

The Influence of Business Strategies and Ownership on Management Accounting Innovations and Risk Management Techniques: An Empirical Analysis in Large Manufacturing Companies in Italy

ABSTRACT

Purpose – This research aims to explore possible relations between firm characteristics, such as business strategies, and ownership patterns as contextual contingent factors and innovative Management Accounting (MA) and Risk Management (RM) techniques.

Methodology/approach – The paper is based on a questionnaire survey. The survey was completed by the Chief Financial Officers (CFO) and Chief Executive Officers (CEO) of large Italian manufacturing companies. The sample is selected from a data set (479 firms) from the Industrial, Commerce and Agriculture Confederation (CCIA). The data set captures all Italian companies and includes companies listed on the Milan Stock Exchange.

Findings – The results of the statistical analysis indicate that our expectation of a significant relationship between prospector business strategies and integrated Sophisticated Management Accounting (SMA) was not supported by the data. In addition, the results suggest that our expectation of a significant relationship between prospector business strategies and Sophisticated Risk Management (SRM) was not supported by the data. In conclusion, the use of SRM techniques is not influenced by business strategies in large companies in Italy. Finally, the results show that our expectation of a significant relationship between listed firms and SRM was supported by the data. In particular, the tests highlight that there is a significant relationship between listed firms and non-probabilistic risk assessment techniques.

Research limitations – In reflecting upon the results, we recognise that specific research limitations, especially the number of statistical observations, might constrain our generalisations.

Originality/Value of paper – The paper contributes to contingency theory research by considering innovative Management Accounting, rather than concentrating on traditional issues, such as modern cost measurements, and by incorporating a number of Risk Management techniques (probabilistic and non-probabilistic) to understand corporate practices.

Keywords: Business strategy; Ownership patterns, Contingency theory, Management accounting innovations; Risk management.

1. Introduction

Global competition characterises the contemporary manufacturing environment. Understanding the determinants of prosperity in manufacturing firms is needed. This effort requires contributions from many disciplines. Several commentators (e.g., Banker et al., 1993) suggest that firms have responded to these challenges by implementing Innovative Managerial Practices (IMPs), investing in Advanced Manufacturing Technologies (AMT) and emphasising product innovation, product quality, delivery and flexibility to meet customer needs. In parallel with these changes, many firms introduced innovative Managerial Accounting (MA) techniques. As suggested by Abdel-Kader and Luther (2008, p. 3), “these new accounting techniques have been designed to support modern technologies and new management processes, such as Total Quality Management (TQM) and Just-In-Time (JIT) production systems, in the search for competitive advantage to meet the challenge of global competition”. The literature reviewed in this paper suggests that innovative MA, as a sophisticated form of MA that produces information for managers within an organisation, can play a critical role in this challenge by deemphasising short-term financial measures (information) and developing non-financial measures of manufacturing performance that are more coherent with long-term competitiveness and profitability (Kaplan, 1983). More importantly, it is well-accepted that “monitoring performance and indeed the planning of performance may be improved if non-financial information is utilised together with financial information” (Bromwich and Bhimani, 1994, p. 12).

The development of global markets in recent years and the 2008 crisis have presented incremental challenges that underscore the importance of Risk Management (RM) as a critical factor for the success of manufacturing firms. “The combination of extensive financial volatility, rapid technological change and the impacts of the force of globalisation has produced a climate of extreme change and risk” (Bhimani and Bromwich, 2010, p. 95). Management accounting and control researchers have advanced different RM models (e.g., Mikes, 2009). One interesting observation is that RM is being approached from different angles. An important angle “is looking at Enterprise Risk Management (ERM) and how it is deployed in organisations. ERM are triggered by regulation, stakeholders’ demands, and business competitiveness. These systems combine quantitative approaches to evaluate and manage risk exposure traditional of the financial world with qualitative approaches that emphasize sensitivity toward risk and ethical criteria in decision making” (Davila, 2012, p. 79).

Our paper contributes to contingency theory research by considering innovative MA rather than concentrating on traditional issues such as modern cost measurement and by incorporating a number of RM techniques (probabilistic and non-

probabilistic) to understand corporate practices. Two groups of firm characteristics, business strategies and ownership patterns, are examined as contextual contingent factors that could affect innovative MA and RM techniques in large Italian companies.

The paper comprises six sections. First, we review the relevant literature on contingency theory in management accounting and risk management, innovative MA models, and RM models. Section three develops the hypotheses on the basis, either implicitly or explicitly, of the existing literature. Section four describes the research design. Section five reports the statistical analysis and analyses the associations between dependent and contingent variables. The final section draws conclusions from the analyses and relates them to the literature.

2. The literature

2.1 Contingency theory

Because our research aims to explore possible relations between firm characteristics, such as business strategies and ownership patterns as contextual contingent factors, and innovative MA and RM techniques, our methodological approach is based on contingency theory. In this section, we focus on the contingency theory of management accounting and risk management.

“The contingency theory of management accounting represents an attempt to identify the most appropriate (accounting-based) control system for a given set of circumstances” (Otley, 1995, p. 52). However, as suggested by Gerdin and Greve (2004, p. 303), “contingency theory in the accounting control area has for long time been criticized for being fragmentary and contradictory as results of methodological limitation”. Although the approach used by contingency theory studies is limited, the extensive research signals its importance. For Tillema (2005, p. 103) “the question of which contingency factors influence the level of sophistication of an organization’s management accounting systems (MAS) has received considerable attention in the literature”.

In recent years, the contingency perspective of risk management has been suggested by a stream of empirical research investigating the factors that influence ERM. Gordon et al. (2009, p. 303) observe that “the contingent view of enterprise risk management systems is consistent with the literature that examines the more generic notion of management control systems”. Furthermore, in their working paper, Mikes and Kaplan (2013) outline a “minimum necessary contingency framework” that advocates to stop treating ERM as a one-dimensional variable. They propose unpacking the “ERM mix” into its components (processes for

identifying, assessing and rolling up risks; risk tools; linkage to other MCS; the roles of risk function).

A brief overview of research that is relevant to this study is presented below.

Chenhall and Langfield-Smith (1998) examined management accounting practices and performance with different strategic priorities. These researchers found that product differentiation strategies with a high performance were associated in particular with team-based structures and employee-based measures, whereas low-price strategies were associated with activity-based techniques and manufacturing system innovation.

Anderson and Lanen (1999) examined the relationship between competition and management accounting practices. These researchers found a change in management accounting practices based on whether the firms were domestic or international and whether they implemented prospector or defender strategies.

Abdel-Kader and Luther (2008) examined the relationships between firm characteristics (external, organisational and processing) and the factors that explain MAS sophistications. These researchers found that “differences in MA sophistication are explained by environmental uncertainty, customer power, decentralization, size, AMT, TQM, and JIT”, whereas the relationship between competitive strategies and MA sophistication was not supported.

Mikes (2009) included business strategies in a set of contingency variables influencing risk management practices. In her investigation focusing on two banks, she suggested that variations in the use of risk management mixes are also associated with different business strategies.

Kleffner, Lee and McGannon (2003) employed a set of firm characteristics to examine the difference between ERM firms and non-ERM firms. These authors found no significant differences between listed and non-listed firms in relation to whether they used ERM, although their evidence indicated that “compliance with Toronto Stock Exchange Guidelines was an important consideration in adopting ERM”.

Paape and Speklè (2012) examined the association between a number of internal and external factors (regulatory influences, internal influences, ownership, auditor influence, firm and industry-related characteristics) and “the level of development of ERM practices across organizations”. These researchers found that listed firms have more mature ERM systems.

2.2 Management Accounting development model

Management Accounting (MA), in contrast to financial accounting, produces internal reporting to help the work of managers within an organisation. “It is primarily

concerned with the process of identifying, measuring, accumulating, analysing, preparing, interpreting and communicating information that aims to help managers to pursue organizational objectives” (Bhimani et al., 2012, p. 3).

A statement by the International Federation of Accountants (IFAC, 1998) explains the development of MA in four sequential stages. In the first stage, prior to 1950, the focus of MA was on cost determination and financial control. In the second stage, in the 1950s and 1960s, the focus of MA expanded to include provisions of information for planning and control purposes. MA, as part of management control systems, tends to be reactive only when there are deviations from the plan (Langfield-Smith, 1997; Abdel-Kader and Luther, 2008). Therefore, management controls were oriented toward manufacturing (internal factors), rather than strategic and environmental aspects.

As a consequence to the global recession in the 1970s and global competition in the early 1980s, the focus of MA in its third stage of evolution shifted toward “reduction of waste in business resources”. The global competition was accompanied by investments in Advanced Manufacturing Technologies (AMT) to improve product quality and flexibility and, in certain cases, reduce costs. With this change, the traditional financially based performance measurement systems became insufficient. The challenge for a new form of MA for accounting researchers was to develop financial information with non-financial measures of performance to support managers (Kaplan, 1983). The development of Activity-Based Costing (ABC) in the late 1980s captured the cost behaviour pattern change. The introduction of the Balanced Scorecard (BCS) in the early 1990s focused on the causality between different strategic objectives and strategy maps.

The focus of MA in its fourth stage of evolution shifted toward the “creation of value through effective resource use”. The focus of MA incorporated a new set of conditions. In the 1990s, the challenge of global competition continued to increase, and, in parallel, the business environment presented a high degree of uncertainty. In this context, value creation has become an integral part of corporate governance in contemporary organisations. The development of new metrics, such as Economic Value Added (EVA), captures value creation better than traditional accounting measures, such as earnings (Bouwens and Speklè, 2007).

The framework, with its limitations, provides a good view of the evolution of MA to classify its sophistication. “We interpret the fourth stage of MA development as fourth level of sophistication of MAS. The first stage represents a lack of sophistication and the fourth stage is the highest level of sophistication” (Abdel-Kader and Luther, 2008).

The fourth stage of MA development can also be useful for analysing management accounting innovation. As suggested by Ax and Bjørnenak (2007, p. 358), “we see management accounting innovations as a set of design characteristics, such as the

type of cost object (e.g., products, customers), allocation bases (e.g., non-volumes related cost drivers), or data (financial or non-financial). For example, ABC can be seen as a combination of a set of cost objects and allocation bases”.

Following the literature reviewed (e.g., Chenhall and Langfield-Smith, 1998; Ax and Bjornenak, 2007), this paper identifies the following as relevant MA innovations: Activity-Based Costing (ABC), Balanced Scorecard (BSC), and Economic Value Added (EVA). This paper also incorporates a number of contemporary management accounting practices (MAPs), such as budgeting for long-term plans, target costing, strategic costing, life cycle costing, customers profitability analysis, evaluating the risk of major investment projects using probability analysis, and benchmarking. Further, the study incorporates (ten) non-financial measures that “have attained greater theoretical prominence since the promotion of the balanced scorecard” (Abdel-Maksoud, Dugdale and Luther, 2005).

2.3 Risk management model

Risk management has become an important topic in the last decade (Olson and Wu, 2008), and the interest has intensified in the aftermath of the 2008 crisis and other corporate disasters (Mikes and Kaplan, 2013). Risk management is gaining attention as a critical aspect of management control systems in academic literature. In the context of corporate governance, risk issues are influencing regulatory frameworks and organisational policies to a growing extent (Bhimani, 2009).

Risk refers to the effect of uncertain events where the effect is knowable by probability distributions (Knight, 1921). Risk management concerns “timely identification, assessment and management of the portfolio of risks faced by an entity” and their link with the achievement of entity objectives (Subramaniam, Collier, Phang and Burke, 2011, p. 133).

In recent years, in a dynamic global environment, “a paradigm shift has occurred in the way organizations view risk management” (Gordon, Loeb and Tseng, 2009, p. 1). In particular, there has been a tendency to move from a “silo-based” approach toward an enterprise-wide approach (ERM), which is characterised by an integrated or holistic view of risks (Olson and Wu, 2008).

In the “silo-based” approach, which is the traditional risk management approach, individual categories of risk are managed independently in separate units or functional areas (“silo”) within the firm (Altuntas, Berry-Stöltle and Hoyt, 2011). The silo-based approach is grounded on a disaggregate method of risk management.

By contrast, as suggested by Liebenberg and Hoyt (2003), ERM addresses each of the categories as a part of a firm’s risk portfolio, which is managed holistically on a company-wide level. For Dickinson (2001), ERM is a systematic, integrated approach to managing all the risks facing an organisation.

A definition of ERM has been established by the Committee of Sponsoring Organizations of the Treadway Commission (CoSO, 2004, p. 2): “Enterprise risk management is a process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives”.

As the CoSO definition suggests, event identification is a critical part of the ERM process and has the scope of providing a sample listing of potential events affecting the achievement of objectives (CoSO, 2004). Several organisations find it helpful to group significant events into categories (IMA, 2007). Simons (1999), in recognising events or conditions that can reduce the ability of managers to implement their business strategies, provides four types of risk categories: operation risk, asset impairment risk, competitive risk and reputation risk.

Another key element in ERM is risk assessment, which aims to estimate the likelihood and impact on the achievement of objectives of a potential event. Likelihood is the possibility that a given event will occur. Impact refers to the extent to which a risk event might affect the enterprise (CoSO, 2012). A set of techniques may be used in assessing risks.

Mikes (2009) proposes four ideal types of ERM that differ according to the institutional background, main purposes and applied techniques of risk assessment: risk silo management, integrated risk management, risk-based management, and holistic risk management. She shows that in a given organisation, the ideal types of ERM are mixed depending on top managerial attitudes (calculative culture) toward risk quantification.

Despite the importance of risk assessment techniques, the literature paid little attention to the use and significance of specific techniques in firms. Drawing on the CoSO framework, in this study, we consider a set of risk assessment techniques with different degrees of sophistication (DeLoach, 2000).

3. Development of hypotheses

3.1 Business strategy

Since the 1970s, a number of business strategic typologies have been advanced in the literature (Simons, 1990). These typological classifications cannot encompass every form of organisational behaviour due to its complexity and changeability. Nevertheless, they can be useful for research purposes in predicting the behaviour of an organisation given its typological classification. According to Langfield-Smith

(1997), the most frequently used typological classifications in contingency research are those by Miles and Snow (1978), Porter (1980), Miller and Friesen (1982), and Gupta and Govindarajan (1984).

This research paper uses the Miles and Snow (1978) strategic typology because it is more useful for investigating the relationship between business strategies and MA or RM.

Miles and Snow (1978) identify four business strategy typologies (defenders, prospectors, analysers, and reactors) using the rate of change in products or markets. Defenders operate in a relatively stable context characterised by a limited product-market range and narrow product innovation. The defenders compete through high quality, pricing, and customer service and pay attention to efficiency, emphasising cost control. Prospectors operate within a dynamic product-market domain and continually search for new products and market opportunities. The prospectors adopt more flexible and broader-scoped MA. Analysers combine the strengths of both defenders and prospectors, offering a limited set of cost-efficient products and moving beyond these products only after the viability of new product markets has been demonstrated. Reactors are an unsuccessful organisational type. The reactors are neither aggressive in defending their product-market domain nor willing to take new risks.

In this research paper, we only consider prospectors and defenders because they are the most important typologies of business strategies.

A relationship between business strategies and MA sophistication was not supported by the results of Abdel-Kader and Luther (2008) research; however, several authors (e.g., Callahan and Gabriel, 1998; Ittner and Larcker, 2001, Chenhall, 2003) suggest that the prospector strategy leads to the adoption of MA innovations. Anderson and Lanen (1999) found a change in management accounting practices based on whether a firm implemented a prospector or defender strategy.

Using Porter's (1980) strategic typology, Chenhall and Langfield-Smith (1998) argue that firms emphasising product differentiation (as prospectors) place a strong emphasis on MA innovations based on a variety of contemporary practices, including balance performance measures, benchmarking and activity-based techniques. Baines and Langfield-Smith (2003) agree with these results.

Focusing, in particular, on activity-based techniques and building on the Miles and Snow's (1978) typology, Gosselin (1997) finds that there is a positive relationship between MA innovations as Activity Management and the prospector strategy.

These considerations lead to the following hypothesis:

H1: A prospector strategy in large firms is positively associated with MA innovations and the adoption of non-financial measures.

Epstein and Rejc (2005) consider business strategies as an input of the risk management process and underline how firms expanding to new markets and developing new products affect the design of RM.

Mikes (2009) includes strategies as a contingency variable affecting risk management practices. In her case study (2009), she contrasts two ERM models. A conservative (defender) business strategy is associated with quantifiable risks (ERM by the numbers), whereas an entrepreneurial (prospector) business strategy is associated with quantifiable and non-quantifiable risks (holistic ERM). Holistic ERM requires both probabilistic risk assessment techniques and non-probabilistic risk assessment techniques.

For DeLoach (2000), the sophistication of risk assessment techniques is driven by the complexity of the environment and the number of risks. This author attributes a higher degree of sophistication to probabilistic models and a high or moderate degree of sophistication to non-probabilistic models, such as scenario analysis and sensitivity analysis.

According to Miles and Snow (1978), prospectors typically perceive more environmental change and uncertainty than defenders, and prospector strategies are inherently riskier than other strategies (Luo, Tan and O'Connor, 2001).

These considerations lead to the following hypothesis:

H2: There is a positive relationship between sophisticated risk assessment techniques and the prospector strategy.

3.2 Ownership patterns

The problem with the relationship between risk management and ownership patterns concerns the demands of regulators and legislation, which are drivers of risk management practices and exert influence on the methods adopted for risk management (Collier, Berry and Burke, 2006).

As Paape and Speklè (2012, p. 538) notice, “in many countries, regulators are pressing firms to improve risk management and risk reporting”. The pressure to improve risk management is linked to the requirements of corporate governance and is greatest for listed firms. In fact, for listed firms, compliance with the requirements of corporate governance codes is typically mandatory. In Italy, in December 2011, the Committee for Corporate Governance, promoted by the Italian Stock Exchange, published on a revised code of corporate governance (Code of Self-discipline) in which firms are encouraged to measure risks. Bozzolan (2004) outlines that the adoption of sophisticated risk assessment techniques may be necessary if it is required by an external pressure (e.g., regulatory bodies).

In their analysis based on a sample of Norwegian power companies and banks, Berg and Westgaard (2012) propose that regulation has enhanced ERM.

In their study on the use of ERM by Canadian firms, Kleffner, Lee and McGannon (2003) found no differences between listed and non-listed firms in terms of the propensity to use ERM. By contrast, using data from 825 organisations in the Netherlands, Paape and Speklè (2012) demonstrated that listed firms have more fully developed ERM systems than non-listed firms.

These considerations lead to the following hypothesis:

H3: Sophisticated risk assessment techniques are more important in listed firms than in non-listed firms

4. Research design and data collection

The research is based on primary data. The information was collected through a self-compiled questionnaire.

Method

The survey was completed by the Chief Financial Officers (CFO) and Chief Executive Officers (CEO) of large Italian manufacturing companies. The sample was selected from the data set (479 firms) from the Industrial, Commerce and Agriculture Confederation (CCIA). The data set captures all Italian companies and includes companies listed on the Milan Stock Exchange.

In the first phase, a letter of participation was sent by mail to the CEOs and CFOs of the 179 companies included in the sample. The names and addresses were noted from the websites of the firms. Of the 179 letters of participation sent, there were 70 responses, or a response rate of 39.1%. Of these responses, 12 (6.7%) were negative for different reasons. The remaining 58 responses were positive, providing a positive response rate of 32.4% of all questionnaires sent (table 1).

INSERT TABLE 1 ABOUT HERE

In the second phase, the questionnaires were sent by e-mail¹ to the firms with positive responses. The survey was completed via web by the CFO or CEO of each firm.

¹ A copy of the questionnaire is available from the authors upon request.

In Italy, this positive response rate was favourable in comparison with previous surveys on management accounting².

The questionnaire consists of four sections: information on firm characteristics, pressures from business environments and business strategies implemented by listed and non-listed firms in large manufacturing firms, the impact of business strategies on management accounting innovations, the influence of business strategies on risk management techniques.

The questionnaire was pilot tested with eight Chief Risk Officers (CRO) or Operating Financial Officers (CFOs) in different sectors. The pilot testing included face-to-face meetings with semi-structured interviews.

The objective of the questionnaire was to determine the impact of firm characteristics such as business strategies and ownership patterns on MA innovations and the adoption of different levels of Sophistication of Risk Management (SRM).

Methodologies of data analysis

The respondents were asked to indicate their perceptions by answering on a five-point Likert scale.

We were also concerned with a possible non-response bias in the responses. The collected data present a structure similar to the designed sample with regard to manufacturing sectors.

The statistical test³ used in this study is the Wilcoxon Test (a mean comparison non-parametric test) (Hollander and Wolfe, 1999). In the results, the p-values of the tests are shown. A 10% significance level was used.

For the sample selection, we consider the hypothesis of missing at random.

5. Survey results

5.1. Classification of responding companies

This study is based on a final sample of 58 large Italian companies. Table 2 presents statistics regarding the types of strategic decisions adopted by the surveyed companies. The respondents were asked to indicate three strategic decisions across a range that mixes both prospector and defender strategy characteristics (Miles and Snow, 1978). The table reports that 72.41% of companies focus on high-quality

² For example, in the study of Cinquini et al. (1999) on cost accounting practices in Italian large- and medium-sized manufacturing firms, the response rate was 11.6%.

³ All the results (with statistical analysis) were carried out using the software R (version 15.2).

products, whereas more than half address the introduction of new markets. The lower percentages are attributed to the prompt delivery and limited range of products.

INSERT TABLE 2 ABOUT HERE

According to the strategic decisions they selected, the large firms were classified into two groups of business strategies (BS): prospector BSs (those adopting the introduction of new markets, quick changes in product design and the introduction of new products, quick changes in the product mix, prompt delivery, customised products, and product/market flexibility) and defender BSs (those adopting high-quality products, low-cost production, low prices, after-sale customer service, and a limited range of products)⁴.

Table 3 summarises the number and percentage of each group of business strategies and ownership patterns. The sample comprises 39 large companies with prospector BSs, 16 defender BSs and 3 firms that cannot be classified as prospector BSs or defender BSs. If we classify the firms into the two groups based on ownership patterns, there are 33 non-listed firms and 25 firms listed on the Milan Stock Exchange.

INSERT TABLE 3 ABOUT HERE

5.2. Categories of business strategy and innovative MA

Table 4 summarises responses on innovative MA considering financial and non-financial information. The means and standard deviations are displayed separately for each innovative MA and for the two groups of business strategies (prospectors and defenders). The results of statistical analysis (one-sided Wilcoxon test) are also presented with the aim to understand whether prospector strategies affect innovative MA as an integrated sophisticated management accounting (SMA) system with financial and non-financial information.

INSERT TABLE 4 ABOUT HERE

The p-values of the test show that there are no statistically significant differences between prospector and defender business strategies related to innovative MA as an integrated SMA system. However, there is a relationship between strategic costing and the prospector strategy (p-value = 0.076). Therefore, with the exception

⁴ The classification of prospector BSs and defender BSs is in accordance with Kober, Ng and B. J. Paul (2007).

of strategic costing, the first hypothesis (H1) is rejected. This research result confirms the UK-based empirical findings of Abdel-Kader and Luther (2008), who argued that the relationship between competitive strategy and MA sophistication was not supported by the data.

5.3. RM process formalisation

A theme in the recent literature is RM. In theory, RM process formalisation involves the systematic process of risk identification, risk assessment and the implementation of risk controls (Subramaniam et al., 2011).

5.3.1. Risk identification

Risk identification is based on the development or updating of a list of potential events that could affect business process performances and the ability to achieve objectives (O'Donnell, 2005). Simons (1999) focuses on unexpected events or a set of conditions that significantly limit "the ability of managers to implement their intended business strategy". This author considers four sources of (strategic) risk that may affect companies: operation risk, asset impairment risk, competitive risk, and reputation risk.

Operation risk derives from any error in operating and manufacturing activities. Asset impairment risk results from the value reduction of an asset and may be linked to a decline in the value of financial assets on the balance sheet (e.g., credit risk), to intellectual property rights impairment, or to the deterioration of the physical conditions of assets. Competitive risk relates to changes in the competitive environment that affect the ability of a company to differentiate its products/services from its competitors. Reputation risk occurs "when business problems or actions negatively affect customer perceptions of value in using the business's goods or services".

The respondent companies were asked to express opinions on a five-point Likert scale (from not important to crucial) concerning the importance of the four sources of strategic risk. Table 5 displays the distribution of the responses and the mean score for each source of risk. For this specific question, the response rate was approximately 62% (36/58 respondent companies).

INSERT TABLE 5 ABOUT HERE

All respondents agree with the statement that it is necessary to pay attention to the four sources of strategic risk (SR). In particular, competitive risk is the source of SR

with the highest importance (mean score = 3.86). However, the mean scores highlight that large firms are sensitive, more or less, to all sources of SR.

5.3.2. Risk assessment

Risk assessment is based on the use of techniques that allow firms to evaluate the likelihood of potential risk events and estimate their probable impact.

Mikes (2009) proposes four ideal types of enterprise-wide risk management, which vary also in terms of techniques used: risk silo management, integrated risk management, risk-based management, and holistic risk management.

Risk silo management focuses on assessing risk types that may be quantified by statistical techniques. Integrated risk management concerns risk aggregation, and the technique used for its assessment is the calculation of economic capital. Risk-based management refers to risk-based performance measurements (e.g., risk-adjusted returns on capital), whereas holistic risk management encompasses both quantifiable and non-quantifiable risks. The assessment of non-quantifiable risks is not statistics based and requires techniques such as scenario analysis and risk mapping.

According to Mikes, in practice, the RM process is an assembly of ideal types of RM. Respondent companies were asked to indicate the degree of development of each ideal type of RM from fully implemented to less implemented to considered but not implemented.

The results are shown in table 6. For this specific question, the response rate was approximately 55% (32/58 respondent companies).

INSERT TABLE 6 ABOUT HERE

In Italy, among large firms, there is at least a consideration of ideal types of RM. The majority have implemented risk-based management and risk silo management. However, a significant majority of respondents do not consider the implementation of ideal types of RM, especially holistic risk management.

Focusing on risk assessment, in this study, we investigate the impact of BSs and OPs on SRM techniques in large Italian companies. To provide a theoretical framework for modelling the sophistication of RM, we consider DeLoach's model (2000). We use the framework of the CoSO model (2004) to classify SRM techniques as probabilistic and non-probabilistic. Probabilistic techniques are based on distributional assumptions about the behaviour of events and include "at-risk" models and the assessment of loss events. Non-probabilistic techniques (such as scenario analysis, sensitivity analysis, stress test, and risk maps) allow us to estimate

the impact of a potential event but without assigning likelihoods of event occurrence.

5.4. Categories of business strategy and sophisticated risk assessment techniques

To test Hypothesis 2 (H2), the responding companies were asked to indicate and rate the sophisticated risk assessment (SRM) techniques they employed. SRM techniques constitute the dependent variable of the test, and the two groups of BSs constitute the independent variable.

INSERT TABLE 7 ABOUT HERE

Table 7 presents the responses on SRM techniques in large firms. The mean scores and standard deviations are provided separately. The results of statistical analysis (one-sided Wilcoxon test) are also reported with the aim of describing whether there is a positive relationship between SRM techniques and the prospector strategy.

The p-values of the test indicate that we were unable to find significant evidence of a positive relationship between sophisticated risk assessment techniques and the prospector strategy. Hence, hypothesis 2 is rejected. We can conclude that the use of sophisticated risk assessment techniques is not influenced by business strategies.

5.5. Ownership patterns and sophisticated risk assessment techniques

Hypothesis 3 (H3) seeks to identify a relationship between listed firms and sophisticated risk assessment techniques. To test H3, we use the responses on SRM techniques and the two groups of ownership patterns, listed and non-listed large firms.

Table 8 displays the mean scores and standard deviations for responses on sophisticated risk assessment techniques provided by listed firms and non-listed firms. The statistical test is included, as well.

INSERT TABLE 8 ABOUT HERE

The p-values of the test highlight that there are significant relations between listed firms and non-probabilistic sophisticated risk assessment techniques. The results of the Wilcoxon test support hypothesis 3 as regards stress testing⁵ and risk maps, which is a representation of the impact plotted versus the likelihood of potential risk events.

⁵ For Olson and Wu (2008), stress testing is considered a specific type of scenario analysis.

In this analysis, the results are consistent with the study by Paape and Speklè (2012), who found that listed firms have more mature ERM systems.

6. Discussion and conclusion

In this research study, we have examined the effect of two groups of firm characteristics on MA and RM in large Italian companies. In particular, we have sought to ascertain the extent to which characteristics relating to a firm's business strategy and ownership patterns explain the sophistication levels of its MA and RM. The paper contributes to contingency theory research by considering innovative (sophisticated) MA, rather than concentrating on traditional issues such as modern cost measurement and by incorporating a number of RM techniques (probabilistic and non-probabilistic) to understand Risk management practices (RMPs) in large firms.

To provide a theoretical framework for modelling the sophistication of MA, we used the IFAC statement of MA evolution. We considered the third and fourth stages of the IFAC statement to classify the sophistication (innovations) of MA, such as EVA, BSC, and ABC. Next, we developed an integrated sophisticated management accounting (SMA) system with financial and non-financial information.

Using statistical analysis, we examined the differences between the two groups of business strategies (prospector and defender BSs) in large firms to determine if this contextual contingent factor affects integrated SMA with financial and non-financial information. The results of the statistical analysis indicate that our expectation of a significant relationship between prospector business strategies and integrated SMA was not supported by the data. Therefore, hypothesis 1 (H1) is rejected. However, there is a relationship between strategic costing and prospector strategies.

In addition, to provide a theoretical framework for modelling the sophistication of RM, we consider DeLoach's (2000) and Mikes's (2009) models and use the framework of CoSO (2004) to classify sophisticated risk management (SRM) techniques, such as non-probabilistic and probabilistic techniques.

Next, we examined the differences between the two groups of business strategies (defenders and prospectors) in large firms to determine if this contextual contingent factor affects sophisticated risk management (SRM) with non-probabilistic and probabilistic techniques. The results of the statistical analysis show that our expectation of a significant relationship between prospector business strategies and SRM was not supported by the data. Therefore, hypothesis 2 (H2) is rejected. In

conclusion, the use of SRM techniques is not influenced by business strategies in large companies in Italy.

Finally, we examined the differences between the two groups of ownership patterns (non-listed and listed companies) to determine if this contextual contingent factor affects sophisticated risk management (SRM). The results of the statistical analysis show that our expectation of a significant relationship between listed firms and SRM was supported by the data. In particular, the p-values of the tests highlight that there is a significant relationship between listed firms and non-probabilistic risk assessment techniques. Therefore, the results of our one-sided Wilcoxon test support hypothesis 3 (H3) with regard to stress testing and risk maps.

Reflecting upon the results, we recognise that specific research limitations, especially the number of statistical observations, might reduce our generalisations.

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Table 1. Analysis of the responses of the sample firms

Number of participation letters sent		179
Number of questionnaires sent	70	
Positive responses	58	
Negative responses	12	

Table 2 – Types of strategic decisions

	n	%
High quality products	42	72.41%
Low cost production	3	5.17%
Low prices	12	20.69%
Quick changes in product design and introduction of new products	17	29.31%
Quick changes in product mix	11	18.97%
Prompt delivery	1	1.72%
After-sales customer service	13	22.41%
Customize products	18	31.03%
Limited range of products	1	1.72%
Introduction of new markets	31	53.45%
Product/market flexibility	28	48.28%

Table 3 – Categories of business strategies and ownership patterns

Business strategy	Ownership patterns		Total
	Listed companies	Non-listed Companies	
Prospector	16	23	39
Defender	7	9	16
Other	2	1	3
Total	25	33	58

Table 4 – A comparison of innovative MA for the two groups of business strategy

	Prospector (n = 39)		Defender (n = 16)		Wilcoxon test	P-value
	Mean	SD	Mean	SD		
<i>Financial measurements</i>						
Economic value added, EVA	2.92	1.36	3.00	1.37	321.5	0.576
Balanced scorecard, BSC	2.54	1.14	3.19	0.83	420.0	0.981
Budgeting for long term (strategic) plan	3.82	1.07	4.00	0.73	331.0	0.649
Activity-based costing, ABC	2.67	1.03	2.62	1.31	302.5	0.431
Target costing, TC	3.49	0.88	3.31	1.08	283.5	0.291
Strategic costing, SC	3.00	1.17	2.56	1.09	237.5	0.076
Life cycle costing, LCC	2.49	1.25	2.62	1.20	335.0	0.673
Benchmarking	3.59	0.97	3.37	0.72	265.0	0.178
Customer profitability analysis, CPA	3.51	1.23	3.37	1.02	285.0	0.305
Evaluating the risk of major investment projects using probability analysis	3.10	1.29	3.06	1.34	306.5	0.462
<i>Non-financial measures</i>						
Number of set-ups (% batches)	2.38	1.09	2.56	1.03	345.5	0.743
Manufacturing cycle efficiency	3.33	1.06	3.44	0.89	335.5	0.683
Defects (% of total production)	3.49	1.10	3.75	0.68	350.0	0.779
Efficiency (standard hours produced/hours worked)	4.00	0.83	3.75	1.00	270.5	0.206
Capacity utilization (hours worked/hours budgeted)	3.72	0.76	3.62	1.02	301.5	0.421
Schedule adherence (%)	3.33	1.01	3.31	0.60	298.5	0.399
On-time delivery to customers	3.82	1.00	4.00	0.73	334.0	0.670
Proportion of overtime worked	2.85	1.01	3.06	0.77	355.0	0.807
Number of complaints from customers	3.49	1.14	3.87	0.81	373.0	0.884
Number of customer returns	3.00	1.32	3.00	1.32	313.0	0.511

Table 5 - Opinions of respondents regarding sources of strategic risk

Sources of strategic risk (Simons, 1999)	% of respondents					Mean	SD
	Score 1	Score 2	Score 3	Score 4	Score 5		
Operations risk	0.0	14.3	22.9	48.6	14.3	3.63	0.90
Asset impairment risk	2.8	13.9	19.4	55.6	8.3	3.53	0.93
Competitive risk	0.0	5.6	25.0	47.2	22.2	3.86	0.82
Reputation risk	0.0	13.9	27.8	36.1	22.2	3.67	0.97

Table 6 - Consideration of respondents for the four ideal types of RM (% of respondents)

ERM ideal types (Mikes, 2009)	1 = fully implemented	2 = less implemented	3 = considered but not implemented
Risk silo management	58.6	17.2	24.1
Integrated risk management	46.4	10.7	42.9
Risk-based management	59.4	12.5	28.1
Holistic risk management	48.4	12.9	38.7

Table 7 – A comparison of sophisticated risk assessment techniques for the two groups of business strategy

Sophisticated risk assessment techniques	Prospector		Defender		Wilcoxon test	P-value
	Mean	SD	Mean	SD		
<i>Probabilistic techniques</i>						
Value-at-Risk (VaR) (prospector, n = 22; defender, n = 11)	3.32	1.46	2.73	1.56	94.5	0.154
Earning-at-Risk (EaR) (prospector, n = 21; defender, n = 12)	3.24	1.58	4.00	1.21	159.5	0.906
Cash flow-at-Risk (CaR) (prospector, n = 21; defender, n = 11)	2.90	1.51	3.45	1.57	139.0	0.835
Loss Distribution (LD) (prospector, n = 19; defender, n = 11)	2.32	1.25	2.45	1.51	109.0	0.589
<i>Non-probabilistic techniques</i>						
Sensitivity Analysis (SA) (prospector, n = 20; defender, n = 11)	3.40	1.06	3.39	0.92	92.5	0.224
Scenario Analysis (ScA) (prospector, n = 20; defender, n = 10)	3.33	0.90	3.12	1.11	83.5	0.229
Stress Testing (ST) (prospector, n = 18; defender, n = 10)	3.07	1.21	2.44	1.26	106.5	0.800
Risk maps (prospector, n = 20; defender, n = 10)	3.56	1.03	2.87	1.02	111.0	0.703

Table 8 – A comparison of sophisticated risk assessment techniques for the two groups of ownership patterns

Sophisticated risk assessment techniques	Listed firms		Non-listed firms		Wilcoxon test	P-value
	Mean	SD	Mean	SD		
<i>Probabilistic techniques</i>						
Value-at-Risk (VaR) (listed firms, n = 17; non-listed, n = 18)	3.18	1.55	3.11	1.41	145.5	0.406
Earning-at-Risk (EaR) (listed firms, n = 17; non-listed, n = 18)	3.53	1.50	3.56	1.42	152.0	0.493
Cash flow-at-Risk (CaR) (listed firms, n = 16; non-listed, n = 18)	2.75	1.73	3.22	1.35	170.0	0.825
Loss Distribution (LD) (listed firms n = 15; non-listed, n = 17)	2.27	1.49	2.47	1.23	140.5	0.704
<i>Non-probabilistic techniques</i>						
Sensitivity Analysis (SA) (listed firms, n = 15; non-listed, n = 18)	3.40	1.06	3.39	0.92	141.5	0.608
Scenario Analysis (ScA) (listed firms, n = 15; non-listed, n = 17)	3.33	0.90	3.12	1.11	116.5	0.338
Stress Testing (ST) (listed firms, n = 14; non-listed, n = 16)	3.07	1.21	2.44	1.26	78.5	0.079
Risk maps (listed firms, n = 16; non-listed, n = 16)	3.56	1.03	2.87	1.02	83.5	0.040