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Published online: 27 Jul 2021.

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Is quality management a competitive advantage? A study after the Spanish financial crisis in the furniture industry

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The aim of this study is to test whether the use of non-financial quality performance indicators reduces bankruptcy probabilities. A questionnaire was sent to the population of small-and medium-sized enterprises (SMEs) from the Spanish furniture industry. The final sample consists of 126 SMEs from the referred industry during the recent economic crisis (2007–2014), a period characterised by a huge increase in business competition and the rate of failure. The main argument is that, in this context, the competitive response of the furniture industry, especially in the case of SMEs, revolves around quality. A logistic multivariate regression model is estimated in which we include both financial and non-financial quality-implementation measures. We use a variable inspired by Perera et al.'s (1997) scale which integrates a variety of factors related to quality practices. The results show that the pre-emptive use of quality non-financial indicators is a key factor for subsequent business survival. These findings suggest important implications for external and internal stakeholders as well as policymakers.

Keywords: performance measurement; management control; quality management; non-financial indicators, contingency-based perspective
Subject classification codes: M410; M490; M110

Introduction

In recent decades, there has been an increased emphasis on the role of non-financial measures of performance over traditional financial measures in organisational strategic decision making. Kaplan and Norton (1996, 2001) suggested that the use of non-financial measures means that managers pay greater attention to critical success factors such as quality management. Consequently, companies that use these measures are expected to perform better (Asiaei & Bontis, 2020; Micheli & Mura, 2017). However, the empirical results presented in the literature provide mixed evidence of a link between the operationalisation of quality management systems and the achievement of superior firm performance (Granlund & Lukka, 2017).

Kaynak (2003) argued that these inconsistent results can be due to an inadequate design of the studies; more specifically, that the constructs used to measure both quality management systems and financial performance can be inadequate to investigate the above relationship. Most studies that have analysed the impact of quality practices have proxied them through general signals like the implementation of TQM or ISO certificates

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(Franceschini et al., 2018). However, a mere certification of some of the above practices could not fully reflect the commitment of a company to its quality. Camacho-Minano et al. (2013) considered that the implementation of a management quality system is a complex phenomenon and suggested that the use of a more concrete combination of indicators of quality practices should help to better analyse it.

There is general agreement in the literature that objective financial measures are preferable to those based on mere managerial perceptions, both of which are commonly used to test the effects of quality practices (Snow & Hrebiniak, 1980; Wayhan & Balderson, 2007). However, financial measures are not contemporaneous to the implementation of quality practices and they might be too short-term oriented, subject to manipulation or excessively aggregated. Tsai (1998) highlighted this argument by recognising that companies more committed to quality practices will need some years to see their effects on the firm's performance.

In this study, a new design is set to examine the implementation of quality practices as a pre-emptive strategic move against the contrarian economic environment faced with the last economic recession. For that purpose, both a more sophisticated measure of quality implementation practices and a more objective reference to their financial effects are employed.

The measure of quality management used in this study is inspired by Perera et al. (1997). These authors used a multi-dimensional factor based on non-financial performance indicators as a more effective way to analyse success in the implementation of quality practices. Non-financial performance measures promote employee commitment to quality, make all employees aware of the significance of quality management and involve them in the appropriate organisational actions (Abdel-Maksoud et al., 2016; Al-Saffar & Obeidat, 2020; Chenhall, 1997; Ittner & Larcker, 1995, 1997). These indicators have been measured according to variables such as product quality, on-time deliveries or client satisfaction (Birch-Jensen et al., 2020; Fullerton & Wempe, 2009; Henri & Wouters, 2020; Prajogo & Sohal, 2006; Wickramasinghe & Perera, 2014; Wiersma, 2008). Their implementation focuses on management efforts to acquire and maintain a competitive advantage that eventually leads to an increased probability of business survival.

Even though Perera et al. (1997) went beyond traditional quality certificates by using specific non-financial performance measures, the effects of such measures were still evaluated through mere managerial perceptions. We try to fill this gap by setting survival in a recessionary context as a more objective financial reference that is external to the company. Our research question is: *Does early implementation of a quality strategy based on the use of non-financial performance indicators increase the probability of the survival of SMEs?*

The research design is set in the Spanish furniture industry during the recession period of 2007–2014. Statistics of the European Commission show that the furniture sector was badly affected by this recession. In the period 2007–2009, the trade balance for furniture products deteriorated dramatically by 15% and exports dropped by 16.4% reaching a deficit of 1.2 billion in 2008 (Li et al., 2011). Within Europe, the PIGS countries (Portugal, Italy, Ireland and Spain) were hit particularly hard by the crisis (Reyes & Moslares, 2010). Thus, Spain constitutes an appropriate scenario for this research purpose.

Just as in Europe, the majority of companies in the Spanish furniture sector have a limited size, with small and medium-sized enterprises (SMEs) accounting for approximately 90% of all enterprises (INE, 2014) The furniture sector was the second most affected by the decrease in consumer spending in Spain (IESE, 2015) in part because of its direct link with the housing crash of 2008.

The use of non-financial performance measures takes on particular importance in SMEs because it is more difficult for them to survive in a global competitive business environment. This is especially important in the context of a huge contraction of consumption, exacerbated by competitive pressure from emerging markets. The high percentage of companies in the Spanish furniture industry which were failing during this period is evidence of the high increase in business competition.

The data for the non-financial performance indicators are collected from a postal survey administered to SME managers directly responsible for the quality of business performance management. Data on financial performance and firm survival status are taken from the SABI database. Financial data restrictions and response rates reduce our final sample to 126 SMEs.

A logistic regression model is developed in which we include both financial and non-financial quality-implementation measures. Financial ratios are based on the widely used Zmijweski (1984)'s failure probability model and the simultaneous inclusion of our quality proxies allows the model to overcome the lack of contemporaneity in their effects on financial ratios. The results support the prediction of a higher survival rate for companies highly committed to the use of non-financial quality measures regardless of their financial condition. These results have important implications for external and internal stakeholders as well as for policymakers.

This paper contributes to the literature on the effects of quality management practices in two main aspects. On the one hand, it extends Perera et al. (1997)'s use of a multidimensional factor on quality by applying it to a survival design (the post-crisis years in the Spanish furniture industry) and not merely by measuring its effects through managerial perception or internally generated financial ratios. On the other hand, both financial ratios and non-financial performance quality indicators are studied simultaneously, which allows to better account for the fact that companies more committed to quality practices will need some years to see their effects on the firm's performance. The study also contributes to the bankruptcy prediction literature in which quality-management measures have scarcely been tested.

The rest of the paper is structured as follows. The next section reviews the background of quality non-financial measures and bankruptcy prediction models. The following sections explain the sample, methodology and results. The final sections include a discussion with theoretical and practical implications and conclusions.

Background

Non-financial performance measurement literature

The contingency-based perspective has been the dominant theoretical framework used in accounting research to investigate the role of management control systems in organisations (Chenhall, 2005; Ferreira & Otley, 2009; Gerdin & Greve, 2004; Henri & Wouters, 2020; Ibrahimi & Naym, 2019; Otley, 1994, 2016). Over the past forty years, it has provided insights into how different configurations and uses of control systems have resulted in a variety of different consequences (Granlund & Lukka, 2017; Otley, 2016).

Contingency theory treats strategy as the core organisational variable (Langfield-Smith, 1997; Miles & Snow, 1978; Simons, 1995) suggesting that different company's plans and strategies produce different configurations in control systems. Some research efforts have focused on the study of management control systems which can be used to manage strategy development (Asiaei & Bontis, 2020; Chenhall, 2005; Ittner & Larcker, 1995; Micheli & Mura, 2017). There are also some more detailed, qualitative studies

that have tried to capture the details of strategies adopted in the company and the ways in which these have influenced their control systems (Adler, 2011). Gong and Ferreira (2014) pointed out that the design choice in management control systems is essential to the achievement of a business's strategic objectives.

Performance measurement systems play a key role in the success of strategic plans because their development within the company's strategic lines are linked to its goals and objectives; according to Chenhall (2005), they can support the correct implementation of the strategy and the achievement of the targeted economic financial performance. The lack of a comprehensive performance measurement system appears to have negative effects on the formulation, the implementation (Micheli et al., 2011) and economic consequences of organisational strategy (Henri, 2006; Van der Stede et al., 2006; Widener, 2006).

In recent decades, there has been great emphasis within the performance measurement systems on the role of non-financial measures of performance as good drivers of strategic decision making. Measures such as product or service quality, customer satisfaction and employee learning and growth have been recommended for assessing long-term strategic orientations of organisations that ensure their sustainable performance (Ahmad & Zabri, 2016; Chenhall, 2005; Evans et al., 2010; Henri & Wouters, 2020; Pambreni et al., 2019).

Quality has been acknowledged as a crucial strategy issue in recent years (Chenhall, 1997; Ittner & Larcker, 1995; McAdam et al., 2019; Zatzick et al., 2012) and its implementation requires effective indicators to achieve its objectives. Managers can use non-financial measures to promote employee commitment to quality, clarify their roles and involve them in the organisational actions derived from quality management (Ittner et al., 2003; Lau, 2011) and communicate the objectives of the quality strategy to all staff in the company (Abdel-Maksoud et al., 2016; Azofra et al., 2003). In the case of SMEs, the increased importance of norms and standards, internationalisation and competitiveness has boosted their requirements which focus on quality strategies (Garengo et al., 2005; Hiebl et al., 2013) and, consequently, the incorporation of non-financial indicators in their performance measures is fundamental to monitor their quality outcomes.

In general, researchers approximate quality performance management with a variety of non-financial measures such as product quality, on-time deliveries or client satisfaction (Basu et al., 2018; Birch-Jensen et al., 2020; Camacho-Minano et al., 2013; Fullerton & Wempe, 2009; Hallencreutz & Parmler, 2021; Prajogo & Sohal, 2006; Sadikoglu & Zehir, 2010; Wiersma, 2008), the number of defective products (Merino-Díaz de Cerio, 2003), customer complaints and quality costs (Basu et al., 2018; Curkovic et al., 2000), the product quality and cost of defective and reprocessed products (Kaynak, 2003), some measures of delivery, flexibility and costs (Prajogo et al., 2012), measures associated with internal production process efficiency (Klingenberg et al., 2013; O'Neill et al., 2016) and measures based on quality control, internal production process efficiency and customer and employees (Ahmad & Zabri, 2016).

The literature recognises not only the essential role of non-financial performance measures in the implementation of quality practices, but also their contribution to the improvement of financial performance. In this line, Wiersma (2008) tested the relative and incremental information content of two non-financial performance measures (absence frequency and on-time delivery) and found that, even though financial measures are more congruent with future financial performance, the two non-financial measures have incremental information content for both future costs and revenues. Fullerton and Wempe (2009) evidenced that the use of non-financial indicators related with lean manufacturing is positively associated with return on sales and Duh et al. (2012) found that non-financial

measures, such as product defect rate, product rework rate, production lead time, employee morale and customer satisfaction positively impact on return on assets. More recently, Eklof et al. (2020) showed that customer satisfaction has a positive impact on the future profitability of Scandinavian banks, and Birch-Jensen et al. (2020) reinforced the idea that the use of customer satisfaction measurements, when combined with prospector strategy, are a key driver of companies' financial improvements. Building upon the signalling theory, Omran et al. (2021) found that for firms following a quality strategy, the disclosure of non-financial performance measures positively impacts financial operating performance.

There are, however, some concerns expressed in this literature. First, contrary findings are also shown in studies like Ittner and Larcker (1995, 1997), Perera et al. (1997) and Callen et al. (2000) that found no positive relationship between non-financial measures and profitability or the rate of growth. Heinicke (2018) and Rojas-Lema et al. (2020) highlighted that in the implementation of quality performance systems, most of the studies in the literature have investigated the effect of non-financial measures related to customer satisfaction and, therefore, a greater research effort has to be made in other dimensions, such as product and process innovation, especially in SMEs.

Finally, the metrics used to evaluate the financial consequences of quality management are internally generated in all cases. Both the managers' perceptions (Chenhall, 1997; Ittner & Larcker, 1995; Perera et al., 1997) and the data taken from accounting documents (Callen et al., 2000; Camacho-Minano et al., 2013; Fullerton & Wempe, 2009; Klingenberg et al., 2013; O'Neill et al., 2016; Wiersma, 2008) suffer from subjectivity and potential manipulation. As a major contribution, the proxy used in the current study (survival in a recession period) is not provided by internal managers but is based on a more reliable external circumstance.

Company survival and hypothesis

The survival analysis carried out in this study builds on bankruptcy prediction models. Extant bankruptcy literature has focused on predicting a firm's failure. Examples of the most well-known papers are Altman (1968), Ohlson (1980) and Zmijweski (1984). They all use a reduced set of accounting ratios that represent different attributes of firm's financial strength as predictors of its financial distress. Their findings clearly support the predictive capability of these ratios.

The bankruptcy prediction literature has subsequently developed in three ways: the improvement of methodological issues, such as the use of artificial intelligence models; the inclusion of macroeconomic variables and, finally, the impact of non-financial (i.e. qualitative) measures. Examples of this are Dimitras et al. (1999) who found that qualitative attributes have more predictive power than financial ones and Bryan et al. (2013) who provided evidence that productivity has a negative effect on bankruptcy risk. Nevertheless, research on non-financial variables for bankruptcy prediction is still scarce and the evidence for those related to quality practices is almost non-existent. To the best of our knowledge, Franceschini et al. (2018) is the only paper that approximates this. They found that companies certified with the ISO 9001 show a lower bankruptcy risk as measured by the value of Altman's (1968) Z score. This paper extends their study by using actual bankruptcy and not just the response of a model developed for listed companies in the United States that might not be adequate for SMEs in Europe.

In the context of this study, that is, the furniture industry facing the last recession in Spain, high competition and contraction of consumption are expected to have a negative

effect on all of the companies' performances. At first glance, an economic recession could be understood as a classical exogenous shock that causes disruption and breakdown. However, survival chances should be understood as an interaction between exogenous shocks and pre-existing corporate strengths of a more endogenous nature (Baker et al., 2020). Pre-emptive quality concerns might be considered one of these strengths which provide a competitive advantage to more efficiently face disruptions in price-oriented and competitive scenarios. Support for this idea was provided by Corredor and Goñi (2011), who found that pioneers in the implementation of a TQM system experience performance gains whereas late adopters do not experience similar results. Likewise, Yu et al. (2020) evidenced that the choice of a proactive strategy, namely the implementation of total quality management (TQM) earlier than competitors, is essential to fully benefit from its long-term effects. The main hypothesis in this study builds upon two ideas, quality strategies as a key factor for facing potential disruptions and non-financial measures which allow a better measurement of the long-term effects of these quality practices. The hypothesis is:

> *H1*: Companies that apply a quality-based strategy monitored through non-financial performance indicators show a higher rate of survival.

Methods

The sample

Data were collected from SMEs furniture companies operating in Spain for the period 2006–2014. A company was considered and 'SME' if it has fewer than 250 employees, in accordance with the definition applied by the European Commission (Eurostat, 2018). The unit of analysis is each one of these companies. To obtain the non-financial indicators, we developed a postal survey which was administered to managers directly responsible for the quality or business performance management. A strength of survey research is its potential to capture important aspects of the natural setting to support external validity and to analyse outcomes in the real world in which they occur (Speklé & Widener, 2020).

The questionnaire was used to obtain information on the perception of managers with respect to the evolution of various non-financial indicators of quality performance (see Appendix). Content validity is guaranteed by the depth of the bibliographical review and by the use of resource of experts. The survey was validated by a Delphi panel of 16 experts who were representatives of business associations, academic experts and CEOs of firms; they all worked in business-related fields and/or the quality management environment. In the first round, a meeting was held to discuss the suitability of the selected indicators for the research objective. In a second round, the relevance of each indicator was assessed on a 7-point scale. The median, deviations and quartiles were used as statistics. The convergence occurred at the third interaction with a positive evolution of the interquartile space, with an overall reduction of the space of 10.5%. After its final design, the questionnaire was sent to a population of 515 SMEs listed on the Spanish SABI database in 2006. From this population, a total of 130 usable questionnaires were obtained, representing a response rate of 25.24%, which is in line with levels in studies with similar aims (Henri & Wouters, 2020; Ittner et al., 2003). The use of several measures suggested by Dillman (2000) may have increased the response rate; namely, response-friendly questionnaires and the inclusion of a pre-paid return envelope with personalisation of correspondence. Although our sample may seem small, it is worth noting that we required that the surveys be filled out by managers with decision-making responsibilities and that the

questions be thoroughly answered. The companies were also identified by their value-added tax identification number so the surveys were not anonymous. These requirements ensured the firms' commitment to this research and the provision of high-quality answers although they also reduced the response rate.

Data on financial performance and firm survival status were taken from the SABI database. Financial data restrictions reduced our final sample to 126 companies, 59 of which failed during the period analysed, representing a bankruptcy rate of 46.82%. This provides evidence of the noticeable impact of the Spanish financial crisis in the furniture industry.

To check for a possible non-response bias, we performed t-tests comparing sales revenue, number of employees, cash-flow and return on assets ratio between respondents and non-respondents. Only sales revenue showed a significant difference ($p = 0.046$), with a higher value for respondents. Further, t-tests for two independent samples were undertaken by comparing early and late respondents. No significant differences were found in any of the abovementioned variables. Together, these results indicate no significant concern for non-response bias.

Analysis

A logistic regression model was estimated to evidence the effect of non-financial indicators on failure probability between 2007 and 2014. In addition to the non-financial variables, we used different financial distress control variables previously tested in bankruptcy prediction models.

The model shows the following form:

$$BK_t + 1 = \beta 0 + \beta 1 Q_t + \beta 2 \text{ROA}_t + \beta 3 \text{CR}_t + \beta 4 \text{L}_t + \beta 5 \text{ACID}_t + \beta 6 \text{SIZE}_t + \mu 1 \quad \text{(model 1)}$$

Where,

$BK =$ a dichotomous variable that takes the value 1 if the firm enters bankruptcy in year t+1 and 0 otherwise

$Q =$ the extent of managers' use of non-financial performance measures in business decision making. It includes performance evaluation by way of a factor analysis on the basis of eight items extracted from Perera et al. (1997): (Q1) orders delivered on time; (Q2) satisfied customers; (Q3) number of defective products detected in the company; (Q4) number of returned products due to quality defects; (Q5) customer claims or complaints; (Q6) new products launched on the market; (Q7) product design and improvement skills; and (Q8) relationship between real and estimated resources. The first two items (Q1, Q2) point in the same direction, that is, they are key indicators of customer-focused quality performance. There are three items (Q3, Q4, Q5) that point to the measurement of product quality performance and three other items (Q6, Q7, Q8) that are related to quality performance and arise from the processes of innovation and learning. Thus, the non-financial variable is a factor with a value generated from the scores for each item; the greater the value of this factor, the greater the extent of managers' use of non-financial measures in business decision making.[1] The sign of the factor loadings was positive for the eight items, with values higher than 0.7 for most of them ($Q2 = 0.65$ and $Q8 = 0.58$). The reliability analysis (Cronbach's alpha = 0.81) confirmed that the items of the non-financial variable are highly reliable (i.e. the total alpha value is higher than 0.6). Results from the confirmatory factor analysis (CFA) revealed a second-

order factor of the Q construct that is represented by three first-order factors: $f1 =$ customer measures, $f2 =$ products measures, and $f3 =$ process measures, with these weights respectively 0.72 ($f1$) > 0.64 ($f2$) > 0.52 ($f3$). A bootstrapping procedure with 5000 iterations showed the statistical significance of weights ($p < 0.01$). Moreover, results from the exploratory and confirmatory factor analysis confirm construct validity.[2]

Control variables:

ROA = ratio of return on assets, as measured by net income to total assets.
CR = current ratio, as measured by current assets to current liabilities.
L = leverage ratio, as measured by total liabilities to total assets.
ACID = acid ratio, as measured by cash to current assets.
SIZE = ln of sales at the beginning of the year.

Zmijweski (1984) developed a logistic regression model to estimate corporate failure probability which is a function of profitability (ROA), liquidity (CR) and financial leverage (L). We expect that these variables have an impact on the probability of bankruptcy. While we expect a negative impact for ROA, CR and ACID, we expect a positive one for L. In addition to the above variables, the size variable is included because small firms have a higher probability of bankruptcy, as evidenced by Altman and Narayanan (1997). Finally, the crisis in Spain has tightened the restrictions on businesses' access to finance, consequently, more liquid firms could better manage to survive during these years.

Results

Table 1 shows descriptive statistics of the variables used in model 1 by their financial condition. All the non-dummy variables were truncated at percentiles 1 and 99 to eliminate the influence of extreme observations. As expected, bankrupt firms are significantly less concerned about non-financial performance measures and present worse financial indicators than non-bankrupt firms. Additionally, bankrupt firms are also smaller.

Table 2 exhibits the results for the multivariate logistic regression model that explains the probability of bankruptcy.

The estimated model is highly significant (p-value = 0.000) and shows a relatively high goodness of fit (McFadden P-seudo $R^2 = 0.500$), that is, the model seems to be useful in predicting failure in the Spanish furniture industry. Most papers show lower P-pseudo R^2. Regarding the variable of interest (Q), it presents a negative and significant relation; that is, ceteris paribus, firms that implement a more effective quality management system seems to have a higher probability of survival. In other words, the use of nonfinancial performance measures such as improvements in customer satisfaction, quality of products and services, or employee performance, create a competitive advantage that finally enables companies to achieve over a long period of time lower bankruptcy probabilities. This result is in line with those studies that found a positive impact of non-financial measures on business performance (Birch-Jensen et al., 2020; Duh et al., 2012; Eklof et al., 2020; Fullerton & Wempe, 2009) but it is contrary to Perera et al. (1997) which was used to build the non-financial performance quality measure. This opposite finding can be explained by the fact that we measure financial health through a more reliable external circumstance, bankruptcy, which is not affected by managers' subjectivity.

Table 1. Sample descriptive statistics.

	Bankruptcy firms				Non-Bankruptcy firms				Mean dif
	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.	N	
Q_t	−0.122	0.1412	0,926	59	−0.033	0.228	1.055	681	−0.089*
ROA_t	−0.314	−0.331	0.095	59	−0.015	0.012	0.182	681	−0.299***
CR_t	1.133	1.073	0.229	59	2.097	1.648	1.405	681	−0.964***
$ACID_t$	0.027	0.022	0.023	59	0.105	0.057	0.125	681	−0.078***
L_t	1.598	1.626	0.429	59	0.560	0.536	0.421	681	1.038***
$SIZE_t$	8.046	7.977	0.568	59	0.560	8.793	1.116	681	7.485***

Table 2.   Multivariable logistic regression of failure probability.

Dependent variable: BK_{t+1}	β	Wald	p-value
Q_t	−0.040	−2.010	0.044
ROA_t	−4.446	−5.600	0.000
CR_t	−0.596	−1.630	0.102
$ACID_t$	−8.038	−1.420	0.156
L_t	2.007	5.790	0.000
$SIZE_t$	−0.317	−1.430	0.153
Cons	−1.358	−0.680	0.498
$\chi2$	179.34		
p-value	0.000		
P-pseudo R^2	0.500		
N	740		

The results also support studies like Wiersma (2008) which evidence that non-financial measures contain incremental information beyond lagged financial measures to predict future financial performance. Furthermore, we extend the conclusions of Franceschini et al. (2018) to the use of a sophisticated non-financial quality measure which is more comprehensive and detailed than a mere ISO certification and, thus, a more credible signal of SMEs' commitment to a quality strategy. This higher commitment will affect the relationship between those companies and their debtholders. The control variables, in general, show the expected signs, although only ROA ($\beta = -4.446, p = 0.000$) and Leverage ($\beta = 2.007, p = 0.000$) are significant. Bankrupt firms tend to be less profitable and to use more debt.

Although the above results provide evidence that supports the intuition that the use of a good quality performance system offers competitive advantages that in the end reduce the probability of bankruptcy, some papers argue that firms involved in quality processes are usually more profitable or have more financial resources (Agarwal et al., 2013; Duh et al., 2012; Ismyrlis et al., 2015). If this is true in the Spanish furniture industry, the results shown could be biased because our quality measure could in itself be a proxy for financial health. We try to shed some light on this issue by jointly applying a quality criterion and a financial condition criterion to split the sample in four groups:

Group 1 Better quality and financial performance: firms in this group take the value 1 if they are above the median for the quality and the financial performance measures at the beginning of the sample period (2006) and 0 otherwise.

Group 2 Better quality and worse financial performance: firms in this group take the value 1 if they are above the median for the quality measure and below the median for the financial performance measure at the beginning of the sample period (2006) and 0 otherwise.

Group 3 Worse quality and better financial performance: firms in this group take the value 1 if they are below the median for the quality measure and above the median for the financial performance measure at the beginning of the sample period (2006) and 0 otherwise.

Group 4 Worse quality and financial performance: firms in this group take the value 1 if they are below the median for the quality and the financial performance measure at the beginning of the sample period (2006) and 0 otherwise.

Table 3 shows the descriptive results for the four groups. As can be expected, firms in group 1 present the lowest bankruptcy probability and firms in group 4 the highest probability. However, firms in group 2 exhibit a higher failure probability than those in group 3.

Table 3. Descriptive statistics by group.

	Group 1 (h, h)			Group 2 (h, l)			Group 3 (l, h)			Group 4 (l, l)		
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N
Bk	0.046	0.000	226	0.061	0.000	134	0.058	0.000	180	0.141	0.000	200
Q	0.736	0.645		0.690	0.551		−0.776	−0.571		−0.787	−0.367	
ROA	0.004	0.031		−0.088	−0.011		0.018	0.026		−0.087	−0.002	

These results provide some evidence that firms which implement better quality practices increase their survival potential. Further, we ran the logistic multivariate model to try to isolate the effects of these practices. The results are shown in Table 4.

The multivariate results are very clarifying, the non-financial indicator is negative and significant only in panels B and C. Consequently, as the differences in the use of non-financial performance measures become higher, their influence on bankruptcy probabilities is more important even if their previous financial position was worse. These results are somewhat related to those found by Corredor and Goñi (2011), Baker et al. (2020) and Yu et al. (2020). Firms committed to quality before the financial crisis, that is, earlier than their competitors, will have higher probabilities of survival than those less committed or whose commitment comes late.

As in Table 2, financial variables, in general, show the expected signs; however, only ROA and L are significant. That is, more profitable companies and those that use less leverage are more likely to survive in a context of highly increased competition.

Overall, the results seem to support our hypothesis. Regardless of their previous financial position, managers that make an extensive use of non-financial quality measures will increase the competitiveness of their companies and, eventually, their chances for survival. The implementation of a quality management system based on non-financial indicators seems to provide valuable information to decision makers.

Discussion

The results of this paper have important implications from both theoretical and practical standpoints. Contingency theory claims that the success of management control depends on the configuration of a measurement performance system that aligns with company plans, goals and strategies. As for quality strategies, this paper provides evidence that non-financial indicators are a key factor to achieve this alignment.

The results also have implications with regard to the signalling theory. According to Omran et al. (2021), the impact of non-financial measures depends on their perception by stakeholders as a credible signal of company performance. The finding that companies more committed to quality practices have a lower probability of failure implies that stakeholders are somewhat aware of these practices which, in turn, has a critical effect on their financial decisions. This is noticeable in a context in which companies suffer from severe financial restrictions.

This study is of importance to external and internal practitioners in a context of a dramatic increase in competitiveness such as the European furniture industry. In the implementation of quality strategies, managers are encouraged to include a wide set of non-financial measures that do not focus exclusively on customer satisfaction. Although highly significant, other dimensions like product indicators and innovation and learning processes are similarly relevant to achieve a sustainable competitive advantage.

Credit risk is an important issue from both academic and empirical points of view. Financial measures suffer from certain problems that limit the extent of their predictive ability; non-financial indicators that are more focused on day-to-day operation might better anticipate competitive restrictions and disruptions that eventually deteriorate the financial health of an organisation.

Finally, policymakers might consider that the information released through the annual reports is still too biased towards the financial aspects of performance. The inclusion of non-financial measures might complement these and contribute to an increase in the usefulness of such reports. Studies like Amir and Lev (1996) and Coram et al. (2011) show

Table 4. Multivariable logistic regression of failure probability by group.

	Panel A. Group 2 (h, l) vs Group 1 (h, h)			Panel B. Group 2 (h, l) vs Group 3 (l, h)			Panel C. Group 2 (h, l) vs Group 4 (l, l)		
	β	Wald	p-value	β	Wald	p-value	β	Wald	p-value
Q	-0.130	-0.110	0.911	-1.13	-2.310	0.021	-1.49	-1.840	0.065
ROA	-3.577	-3.330	0.001	-3.978	-1.910	0.057	-4.439	-1.840	0.066
CR	-0.499	-1.190	0.236	0.009	0.020	0.985	0.048	0.100	0.919
ACID	-14.011	-1.360	0.173	-0.897	-0.080	0.934	-9.333	-0.640	0.521
L	0.932	3.070	0.002	7.208	4.100	0.000	9.043	4.060	0.000
SIZE	-0.148	-0.470	0.637	0.684	1.210	0.227	0.546	0.810	0.416
cons	-1.699	-0.610	0.543	-16.668	-2.550	0.011	-17.203	-2.230	0.026
$\chi2$	45.13			88.84			139.01		
p-value	0.000			0.000			0.000		
P-pseudo R^2	0.4585			0.6114			0.6241		
N	360			314			334		

that the voluntary disclosure of non-financial information is value relevant to shareholders. Consequently, the inclusion of non-financial information would help companies to differentiate themselves and help stakeholders to make better informed decisions.

Conclusions

The European furniture sector is a key driver of sustainable growth and is particularly significant in Europe as it contributes to overall economic health. SMEs account for around 90% of the companies in the industry. However, the recent financial crisis has dramatically increased competitive pressure for two basic reasons. First, all national markets in the EU witnessed contractions in consumption and companies suffered severe credit constraints. Second, competitors from emerging countries are turning the EU into an increasingly cost competitive environment. As a result, the furniture industry is more and more price oriented. In this context, the competitive response of the European furniture industry, especially in the case of SMEs, revolves around quality. The Spanish sector has not been an exception.

The contingency theoretical framework has been taken to explore the contribution of non-financial quality measures to the survival probabilities of a sample of Spanish SMEs in the furniture industry during the recent economic crisis. The literature seems to achieve consensus about the superior value of non-financial measures, such as product or service quality, customer satisfaction and employee learning, over financial ones to achieve a sustainable competitive advantage. However, concerns exist that call for further research (Heinicke, 2018; Rojas-Lema et al., 2020). This study contributes by incorporating a more sophisticated proxy for non-financial quality measures and by using a more realistic metric of future financial performance.

Considering Camacho-Minano et al.'s (2013) view of quality management as a complex phenomenon, we use a variable inspired by Perera et al.'s (1997) scale, which integrates a variety of factors related to quality practices. The results of this paper extend previous studies by showing that factors other than customer satisfaction (i.e. product and innovation and learning process) are also critical to drive the improvement of long-term financial performance.

Another important difference between this paper and others is the measure used as a proxy for financial performance. Previous studies have focused on metrics internally generated which suffer from subjectivity, potential manipulation and short-term orientation. We extend them by using a more realistic external reference, bankruptcy. This methodological approach contributes to explain contradictory results in the literature in the sense that companies more committed to quality practices will need some years to see effects on firm performance.

Finally, the results of this study also contribute to the credit risk literature. To the best of our knowledge, only Franceschini et al. (2018) analysed the effect of quality management practices on the probability of bankruptcy, but they did it by simply comparing the values of a pre-existing (Altman, 1968) Z-score model. We estimate our own multivariate model using actual bankruptcy as the dependent variable. The results confirm that non-financial quality measures contain incremental information beyond financial ratios to predict bankruptcy. This finding indicates that debtholders perceive such measures as a credible signal that impacts their financial decisions.

This study is not without its limitations. First, it is conducted on data for the furniture industry in Spain. Even though highly representative of the effects of the crisis, the generalisation of our findings to other industries or countries should be taken with care. Second, the

study builds on quality actions carried out as a pre-emptive strategy to face subsequent disruptions. Companies are not expected to dispense a high volume of resources to implement quality practices during periods of crisis. Further research might explore the effects of the timing of different implementations or the actual reactions of stakeholders to these practices.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix.   Survey instruments used.

Use of non-financial performance measures

Please indicate the extent to which your company has used the following measures over the past three years in various business decisions including performance evaluation of the firm.(1 = Not at all, 7 = to a very great extent):

Indicators	Minimum	Maximum	Measure
Q1. Number of orders delivered on time	1	7	Likert 1–7
Q2. Number of satisfied customers	1	7	Likert 1–7
Q3. Number of defective products detected in the company	1	7	Likert 1–7
Q4. Number of returned products due to quality defects	1	7	Likert 1–7
Q5. Customer claims or complaints	1	7	Likert 1–7
Q6. Number of new products launched on the market	1	7	Likert 1–7
Q7. Product design and improvement skills	1	7	Likert 1–7
Q8. Relationship between real and estimated resources	1	7	Likert 1–7

Use of non-financial performance measures

Descriptive statistics

Indicators	Mean	Median	S.D.
Q1. Number of orders delivered on time	5.11	6.00	1.69
Q2. Number of satisfied customers	5.11	6.00	1.73
Q3. Number of defective products detected in the company	5.21	6.00	1.73
Q4. Number of returned products due to quality defects	5.24	6.00	1.95
Q5. Customer claims or complaints	5.43	6.00	1.82
Q6. Number of new products launched on the market	5.05	5.00	1.76
Q7. Product design and improvement skills	4.73	5.00	1.73
Q8. Relationship between real and estimated resources	4.56	5.00	1.75

Use of non-financial performance measures	First-order constructs		
	Factor 1 (customer measures)	Factor 2 (product measures)	Factor 3 (innovation and learning process measures)
Q1. Number of orders delivered on time	*0.87*		
Q2. Number of satisfied customers	*0.65*		
Q3. Number of defective products detected in the company		*0.81*	
Q4. Number of returned products due to quality defects		*0.94*	
Q5. Customer claims or complaints		*0.88*	
Q6. Number of new products launched on the market			*0.77*
Q7. Product design and improvement skills			*0.84*
Q8. Relationship between real and estimated resources			*0.58*
Composite reliability (CR)	0.73	0.91	0.76
Extracted variance (AVE)	0.58	0.77	0.53
Weight (T-value)	0.72	0.64	0.52
	(11.6***)	(10.34***)	(8.31***)

Goodness of fit: likelihood ratio test:0.000; GFI=0.91, RMSEA=0.09, RMR = 0.056; GFI=0.91, AGFI = 0.9; chi-square ratio (χ^2/df=2.4)

(***)Significance of 99%.
Standardised loading of items (*in italic*).

Notes

1. Despite the fact that the initially proposed multi-item scale included ten items, two of them were finally eliminated ('time taken to deliver product' and 'machinery usage time'), resulting in the Q scale with the eight items described.
2. In the EFA: Kaiser-Meyer-Olkin test (KMO) = 0.731; Bartlett's test of sphericity = 0.000; In the CFA: likelihood ratio test = 0.000; root mean square error of approximation (RMSEA) = 0.091; standardized mean squared residual (RMR) = 0.056; GFI = 0.91; AGFI = 0.9; chi-square ratio (X^2/df = 2.4). The analyses are done using AMOS software version 12.