2010).

Finally, to assess common-method variance, the authors performed Harman's single-factor test. The single factor extracted explained 19.9% of the total variance, which is significantly lower than the 50% threshold (Podsakoff et al., 2003; Chang et al., 2010). Harman's single-factor test has limitations (e.g., it is not an inferential test) but, together with the preventive measures that were taken by the researchers (Section 3.2), provides some evidence that suggests the absence of this problem.

4.3. Analysis of the measurement model

Analysis of the measurement model includes the assessment of the: (1) internal consistency reliability; (2) convergent validity, and (3) discriminant validity (Hair et al., 2017). Regarding the internal consistency reliability of the measurement model, all latent variables exhibit composite reliability values higher than 0.7 (Table 5), with an average of 0.86, which is considered appropriate and indicative of good internal consistency (Hair et al., 2017).

Regarding the convergent validity of the measurement model, all latent variables show average variance extracted (AVE) values above 0.5 (Table 5), which is considered appropriate (Hair et al., 2017), and all indicators have loadings above 0.55 (Table 4), with 0.4 being considered the minimum acceptable (Hair et al., 2017). The large majority of the loadings, however, are higher than 0.7, averaging 0.79. Indicators with loadings between 0.4 and 0.7 were initially tested for removal and the items whose exclusion improved composite reliability and AVE were removed from the measurement model (Hair et al., 2017). The final list of items is shown in Table 4.

Finally, the discriminant validity of the measurement model was examined with the help of three different criteria (Hair et al., 2017). These criteria were not met at first but, following Hair et al.'s (2017:120) recommendations, some items were removed and in the end all criteria were met. First, all indicator's loadings are higher than all of their cross-loadings (not show in the manuscript). Second, the square root of the AVE of all latent variables (diagonal in Table 5) is higher than the corresponding correlations with all other constructs (values below the diagonal). Third, all heterotrait-monotrait (HTMT) ratios (in parenthesis in Table 5) are smaller than the 0.85 threshold (Hair et al., 2017). These results are supportive of adequate discriminant validity.

In summary, the analysis of the measurement model suggests that all relevant criteria are met and, consequently, that the indicators are valid and reliable to measure the research's latent variables.

4.4. Analysis of the structural model

First, the structural model was examined for collinearity with the help of variance inflator factors (VIF). All computed VIF values (in square brackets in Table 5) are close to one, or two, and significantly below the recommended threshold of five (Hair et al., 2017), which suggests that the structural model's latent variables are free of any collinearity issues.

Next, the coefficient of determination R^2 was assessed for all endogenous variables. The internal certification benefits R^2 is 0.549, the external certification benefits R^2 is 0.403, the internal decertification motivations R^2 is 0.339, and the decertification propensity R^2 is 0.317 (Table 5). These are all satisfactory and appropriate values, according to Hair et al. (2017), and suggest that the model contributes to the explanation of the endogenous variables' behaviour.

The predictive relevance of the model was next assessed with Q^2 and a blindfolding technique. Following Hair et al.'s (2017) recommendations, the computation method adopted an omission distance of seven, resulting in Q^2 values larger than zero (Table 5). These results are indicators of the model's out-of-sample predictive power and predictive relevance (Hair et al., 2017).

Then, the total effects were examined. The procedure evaluates the extent of the effects of the exogenous variables on endogenous constructs (Hair et al., 2017). There are three strong total effects, namely two between certification motivations and certifications benefits (Table 6, Panel C), and one between certification barriers and internal decertification motivations (Panel B). There are also two moderate total effects from decertification motivations to decertification propensity (Panel A). The remaining total effects (panels A and B) and indirect effects (panels A, B and D) are weaker.

Lastly, a bias-corrected (BCa) bootstrap analysis with 5000 subsamples was conducted to evaluate the statistical significance of the direct effects (structural coefficients), indirect effects and total effects. The results in Table 7 show that five structural coefficients are statistically significant at the 1% level (p-value = 0.000), three path coefficients are significant at the 5% level (p-values = 0.013, 0.026 and 0.040), and one structural coefficient is not significant (p-value = 0.450). Similarly, the results in Table 6 show that all but two total effects are statistically significant, and all but one indirect effect is statistically significant. (The insignificant indirect paths in Panel A and Panel D are, in fact, the same path.)

In addition to these results, the analysis of Tables 6 and 7 shows that the path coefficients exhibit a sign which is in accordance with the research hypotheses, except in the case of the hypothesis H4a, which is

also associated with the insignificant path coefficient. Consequently, the empirical analysis in this study supports all research hypotheses, except H4a.

4.5. Heterogeneity

Heterogeneity analysis refers to the study of possible differences in structural coefficients among smaller groups of observations in the main sample. A moderator variable, such as industry sector or firm size, is chosen to divide the sample into two groups. Then the PLS-SEM is rerun to assess measurement invariance between the two subsamples (MICOM) and to estimate structural coefficients for each of the groups. Statistical tests, which are based on a permutation method, can then be conducted for the comparison of the estimated structural coefficients. The procedure followed here is that suggested by Hair et al. (2017), and the recommended permutation test was adopted because of its better performance across a broad range of conditions. Following this procedure, total measurement invariance was established for the SEM models of manufacturing industries (n = 85) and service industries (n = 68), and the statistical tests performed with 1000 permutations showed that there are no significant statistical differences between the structural coefficients of the two models (p-values range from 0.059 to 0.952). Partial measurement invariance was next established for the SEM models of micro-small firms (n = 116) and medium-large firms (n = 104), and the statistical tests showed that there are no significant statistical differences between coefficients for the two models (p-values range from 0.091 to 0.832). These results indicate that the aggregate SEM model in Fig. 2 is valid for all tested subsamples. These results suggest also that the moderator variables industry sector and firm size have no significant moderating effect on the aggregate model.

4.6. Control variables

The control variables considered in the study are size, respondent years in position, and sector. None of these variables shows any significant effect on decertification propensity: size (-0.021, p = 0.711), respondent years in position (-0.091, p = 0.136), and sector (-0.050, p = 0.480), while all structural coefficients are significant, except that corresponding to H4a (Table 7).

5. Discussion

The main empirical results (Fig. 2) show that distinct certification motivations lead to different types of certification benefits during the certificate validity period: internal motivations have a strong and significant positive impact on internal benefits (H1a), and external motivations a strong and significant impact on external benefits (H1b). These results are in accordance with previous research (Gotzamani and

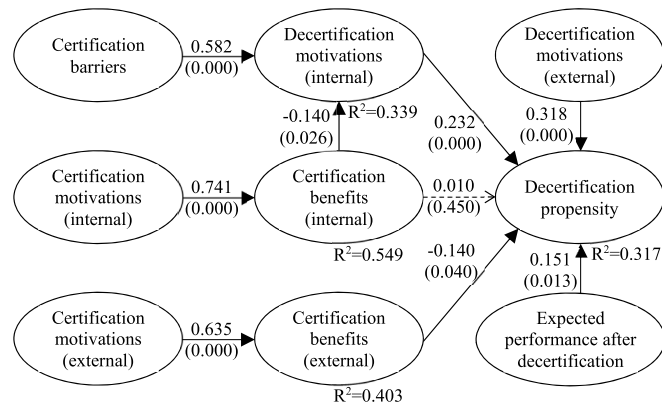


Fig. 2. Path coefficients, significance and explained variance.

Table 8
Correlations for two subsamples.

	Organisations not motivated to abandon ISO 9001 in order to adopt another standard (DM8 = 1 or 2, n = 134)	Organisations motivated to abandon ISO 9001 to adopt another standard (DM8 = 4 or 5, n = 27)
	Expected sign of correlation (-)	Expected sign of correlation (+)
Internal certification benefits correlations with decertification propensity	-0.233***	0.401**

Notes: Pearson correlations of construct scores. Subsample DM8 = 3 not included. ** Significant at the 5 percent level, *** Significant at the 1 percent level. Unilateral tests.

Tsiotras, 2002; Bhuiyan and Alam, 2005; Boiral and Roy, 2007; Martínez-Costa et al., 2008; Sampaio et al., 2012; Yaya et al., 2014; Heras-Saizarbitoria et al., 2015; Djofack and Camacho, 2017). In addition, the results show that internal motivations have a stronger effect on benefits than external motivations (0.741 > 0.635; p = 0.000¹), which is also in accordance with previous research (Terziovski and Power, 2007; Martínez-Costa et al., 2008; Prajogo, 2011; Sampaio et al., 2014). Consequently, this study does not support Prajogo's (2011) conclusion that external motivations have no significant effect on performance.

Certification barriers, in turn, have a strong and significant positive effect on internal decertification motivations (H2). This is a novel result for the ISO 9001 literature which suggests that the higher the certification difficulties felt during the implementation period (before the certificate was awarded), the higher the intensity of subsequent decertification motivations. The difficulties and obstacles that hindered certification can persist after the certificate is received and can then contribute to generate decertification motivations. Alternatively, if the system is well implemented as a whole, fewer barriers should be felt throughout the certification process, and the motivations to abandon certification should be weaker or absent.

Besides the strong effect of barriers on decertification motivations, there is also the effect of internal certification benefits on motivations for withdrawal (H3). The effect is significant and negative, as hypothesised, but small (-0.140). According to this result, the lower the internal benefits achieved with certification, the higher the decertification motivations to expect. This is also a novel result for the literature on ISO 9001 as no previous research has addressed this relationship. Although some research has suggested that low benefits can contribute to decertification (Lo and Chang, 2007; Sansalvador and Brotons, 2015; Chiarini, 2019), there was no empirical support to that claim. In addition, this study shows that there is a third variable to consider (decertification motivations) which might mediate the relationship between benefits and decertification intent. This mediation is further discussed below.

The relationship between internal certification benefits and decertification propensity (H4a) is not supported (p-value = 0.450). There is, however, one possible explanation for this result. Companies with both low and high benefits can opt for maintaining or abandoning the certificate, depending on a combination of factors, including certification and decertification motivations. Specifically, some companies might behave as expected and become inclined to abandon the certificate, because of poor internal benefits (H4a), while some other companies, also with poor benefits, but internally motivated, may decide to persist in their efforts to improve processes and quality, thus maintaining their registration. Similarly, firms with high internal benefits might keep the certificate because of the benefits (H4a), or abandon the certificate to move on to other types of QMS certification (e.g., IATF 16949: 2016).

¹ Rodríguez-Entrena et al. (2018).

Companies with high benefits might also abandon the certificate because they may perceive it as expensive, they may have internalised the standard into the company processes, and their customers may no longer require formal ISO 9001 registration (Cândido et al., 2016). Coexistence of these types of companies in the population could render the relationship between internal benefits and decertification propensity statistically insignificant. This explanation is partly based on Naveh and Marcus (2005) intriguing concept that: ‘adherence to [ISO 9001] and moving away from it, after thoroughly incorporating it, are needed’. According to this explanation, companies withdrawing from ISO 9001 to upgrade their QMS (Naveh and Marcus, 2005; Laskurain-Iturbe et al., 2020) should exhibit a positive relationship between internal benefits and decertification propensity, whereas companies withdrawing from ISO 9001 for other motives, such as low benefits and cost avoidance, should show the hypothesised negative relationship (H4a). This research sample data seems to support this explanation. For the subsample of companies that are motivated to abandon ISO 9001 and adopt another standard (DM8 = 4 or 5), the higher the certification benefits the higher the decertification propensity (positive and significant correlation in Table 8). For the subsample of companies that are not motivated to adopt another standard (DM8 = 1 or 2), the higher the certification benefits the lower the decertification propensity (negative and significant correlation in Table 8). This empirical evidence, thus, provides strong support to the above explanation for the rejection of H4a, and to the idea that neither H4a, nor Naveh and Marcus (2005) statement, can be considered true for all organisations.

The relationship between external benefits and decertification propensity (H4b) is supported, as hypothesised, although the strength of that relationship is small (-0.140). In this case, low or no external benefits increase firm propensity for ISO 9001 withdrawal. It is very interesting to note that, in general, internal benefits do not influence decertification (H4a), but external benefits do. Together, these results suggest that firms that adopted ISO 9001 based mostly on internal motivations do not immediately abandon ISO 9001 because of a poor level of internal benefits, whereas companies that adopted ISO 9001 based mostly on external motivations, generally abandon ISO 9001 if they obtain less than satisfactory external benefits. Conversely, externally motivated firms with high benefits do not abandon ISO 9001, whereas internally motivated firms with high benefits may keep it, if not motivated to adopt a more demanding QMS, or abandon the certificate to adopt a more demanding QMS.

There is a similar analysis to be made on the statistical insignificance of the first specific indirect effect in Table 6 (Panel D) and the significance of the third one (same panel). While the first path (internal motivations \rightarrow internal benefits \rightarrow decertification propensity) shows that internal certification motivations have no effect on decertification propensity through internal benefits, the third one shows that there is a significant effect of external certification motivations on decertification propensity through external benefits. Again, poor internal benefits do not affect decertification intent when the firm is internally motivated towards certification, but poor external benefits can lead to decertification when the firm was initially externally motivated towards certification.

The significance of the second of the specific indirect effects, in the same Panel (internal motivations \rightarrow internal benefits \rightarrow decertification motivations \rightarrow decertification propensity) is very important, but can be puzzling. This significant path suggests that internal certification motivations is related to decertification propensity, through the mediation of decertification motivations. That is, even if the organisation has the right motivations for certification (internal motivations), poor benefits associated with strong motivations for decertification can lead to decertification intent. This indirect path, together with the first one in Panel D, suggest that internal certification motivations influence decertification propensity only through the combined mediation of benefits and decertification motivations.

Although the magnitude of these effects is small, their statistical

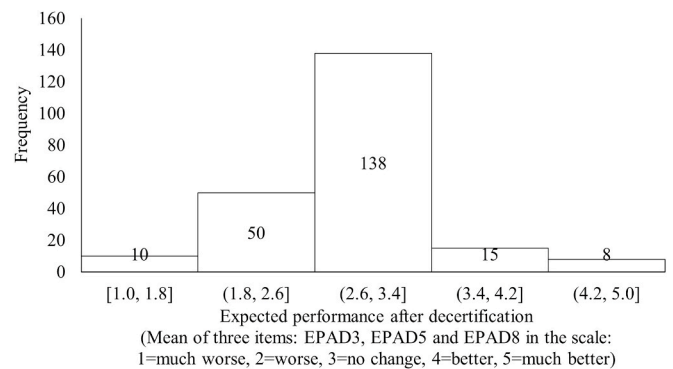


Fig. 3. Histogram: expected performance after decertification.

significance is relevant, because the indirect effects support the claim, in this research, that the roots for decertification lay with the initial certification motivations and the barriers that influenced the implementation of the standard. The indirect effects reveal that certification motivations and barriers are underlying factors that contribute to decertification motivations, and lead to decertification propensity.

Research results show that the greater the decertification motivations, the greater the decertification propensity (H5a and H5b). Decertification propensity increases with internal decertification motivations (H5a) such as the costs of maintaining the certificate, decreasing benefits from certification, difficulties to sustain continuous improvement, and documentary burden. Decertification propensity increases also with external decertification motivations (H5b) such as the existence of alternative certification standards, loss of certificate value as a competitive weapon, and others. Interestingly, external motivations have a stronger effect than internal motivations ($0.318 > 0.232$; $p = 0.000^2$). Whereas internal motivations for certification are stronger than external motivations ($0.741 > 0.635$; $p = 0.000$), the motivations for decertification exhibit an inverse order of importance. Why this inversion occurs might constitute a subject for further research.

Finally, the greater the expected performance after decertification, the greater the firm propensity for decertification (H6). This result suggests that firms have an expectation of what their performance might be after decertification and that expectation is related to their propensity for decertification. This is a novel result, because expectations of performance after decertification have not been researched until now. A comparison between this result and previous research may however be established if previous research on decertification consequences, specifically, in terms of firm performance, is considered. The scarce existing studies on this topic are not consensual. As already noted, Alić (2014) shows empirical evidence that firm performance declines after decertification, and Sansalvador and Brotons (2015) present evidence that company value declines after that event. In contrast, Cândido et al. (2016) exhibit empirical evidence that there is no decline in post-decertification performance. Interestingly, the majority of our sample respondents seems to agree with the later study (Fig. 3). Some sample companies expect their performance to worsen after decertification (60), others expect their performance to improve (23), but the majority expects their performance to remain largely unaltered (138). These research results can contribute to explain the contradiction in the literature. There seems to be different groups of firms, in terms of their post-decertification performance expectations and – as noted earlier in the discussion of H4a – in terms of companies’ motivations for certification and decertification. Some firms may decertify because their objective is to replace or upgrade their QMS (Naveh and Marcus, 2005; Laskurain-Iturbe et al., 2020). In these cases, it seems reasonable that performance after decertification may improve and, if that is also the

² Rodríguez-Entrena et al. (2018).

firms' expectation, such firms may opt for decertification. Other organisations may, in turn, abandon the certificate for believing that the standard is already internalised in their processes and customers do not demand certification (nor other types of QMS). In this case, their performances may remain unaltered (Cândido et al., 2016). Lastly, some firms may lose the certification because their fragile QMS does not pass the audits and, in this case, firm performance may remain unaltered or decrease, depending on other factors. Thus, differences in sample composition of previous studies, in terms of these three types of companies, could explain the contradictory research results so far.

6. Implications

6.1. Implications for theory

A major gap in the literature on decertification is the complete absence of analytic studies establishing quantitative relationships between explanatory variables (Chiarini, 2019), and, particularly, the absence of a model or theory relating the factors that lead to decertification propensity. This study begins to close this research gap by developing and analysing the first comprehensive model of decertification that highlights the factors contributing to the decertification propensity. Existing studies address only the reasons and/or the consequences of decertification, while this study links both of these aspects to the preceding ISO 9001 certification process. In an effort to answer the research question of what factors lead to decertification and how they relate to each other, the study shows that the root causes for decertification go back to the initial certification barriers and motivations, involving also as antecedents to decertification the decertification motivations and the expectations of performance after ISO 9001 withdrawal. In addition, the research shows that three variables (decertification motivations, internal certification benefits and external certification benefits) mediate the relationships between, on the one side, certification barriers and certification motivations and, on the other side, decertification propensity. This research further expands extant research by showing that external decertification motivations have a stronger effect on decertification propensity than internal motivations.

This study also contributes to the strategy implementation literature. The study shows that certification barriers lead to decertification motivations, which in turn lead to decertification propensity and, eventually, to actual ISO 9001 withdrawal. This means that implementation obstacles do not simply accumulate, as suggested in the strategy literature, but that they may exhibit other types of relationships. Thus, this study contributes to the strategic management literature by providing empirical evidence to support Beer and Eisenstat (2000) claim, based on anecdotal evidence, that obstacles interact with other implementation problems. Similarly, this study contributes to the strategy literature by supporting Cândido and Santos (2019) claim, based only on a case study, that obstacles can lead to other implementation problems, in a succession, until complete strategy abandonment.

6.2. Implications for practice in companies and certification bodies

Approximately 330,000 companies must decide every year whether to renew their ISO 9001 certification or not. Such a decision can have serious implications for companies. This study helps managers to understand what factors lead companies to decertification and some of the main factors that should be taken into consideration when contemplating the decision to renew or abandon certification. These variables include the reasons that led to the ISO certification in the first place, the factors that hindered implementation of the standard, the benefits attained from certification, and the expected performance after withdrawal. Other factors to consider also are the objective and motivations for decertification, such as the existence of other alternative certifications and the competitive advantage provided by the certificate.

Certification withdrawal is not irreversible, and any company may consider testing a temporary decertification. However, the decision to withdraw must be carefully considered and take into account the variables that this study identified as main factors.

If the decision is to maintain the certificate, managers must be alert to identify and mitigate certification barriers that may persist after certification, as these barriers, together with weak internal certification benefits, can give rise to (seed) strong decertification motivations and eventual withdrawal. Even if the right (internal) motivations for certification are strong, managers must be alert. In the presence of internal and external motivations for decertification, the motivations for certification are countered and decertification propensity increases.

There are also implications for certification bodies. Certification bodies might be inclined to believe that once the certification has been awarded, certification obstacles felt during the process and initial certification motivations will no longer affect future recertification processes. This study has demonstrated that this is a dangerous belief. The study identifies the variables that lead to ISO 9001 decertification propensity and can be used by certification bodies to help companies anticipate the factors that may lead to certification withdrawal and help organisations counter their effects. In accordance, this study results can help both registered firms and certification bodies predict the decertification propensity of certified companies.

7. Conclusion, limitations and future research

The main objective of the study is to contribute to the understanding of the reasons underlying certification loss. Existing studies on decertification have addressed the issue in a fragmented and less than comprehensive perspective, considering only the motivations for decertification and/or its consequences. The assumption underlying this study is that an integration between aspects related to pre-certification, certification, decertification and post-decertification is essential for a better understanding of the phenomenon. The absence of this integration has been an obstacle to a more complete understanding of certification withdrawal, thus leading to a gap in the literature that this study begins to fill.

The study has limitations that may, in turn, offer opportunities for future research. Firstly, the study took place in a specific setting (Portugal) which might affect generalisability of the research results and implications. Although the Portuguese economy is an open European economy whose companies face strong international competition in most (or all) sectors, applicability to other countries may not be guaranteed. There are differences between countries that may contribute to limit the study generalisability, in particular differences in terms of the proportion of firms that have adopted ISO 9001, level of incentives from national governments towards adoption and maintenance of ISO 9001, and proportion of companies withdrawing from ISO 9001. In fact, the adoption of ISO 9001 in Portugal was not as intense as, for instance, in its neighbour Spain, where the Spanish government strongly supported the adoption. In addition, Portugal exhibits a high proportion of ISO 9001 withdrawals, similar to some developed countries, but distinct from other developed and developing countries which exhibit a much smaller rate of ISO 9001 cancellation (Marimon et al., 2009; ISO, 2015). Thus, further research is required to assess the generalisability of the results, particularly in countries in which the government support is (or was) stronger than in Portugal and where the rates of ISO 9001 adoption and withdrawal are significantly distinct from those of Portugal. Secondly, this study uses cross-sectional data and, as such, can only assess two of three necessary conditions for establishing causality relationships, i.e., (1) existence of significant correlation between variables, and (2) ruling out of extraneous variables (Bullock et al., 1994). The third condition, temporal precedence of the cause, cannot be assessed in cross-sectional research. Future research might consider longitudinal methodologies to address this limitation. Thirdly, the research model developed in this study explains approximately one third of the

variability in the main endogenous variable, which is a considerable explanatory power in social sciences (Hair et al., 2017). However, the study considers mainly internal variables. Future research might consider the inclusion of other external variables in the structural model. For instance, external variables such as industry competitiveness, industry ISO 9001 adoption level, industry ISO 9001 withdrawal rate, industry growth rate (Lo et al., 2013), environmental dynamism, environmental munificence (Jacobs et al., 2015), institutional pressure, external legitimacy, conformity (Prajogo, 2011; Castka, 2018), supply chain relationships, and country of origin might be considered. Internal variables that may also be considered are organisational strategy, organisational strategic position (Sroufe and Curkovic, 2008), timing of adoption, TQM adoption, Six Sigma adoption, alternative certifications (Su et al., 2015), ISO 9001 experience (Jacobs et al., 2015), technology intensity (Lo et al., 2013), technology diversity (Benner and Veloso, 2008), training, quality culture, ISO 9001 maintenance, and scope of operations. Finally, the measurement scales used in this research were developed from an extensive review of the literature and can be used in future research. However, since some measurement items were excluded in the empirical stages of the research, as a means to obtain reliable scales, these scales may best be used as a point of departure for further development.

Credit author statement

Luís M.F.R. Ferreira: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Visualisation; Carlos J. F. Cândido: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Writing – review & editing, Visualisation, Validation, Supervision.

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Declaration of competing interest

The authors have no conflicts of interest to declare.

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