Business and Management Sciences
International Quarterly Review

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Pavia, June 30, 2026
Volume 17 – N. 2/2026
DOI: 10.13132/2038-5498/17.2.457-475

www.ea2000.it
www.economiaaziendale.it

PaviaUniversityPress

Electronic ISSN 2038-5498
Reg. Trib. Pavia n. 685/2007 R.S.P.

Economia Aziendale Online – Business and Management Sciences International Quarterly Review
Vol. 17-2/2026 - DOI: 10.13132/2038-5498/17.2.457-475

Making uncertainty manageable: Management control as a coping system in SMEs

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Cite as:

Mariani, A. (2026). Making uncertainty manageable: Management control as a coping system in SMEs. *Economia Aziendale Online, 17*(2), 457-475.

Section:

Refereed Paper

Received: April 2026
Published: 30/06/2026

ABSTRACT - SOMMARIO

Uncertainty is a pervasive condition for contemporary organizations, yet empirical research has predominantly framed it as external environmental turbulence affecting performance outcomes. This study adopts a managerial and management control perspective to examine how firms cope with uncertainty through combinations of managerial practices. Drawing on survey data from 30 small and medium-sized enterprises, the study distinguishes between market, supply, technological, and financial uncertainty and analyzes their associations with planning, organizing, human capital development, leadership, and controlling practices. The results indicate that perceived uncertainty is moderate and persistent rather than episodic, and that external uncertainty alone does not systematically trigger changes in managerial systems. Market and supply-side uncertainty show limited association with managerial practices, a finding that itself carries theoretical significance: environmental volatility appears to be a background condition rather than a direct driver of control system design. Instead, the most robust empirical pattern concerns the strong internal coherence among managerial practices. Strategic planning, organizational structuring, leadership, human capital development, and management control systems are highly interrelated, indicating that firms rely on integrated managerial arrangements to make uncertainty manageable. By shifting attention from external turbulence to the internal integration of managerial practices, the study contributes to management control research by showing that management control systems function as internally coherent coping infrastructures, whose effectiveness lies in systemic coherence rather than in the activation of isolated control tools in response to specific uncertainty sources.

L'incertezza rappresenta una condizione pervasiva per le organizzazioni contemporanee, ma la ricerca empirica l'ha prevalentemente interpretata come una turbolenza ambientale esterna che influenza i risultati aziendali. Questo studio adotta una prospettiva manageriale e di management control per analizzare come le imprese affrontino l'incertezza attraverso combinazioni di pratiche manageriali. Basandosi su dati di survey raccolti presso 30 piccole e medie imprese, lo studio distingue tra incertezza di mercato, di approvvigionamento e di costo, tecnologica e finanziaria, analizzandone le relazioni con pratiche di pianificazione, organizzazione, sviluppo del capitale umano, leadership e sistemi di controllo di gestione. I risultati indicano che l'incertezza percepita è moderata e persistente piuttosto che episodica, e che le diverse dimensioni di incertezza esterna non

attivano sistematicamente cambiamenti nei sistemi manageriali. In particolare, l'incertezza di mercato e di approvvigionamento mostra associazioni limitate con le pratiche manageriali. Al contrario, il risultato empirico più robusto riguarda la forte coerenza interna tra le diverse pratiche manageriali. Pianificazione strategica, strutturazione organizzativa, sviluppo delle competenze, leadership e sistemi di controllo di gestione risultano fortemente interrelati, suggerendo che le imprese si affidano a configurazioni manageriali integrate per rendere gestibile l'incertezza. Spostando l'attenzione dalla turbolenza ambientale all'integrazione interna delle pratiche manageriali, lo studio contribuisce alla letteratura sul management control mostrando come i sistemi di controllo possano essere interpretati come infrastrutture organizzative di coping, la cui efficacia risiede nella coerenza sistemica piuttosto che nell'attivazione di singoli strumenti di controllo in risposta a specifiche fonti di incertezza.

Keywords: uncertainty, management control systems, SMEs, managerial practices, incertezza; sistemi di controllo di gestione, PMI, pratiche manageriali, configurazioni manageriali

1 – Introduction

Uncertainty has become a defining feature of contemporary organizational environments. The disruptions associated with the Covid-19 pandemic and subsequent macroeconomic volatility have reinforced this view, demonstrating that uncertainty can operate as a persistent structural condition rather than a temporary shock, with significant implications for how firms design and use their managerial systems (Roffia & Dabić, 2024; Frare et al., 2023). Building resilience in such conditions requires organizations to develop integrated managerial responses rather than reactive adjustments to isolated control tools (Giancotti & Mauro, 2020).

Volatile markets, rapid technological change, evolving cost structures, and shifting financial conditions increasingly challenge managers' ability to plan, coordinate, and control organizational activities (Daft et al., 1988; Calantone et al., 2003). While uncertainty is not new in management research, its persistence and multidimensional nature have renewed interest in understanding how organizations operate under imperfect knowledge and unpredictable outcomes.

A substantial body of literature has examined uncertainty as an external condition affecting organizational performance and strategic choices. From a contingency perspective, uncertainty is typically conceptualized as environmental turbulence that increases information-processing requirements and calls for adaptive structural responses (Daft et al., 1988; Calantone et al., 2003). However, much of this research implicitly assumes that uncertainty originates outside the organization and that managerial responses materialize primarily through structural alignment or performance adjustments, rather than through changes in how managers plan, coordinate, and exercise control on a day-to-day basis (Jaworski & Kohli, 1993).

Recent developments suggest that this view is incomplete. Uncertainty is not only external but also embedded in operational and organizational dynamics. Rapid technological change may create uncertainty regarding the adequacy of existing processes and competencies (Calantone et al., 2003; Story et al., 2014). Volatility in input costs and supply conditions may challenge internal coordination and resource allocation. In such contexts, managers face uncertainty not only about environmental evolution but also about the robustness and integration of their own managerial systems (Daft et al., 1988).

Management control systems are particularly well positioned to shed light on this issue. Traditionally associated with monitoring, variance reduction, and compliance, management

control systems have progressively been reconceptualized as broader sets of interrelated managerial practices that support coordination, learning, and strategic dialogue (Simons, 1994). Rather than merely constraining behavior, control systems can structure attention, facilitate communication, and enable coordinated action under conditions of imperfect knowledge. This broader view of management control reflects a long-standing evolution of the discipline, which has progressively expanded from traditional cost monitoring toward broader governance and coordination mechanisms (Provasi & Guizzetti, 2019).

The key question, therefore, is not whether control systems eliminate uncertainty, but how they allow organizations to operate despite it. In this perspective, management control increasingly operates as an integrated managerial infrastructure combining planning, information systems, and coordination practices that support organizational decision-making and value creation (Ghidetti, 2012; Riva, 2012).

Despite these theoretical advances, empirical evidence on how firms combine managerial practices under different sources of uncertainty remains limited. Existing studies often focus on single mechanisms, treat uncertainty as a moderating variable, or emphasize performance consequences rather than managerial processes. Less attention has been paid to the internal coherence among planning, organizing, human capital development, leadership, and controlling practices, particularly in small and medium-sized enterprises where formal systems coexist with strong reliance on managerial judgment.

This study addresses this gap through an exploratory, survey-based approach. Drawing on data from 30 small and medium-sized enterprises, the study distinguishes between market, supply and cost, technological, and financial uncertainty, and examines how these relate to structured managerial practices. Rather than testing whether specific types of uncertainty activate individual control tools, the study investigates whether management control systems operate as internally integrated coping infrastructures.

The findings point in two directions. First, external uncertainty dimensions do not systematically trigger isolated adjustments in managerial practices, suggesting that environmental volatility functions as a background condition rather than as a direct driver of control system design. Second, the most robust empirical pattern concerns the internal coherence among planning, organizing, leadership, human capital, and formal control systems. Firms differ not so much in how they react to specific uncertainty sources, but in the degree to which their managerial practices form coherent and mutually reinforcing arrangements.

By doing so, the paper makes three contributions.

1 – First, it reframes uncertainty as a moderate and persistent managerial condition rather than an episodic shock, emphasizing its multidimensional character (Daft et al., 1988; Calantone et al., 2003).

2 – Second, it provides empirical evidence that external uncertainty alone is a weak predictor of managerial system design, a finding with implications for contingency-based research on management control.

3 – Third, it advances a view of management control systems as internally coherent coping infrastructures, extending prior work on control packages and interactive use of control systems to the SME context (Malmi & Brown, 2008; Simons, 1994).

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on uncertainty and management control. Section 3 outlines the research design and methodology. Section 4 presents the empirical results. Section 5 discusses the findings, implications, limitations, and conclusions.

2 – Literature background

2.1 – *Uncertainty as a managerial condition*

Uncertainty has long been recognized as a central feature of organizational environments and a key driver of managerial behavior. Early contingency research conceptualized uncertainty as the degree to which external conditions are unstable, complex, and difficult to predict, thereby increasing the information-processing demands placed on organizations and decision-makers (Galbraith, 1973; Daft et al., 1988). From this perspective, uncertainty emerges when managers face gaps between the information required to perform tasks and the information available to them, making planning, coordination, and control more problematic (Galbraith, 1973). Managerial practices aimed at addressing such challenges often rely on planning and budgeting systems that structure expectations and support decision-making in complex environments (Meo Colombo, 2013).

Classic studies emphasized that uncertainty is not uniform across environmental domains. Managers experience and interpret uncertainty differently depending on whether it originates from markets, competitors, technology, regulation, or resource availability (Daft et al., 1988; Jaworski & Kohli, 1993). Importantly, what matters for organizational action is not only objective environmental turbulence but also how managers perceive and interpret it. This interpretive dimension helps explain why firms operating in similar contexts may adopt different organizational responses, and why uncertainty often shapes managerial processes rather than producing purely reactive structural adjustments (Daft et al., 1988).

Subsequent research has refined this view by distinguishing multiple sources of uncertainty. Market uncertainty relates to volatility in demand, customer preferences, and competitive dynamics (Jaworski & Kohli, 1993). Technological uncertainty reflects the pace and discontinuity of technological change and the risk of obsolescence of existing knowledge and processes (Calantone et al., 2003; Story et al., 2014). Financial uncertainty concerns access to capital, cost of financing, and instability in financial markets, while supply and cost uncertainty arises from fluctuations in input prices, resource availability, and supplier bargaining power. Although analytically distinct, these sources often coexist and interact, shaping the conditions under which managerial decisions are made.

Despite this multidimensional understanding, much of the uncertainty literature continues to privilege external sources, implicitly treating organizations as passive recipients of environmental turbulence. As a result, uncertainty is frequently examined as a contextual variable moderating the relationship between organizational characteristics and performance, rather than as a managerial condition actively interpreted and addressed through organizational practices (Daft et al., 1988; Chenhall, 2003). Recent empirical work has reinforced this concern, showing that environmental unpredictability shapes the use of control mechanisms in ways that go beyond structural adjustment, particularly in SME contexts exposed to systemic disruptions (Luiz & Beuren, 2023; Frare et al., 2023).

2.2 – *From uncertainty to managerial responses*

A growing body of research suggests that uncertainty primarily challenges managerial processes rather than organizational structures alone. Under uncertain conditions, decision-making becomes less routinized, forecasts lose accuracy, and traditional assumptions underlying planning and budgeting are called into question (Cyert & March, 1963; Galbraith,

1973). In such contexts, managers engage in activities aimed at sensing, interpreting, and responding to emerging signals, often relying on richer information sources and increased interaction across organizational boundaries (Daft et al., 1988).

This shift has led scholars to examine how managers respond to uncertainty through planning, coordination, and learning mechanisms. Rather than attempting to eliminate uncertainty, organizations develop practices that allow them to act despite incomplete information (March, 1991). Planning processes, for example, may be used not only to set targets but also to explore scenarios and support strategic dialogue (Boyd & Reuning-Elliott, 1998). Similarly, coordination and organizing mechanisms help align actions across functions when outcomes are uncertain and interdependencies are high (Galbraith, 1973).

Strategic tools such as strategy maps and integrated planning frameworks have also been interpreted as organizational responses to environmental pressures and uncertainty, helping firms translate strategic objectives into coordinated managerial actions (Francioli, 2021).

Importantly, research has also questioned how direct and systematic the relationship between perceived uncertainty and managerial responses actually is. Contingency-based studies have often assumed that higher uncertainty triggers tighter or more sophisticated control, yet empirical evidence on this relationship is mixed and context-dependent (Chenhall, 2003; Otley, 1999). Firms facing similar uncertainty levels may respond differently depending on managerial interpretation, organizational history, and the existing configuration of practices. This suggests that uncertainty functions as a background condition that shapes the context of managerial action rather than a direct and uniform driver of control system design.

2.3 – *Management control systems under uncertainty*

Within management accounting research, uncertainty has progressively been reframed as a central design condition for management control systems. Traditional perspectives portrayed control systems primarily as tools for monitoring performance, enforcing efficiency, and reducing variance in relatively stable environments (Anthony, 1965; Otley, 1980). However, such views offer limited explanatory power when future outcomes are difficult to anticipate and deviations from plans stem from changing conditions rather than from inefficiency (Otley, 1999).

In response, management control systems have increasingly been conceptualized as packages of interrelated practices encompassing planning, cybernetic controls, administrative mechanisms, and organizational processes (Malmi & Brown, 2008). Studying control systems as packages is particularly relevant under uncertainty, as organizations typically rely on combinations of practices to coordinate action and support decision-making rather than on isolated tools (Grabner & Moers, 2013). Planning, budgeting, performance measurement, and reporting interact with organizational structures and managerial roles, shaping how uncertainty is interpreted and addressed. Within this package view, budgetary controls constitute a particularly well-studied component, whose tightness, detail, and interactivity determine how systematically performance information is used by managers (Van der Stede, 2001). Tightness, in particular, refers to the degree to which budget compliance is binding and performance-contingent rewards depend on budget achievement, dimensions that may vary independently from the mere presence of a budgeting system, and whose level in SMEs is an empirically open question. This systemic interpretation of management control has long been emphasized in the Italian managerial literature, where control systems are viewed as integrated frameworks

combining strategic orientation, organizational coordination, and information processes (Mella, 2018).

From this perspective, management control systems do not merely constrain behavior but also enable managerial action (Ahrens & Chapman, 2004). By providing shared reference points, structuring attention, and facilitating communication, control systems support sensemaking and coordinated responses in uncertain situations (Simons, 1995). Moreover, contemporary control systems increasingly integrate financial and non-financial information to support multidimensional organizational objectives, including sustainability and stakeholder-oriented decision processes (Cavicchi & Vagnoni, 2023).

SMEs also differ from larger organizations in how they experience and absorb uncertainty. Resource constraints and what the literature has termed 'resource poverty' mean that small firms often face heightened vulnerability to environmental volatility, with limited slack to invest in redundant systems or absorb unexpected shocks. At the same time, the centralization of decision-making around owner-managers and the relative absence of bureaucratic layers may confer greater organizational flexibility and faster adaptive responses. In this dual condition of heightened exposure and structural agility, the internal coherence of managerial practices becomes particularly consequential: it may substitute, at least partially, for the resource buffers and formalized procedures that larger organizations can rely upon (Wiklund & Shepherd, 2005; Roffia & Dabić, 2024).

2.4 – *Interactive use and internal organizational uncertainty*

A key theoretical development in linking uncertainty and management control is the distinction between diagnostic and interactive uses of control systems (Simons, 1995). Diagnostic use focuses on monitoring outcomes against predefined targets and correcting deviations, whereas interactive use involves continuous dialogue, debate, and reinterpretation of performance information. Under conditions of uncertainty, interactive use becomes particularly important, as it enables managers to surface emerging issues, challenge underlying assumptions, and adapt strategic and operational responses over time (Simons, 1995; Henri, 2006).

Recent research has also highlighted the growing relevance of internal organizational sources of uncertainty. Rapid technological change, digital transformation, and evolving operational conditions may generate uncertainty regarding the adequacy of existing processes, competencies, and coordination mechanisms (Teece, 2007; Davila et al., 2009). In SMEs specifically, entrepreneurial orientation and access to resources interact with the environment to shape how firms absorb and respond to uncertainty, making the alignment between internal capabilities and external conditions a particularly relevant dimension of managerial practice (Wiklund & Shepherd, 2005). In such contexts, uncertainty is not limited to predicting external developments but extends to assessing organizational readiness and the robustness of managerial infrastructures.

This internal dimension of uncertainty has important implications for management control systems. Organizational structuring, capability development, leadership practices, and the use of performance measures for learning and dialogue become integral components of how firms cope with uncertainty (Widener, 2007). The effectiveness of these managerial systems is also influenced by organizational culture and by how managers interpret and adopt control practices within their firms (De Simeis, 2018).

Control systems thus extend beyond technical accounting devices to encompass broader managerial practices that support coordination, organizational adaptation, and collective sensemaking (Simons, 1995; Ahrens & Chapman, 2004).

2.5 – *Research gap*

Despite these insights, empirical evidence on how firms combine managerial practices to cope with different sources of uncertainty remains limited. Much of the existing literature focuses on single control mechanisms, treats uncertainty primarily as a moderating or contextual variable, or emphasizes performance outcomes rather than managerial processes (Chenhall, 2003; Otley, 2016). Critically, the assumption that higher perceived uncertainty directly activates more structured or sophisticated managerial systems has rarely been questioned empirically, particularly in SME contexts where the relationship between environmental conditions and internal managerial arrangements may be more idiosyncratic and less deterministic than contingency theory implies. Furthermore, the internal coherence among planning, organizational structuring, leadership, human capital development, and formal control mechanisms has received limited attention as an object of study in its own right. Existing surveys tend to analyze these elements separately, overlooking the possibility that what distinguishes firms is not the intensity of individual practices but the degree to which they form mutually reinforcing arrangements (Malmi & Brown, 2008; Grabner & Moers, 2013).

This study addresses this gap through an exploratory, survey-based approach. By distinguishing between multiple sources of uncertainty and examining their associations with a broad set of managerial practices, the study contributes to management control research in two ways. First, it provides empirical evidence on whether and how different uncertainty dimensions relate to managerial system design in SMEs, explicitly attending to the possibility that these relationships are weaker than contingency theory would predict. Second, it advances a view of management control systems not merely as monitoring or coordinating devices but as internally coherent coping infrastructures that structure managerial attention and enable organizational action under persistent uncertainty.

3 – Research design and methodology

3.1 – *Research approach*

This study adopts an exploratory, survey-based research design aimed at examining how firms cope with uncertainty through managerial practices. The objective is not to test causal relationships or develop predictive models, but to explore patterns of association and internal coherence among perceived uncertainty dimensions and managerial systems. This approach is appropriate given the limited empirical evidence on uncertainty as a managerial condition in SMEs and the exploratory nature of the research question (Malmi & Brown, 2008).

The analysis focuses on how managerial practices relate to one another and to different sources of perceived uncertainty, treating these practices as interdependent elements of a broader managerial system rather than as isolated mechanisms (Grabner & Moers, 2013).

3.2 – *Sample and data collection*

Data were collected through an online questionnaire administered to managers and executives of Italian small and medium-sized enterprises. The sample covers firms located across multiple

Italian regions, with a predominance of northern Italy (approximately 77% of respondents), and spans a diverse range of industries including manufacturing, business services, trade, and professional services. Respondents primarily occupied senior decision-making roles, including CEOs, CFOs, and other top management positions, ensuring informed perspectives on organizational uncertainty and managerial practices. Participants were asked to answer with reference to the previous twelve months, allowing for a temporally bounded and comparable assessment.

The final sample consists of 30 completed questionnaires. Firms vary in size, turnover, and organizational maturity, providing heterogeneity suitable for exploratory inquiry. Small samples of this kind are consistent with exploratory survey research in management accounting, where the aim is to identify patterns and generate theoretical insight rather than achieve population-level statistical inference (Otley, 1999; Chenhall, 2003). The study makes no claim to generalizability and interprets its findings as empirically grounded propositions warranting further investigation in larger and more diverse samples.

While the sample was designed to target small and medium-sized enterprises, Table 1 indicates that a small minority of respondents report annual turnover exceeding €50 million or more than 100 employees, which would place them outside the standard European Commission SME definition. Rather than applying a strict institutional threshold, this study adopts a broader characterization of the sample as consisting predominantly of SMEs alongside a limited number of larger entities. This heterogeneity is treated as analytically relevant, as it allows observation of different levels of managerial formalization across a spectrum of organizational sizes.

3.3 – *Measures*

Perceived uncertainty was measured across four dimensions: market uncertainty, supply and cost uncertainty, technological uncertainty, and financial uncertainty. The operationalization builds on established conceptualizations of environmental turbulence and organizational uncertainty (Jaworski & Kohli, 1993; Calantone et al., 2003), capturing volatility in demand, instability in resource and cost conditions, pace of technological change, and variability in financial conditions.

Managerial responses were operationalized through five practice dimensions: strategic planning, organizational structure and processes, human capital and capabilities, leadership and interaction, and management control systems. These dimensions reflect the broader conception of management control as an integrated set of practices (Malmi & Brown, 2008), encompassing planning activities, role clarity and coordination, competence development, interactive use of performance information, and formal control mechanisms.

All items were measured using seven-point Likert scales (1 = strongly disagree; 7 = strongly agree). Construct scores were computed as scale means. Two items (TU5 and FU4) were reverse-coded to ensure scale consistency. The full questionnaire is reported in Appendix A.

3.4 – *Data analysis*

The analysis proceeded in three steps. First, descriptive statistics were computed to examine the distribution of uncertainty dimensions and managerial practices. Second, reliability analysis using Cronbach's alpha was performed to assess the internal consistency of each scale. Third, Pearson correlation analysis was conducted on scale means to explore associations among uncertainty dimensions and managerial practices.

Given the exploratory nature of the study and the limited sample size, the analysis focuses on identifying meaningful patterns of association rather than estimating directional effects or testing structural models. Correlation analysis is appropriate for this purpose, as it allows examination of how uncertainty dimensions and managerial practices co-vary without imposing strong assumptions about causal direction (Chenhall, 2003). It should be noted that Pearson correlation analysis on a sample of 30 firms is intended to identify macro-patterns of association within an exploratory design, rather than to estimate population-level structural parameters or make inferences about causal direction. Results should therefore be interpreted with appropriate caution regarding statistical stability and normality assumptions.

4 – Results

4.1 – *Sample profile and management control maturity*

The empirical analysis is based on a survey administered to senior decision-makers in small and medium-sized enterprises. CEOs constitute the largest group of respondents (50%), followed by CFOs and other top management roles including COOs, owners, board members, and senior executives. This distribution enhances informant credibility and data reliability, as respondents are directly involved in strategic and operational planning within their organizations.

The firms included in the sample display considerable heterogeneity in terms of size and economic scale. While the majority fall within the SME category, they vary substantially in number of employees and annual turnover, ranging from micro-firms to medium-sized organizations. Such dispersion is analytically relevant for an exploratory study, as it enables observation of different managerial arrangements and levels of formalization rather than a single dominant organizational pattern.

The sample also exhibits notable variation in the maturity of management control practices. While some firms report formalized budgeting and cost accounting systems, more advanced infrastructures such as analytical accounting and business intelligence tools are less widespread. This uneven distribution confirms that firms operate with different degrees of managerial structuring, providing an appropriate empirical setting for examining how organizations cope with uncertainty through diverse combinations of practices. Table 1 reports the detailed sample profile and the distribution of key organizational characteristics, offering a contextual basis for interpreting the subsequent analyses.

Table 1. Sample profile and management control maturity

Company Role	N.	%	N. employees	N.	%	Annual turnover	N.	%
CEO	15	50%	>100	2	7%	> €50m	3	10%
CFO	5	16%	30–100	9	30%	€25–50m	3	10%
COO	3	10%	10–30	9	30%	€10–25m	6	20%
Owner	3	10%	<10	10	33%	€3–10m	5	17%
Board member	2	7%				€1–3m	6	20%
Other	2	7%				< €500k	7	23%
Total	**30**	**100%**	**Total**	**30**	**100%**	**Total**	**30**	**100%**

4.2 – *Descriptive statistics and reliability of measurement scales*

Table 2 presents descriptive statistics and reliability indicators for all constructs. Overall, mean values across uncertainty dimensions remain below the midpoint of the scale, indicating that firms are not operating under conditions of extreme turbulence but rather face moderate and persistent uncertainty. This pattern is consistent across dimensions, with technological uncertainty showing the highest average level, followed by market and supply and cost uncertainty, while financial uncertainty appears comparatively lower. These results suggest that managers perceive uncertainty primarily in relation to technological evolution and competitive dynamics rather than financial instability.

Table 2 – Descriptive statistics and reliability of measurement scale

Dimension	ITEM	Avg	Dev std	Alpha
Market uncertainty	MU1	2,73	0,98	
	MU2	3,33	1,21	
	MU3	3,70	1,06	
	MU4	3,43	1,22	
	MU5	3,43	1,25	
	MU - Mean (scale)	**3,33**	**0,82**	**0,758**
Supply & cost uncertainty	SCU1	2,30	1,18	
	SCU2	3,13	1,28	
	SCU3	3,40	1,25	
	SCU4	3,73	0,94	
	SCU5	2,93	0,98	
	SCU - Mean (scale)	**3,10**	**0,80**	**0,751**
Technological uncertainty	TU1	3,83	1,12	
	TU2	3,50	1,22	
	TU3	3,67	1,03	
	TU4	4,17	0,87	
	TU5 (reverse)	4,80	1,03	
	TU - Mean (scale)	**3,99**	**0,66**	**0,665**
Competitive / product dynamics	CPD1	2,60	0,93	
	CPD2	2,87	1,14	
	CPD - Mean (scale)	**2,73**	**0,83**	**0,423**
Financial uncertainty	FU1	2,57	1,22	
	FU2	2,87	1,11	
	FU3	3,03	1,03	
	FU4 (reverse)	4,43	1,22	

	FU5	2,63	1,00	
	FU6	2,67	1,24	
	FU - Mean (scale)	**3,03**	**0,58**	**0,819**
Strategic planning	SP1	3,07	1,53	
	SP2	3,33	1,24	
	SP3	3,03	1,43	
	SP4	3,27	1,23	
	SP5	4,27	0,83	
	SP - Mean (scale)	**3,39**	**0,99**	**0,840**
Organizational Structure & Processes	ORG1	3,70	1,44	
	ORG2	3,73	1,28	
	ORG3	3,53	1,17	
	ORG4	3,27	1,36	
	ORG5	4,30	0,92	
	ORG - Mean (scale)	**3,71**	**0,98**	**0,846**
Human Capital & Capabilities	HC1	3,40	1,30	
	HC2	3,40	1,19	
	HC3	3,17	1,29	
	HC4	3,03	1,35	
	HC5	4,27	0,91	
	HC - Mean (scale)	**3,45**	**0,84**	**0,726**
Leadership, Interaction & Learning	LEAD1	3,33	1,37	
	LEAD2	2,93	1,48	
	LEAD3	2,67	1,30	
	LEAD4	2,90	1,42	
	LEAD5	3,90	1,06	
	LEAD - Mean (scale)	**3,15**	**1,12**	**0,894**
Management Control Systems	MCS1	3,30	1,37	
	MCS2	3,27	1,39	
	MCS3	3,00	1,39	
	MCS4	3,43	1,48	
	MCS5	3,00	1,49	
	MCS6	3,17	1,49	
	MCS7	2,87	1,46	
	MCS8	3,07	1,39	
	MCS9	3,90	1,16	
	MCS - Mean (scale)	**3,22**	**1,17**	**0,946**

Reliability analysis using Cronbach's alpha indicates acceptable internal consistency for most scales. Market and supply and cost uncertainty show satisfactory reliability, while financial uncertainty demonstrates strong internal consistency. Among managerial practice constructs, strategic planning, organizational structure, leadership, and management control systems all exhibit high reliability, supporting their use as coherent measurement instruments. Technological uncertainty shows a lower alpha value, reflecting greater heterogeneity in how firms experience technological change and warranting cautious interpretation. The competitive and product dynamics construct was excluded from subsequent analyses due to insufficient internal consistency (alpha = 0.423), which falls below commonly accepted reliability thresholds. It is retained for descriptive purposes only.

The competitive/product dynamics construct was not included in subsequent analyses due to its low internal consistency (Cronbach's alpha = 0.423). This value falls below commonly accepted reliability thresholds, indicating insufficient coherence between items. Given the exploratory nature of the study, the construct is retained for descriptive purposes but excluded from correlation and configurational analyses to avoid introducing measurement noise and unstable associations.

4.3 – *Associations between uncertainty and managerial practices*

Table 3 reports the Pearson correlation matrix between uncertainty dimensions and managerial practice constructs. Two distinct patterns emerge from the data.

The first concerns the relationship between external uncertainty and managerial practices. Market uncertainty shows weak and non-significant correlations with all managerial practice dimensions. Supply and cost uncertainty displays only modest associations. Technological uncertainty shows positive correlations with other uncertainty dimensions but remains largely uncorrelated with managerial practices. Financial uncertainty tends to display negative associations with several practice dimensions, particularly leadership and management control, suggesting that higher perceived financial instability may coincide with weaker rather than stronger managerial structuring. Taken together, these results indicate that external uncertainty dimensions do not systematically trigger structured adjustments in planning, organizing, leadership, or control systems. Environmental volatility appears to function as a background condition rather than as a direct driver of managerial system design, a finding that questions the straightforward contingency assumption that higher uncertainty activates more structured control.

The second and more robust pattern concerns the internal coherence among managerial practices themselves. Strategic planning, organizational structure, human capital development, leadership, and management control systems exhibit strong and significant intercorrelations. Firms that invest in structured planning also tend to display stronger organizational coordination, more developed capability-building practices, more interactive leadership, and more formalized control mechanisms. This pattern suggests that managerial practices do not operate as independent levers activated selectively in response to specific uncertainty sources. Rather, they form a mutually reinforcing system in which the presence and quality of one element is closely associated with the presence and quality of the others.

Overall, the results suggest that the capacity to cope with uncertainty resides less in the activation of individual control tools and more in the internal coherence of the managerial system as a whole. Firms differ not so much in how they react to specific external pressures, but

in the degree to which their planning, organizing, leadership, and control practices form an integrated and consistent arrangement.

Table 3 – Correlation matrix

Variables	MU	SCU	TU	FU	SP	ORG	HC	LEAD	MCS
MU	1	0.326	0.375*	0.363*	-0.038	0.209	0.152	0.032	0.052
SCU		1	0.227	0.372*	0.174	0.115	0.308	0.335	0.252
TU			1	0.219	0.066	0.021	0.015	-0.013	-0.050
FU				1	-0.159	-0.211	-0.075	-0.344	-0.275
SP					1	0.705**	0.755**	0.683**	0.726**
ORG						1	0.773**	0.586**	0.696**
HC							1	0.750**	0.819**
LEAD								1	0.834**
MCS									1
Note: N = 30. *p < 0.05; **p < 0.01.									

5 – Discussion, implications, limitations and conclusion

5.1 – *Discussion*

This study set out to explore how firms cope with uncertainty through managerial practices, examining both the relationship between external uncertainty and managerial system design and the internal coherence among practices themselves. The results offer a coherent picture that departs in important ways from standard contingency assumptions.

The first finding concerns the limited role of external uncertainty as a driver of managerial responses. Market and supply-side uncertainty show weak and non-significant associations with planning, organizing, leadership, and control practices. Financial uncertainty, if anything, displays negative associations with managerial structuring, suggesting that firms under greater financial pressure may operate with less rather than more formalized systems. A plausible interpretation is that financial constraints limit the organizational slack necessary to invest in and maintain structured managerial practices: when resources are scarce, firms simplify rather than formalize, prioritizing operational survival over system development (Cyert & March, 1963; Gordano, 2026). This is the opposite of what contingency theory would predict, and it points to a boundary condition: below a certain resource threshold, uncertainty may suppress rather than stimulate managerial structuring. Technological uncertainty, while perceived at moderate levels, remains largely unrelated to the managerial practices examined. This pattern is not a null result in a trivial sense. It challenges the implicit assumption, widespread in contingency-based research, that higher perceived uncertainty systematically activates more structured or sophisticated control systems (Chenhall, 2003; Otley, 1999). The findings suggest instead that environmental volatility operates as a persistent background condition within which firms must function, rather than as a trigger that directly shapes managerial system

design. Organizations do not appear to adjust their planning, coordination, or control practices primarily in response to specific uncertainty sources. This finding resonates with research questioning the deterministic nature of contingency relationships in management control and points to the need for more nuanced accounts of how environmental conditions translate, or fail to translate, into managerial responses (Otley, 2016).

The second and more substantive finding concerns the strong internal coherence among managerial practices. Strategic planning, organizational structuring, human capital development, leadership, and management control systems are highly and consistently interrelated. This pattern indicates that these elements do not function as independent tools deployed selectively under specific conditions. Rather, they operate as components of an integrated managerial system in which investment in one dimension tends to be associated with stronger development across all others. Firms that plan more carefully also tend to organize more clearly, develop capabilities more systematically, exercise more interactive leadership, and rely on more formalized control mechanisms. This coherence is the primary empirical result of the study and its main theoretical contribution. The pattern is also consistent with the configurational logic advanced in the SME literature: firms that align multiple internal dimensions simultaneously (strategy, structure, capabilities, leadership, and control) tend to outperform those that optimize individual components in isolation (Wiklund & Shepherd, 2005). What the present study adds is that this alignment appears to be a condition for managing uncertainty, not merely for achieving performance.

The extremely high intercorrelations among managerial practices, with several coefficients exceeding $r = 0.80$, warrant explicit interpretive attention. Two non-mutually exclusive explanations merit consideration. First, in SME contexts characterized by owner-manager centralization, managerial practices may be structurally inseparable: the same individual drives planning, organizes resources, develops capabilities, exercises leadership, and oversees control, making it conceptually and empirically difficult to distinguish these dimensions. Second, single-respondent survey designs carry an inherent risk of common method bias and halo effects, which cannot be ruled out in the present study. Importantly, however, these explanations do not undermine the central finding. If anything, they reinforce the configurational argument: managerial practices in SMEs may be so deeply intertwined that they are best understood as a unified infrastructure rather than a set of separable levers.

A closer look at the MCS block is instructive in this regard. Items measuring the presence and use of budgeting and reporting systems (MCS1, MCS2, MCS4, MCS6, MCS7, MCS8) display higher mean scores than items capturing control tightness; specifically, budget compliance bindingness (MCS3, mean = 3.00) and performance-contingent rewards (MCS5, mean = 3.00). This descriptive pattern suggests that SMEs in this sample tend to have budgetary infrastructures in place but deploy them in a relatively loose and non-coercive manner, consistent with the enabling rather than constraining role of control systems in resource-constrained organizational contexts (Van der Stede, 2001; Simons, 1995). Interpreted through the lens of management control as a package (Malmi & Brown, 2008), this finding suggests that what enables firms to cope with uncertainty is not the presence of any specific control tool but the systemic integration of managerial practices. Control systems, in this view, are not reactive mechanisms triggered by environmental shocks. They are infrastructure: structures that stabilize managerial attention, support coordination, and enable organized action under conditions of persistent and imperfect knowledge. This interpretation extends prior work on the

enabling role of control systems (Ahrens & Chapman, 2004) and the interactive use of performance information (Simons, 1995) by emphasizing that the effectiveness of individual practices depends on the coherence of the broader system in which they are embedded.

The SME context adds a further dimension to this interpretation. In organizations where formal systems coexist with strong reliance on managerial judgment and informal coordination, the degree of internal coherence among practices is unlikely to be the product of deliberate system design alone. It may also reflect managerial orientation, organizational culture, and accumulated routines. This suggests that building the capacity to cope with uncertainty in SMEs is less a matter of installing specific control tools and more a matter of developing integrated managerial arrangements over time.

5.2 – *Conclusions*

This study contributes to management control research by examining how SMEs cope with uncertainty through combinations of managerial practices. Two results stand out. External uncertainty dimensions show limited and largely non-significant associations with managerial system design, suggesting that environmental volatility is a background condition rather than a direct driver of control system activation. By contrast, planning, organizing, leadership, human capital development, and formal control mechanisms are strongly interrelated, indicating that firms cope with uncertainty through internally coherent managerial arrangements rather than through isolated tools.

These findings advance understanding of management control systems not as reactive mechanisms calibrated to specific uncertainty sources, but as internally coherent coping infrastructures that enable organized action under persistent uncertainty. Ultimately, coping with uncertainty is less about predicting the future accurately and more about building managerial systems that allow organizations to act effectively despite not knowing it.

5.3 – *Implications*

The findings carry practical implications for managers and controllers in SMEs. Firms should resist the temptation to treat uncertainty as a purely external problem requiring reactive adjustments to individual control mechanisms. Tightening the budget process or installing a new reporting system in isolation is unlikely to improve the organization's capacity to act under uncertain conditions if planning, coordination, leadership, and capability development remain weakly integrated. The study suggests that managerial attention should be directed toward the coherence of the overall system rather than the sophistication of its individual components.

For controllers and finance leaders specifically, the findings point to a role that extends beyond budget monitoring and variance reporting. Fostering integration across organizational areas, supporting structured dialogue between functions, and ensuring that performance information is used for learning and coordination rather than mere compliance are practices that contribute to the internal coherence that makes uncertainty manageable.

5.4 – *Limitations and future research*

Some limitations should be acknowledged. The study relies on a small, survey-based sample of 30 firms and on self-reported data, which limits statistical generalizability and precludes causal inference. The cross-sectional design does not allow observation of how managerial configurations evolve over time or in response to changing uncertainty conditions. Common

method bias, inherent in single-respondent survey designs, cannot be ruled out. Additionally, while the sample was designed to target SMEs, it includes a small minority of organizations that approach or exceed standard institutional size thresholds. Future research should replicate these findings on samples with stricter size homogeneity to assess whether the configurational patterns observed hold consistently across different organizational scales.

Future research could extend these findings through larger probability samples that enable more robust statistical analysis, including structural equation modeling, cluster-based approaches, or fuzzy-set qualitative comparative analysis (fsQCA) to identify distinct managerial configurations empirically, the latter being particularly well suited to the configurational and package-based logic advanced in this study. Longitudinal designs would allow examination of how internal coherence develops and changes as firms grow or face new uncertainty conditions. Qualitative case studies could complement these findings by capturing the processes through which integrated managerial systems emerge and the role of managerial agency in shaping them. Finally, future research could examine how digital transformation and the adoption of data-driven management tools affect the internal coherence of managerial systems, particularly in SMEs where digitalization may simultaneously introduce new sources of uncertainty and expand the infrastructure available for coping with it.

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Appendix A

7-point Likert scale

Please answer the following statements with reference to the last 12 months. Indicate your level of agreement using the following 7-point Likert scale: 1 = Strongly disagree; 2 = Disagree; 3 = Slightly disagree; 4 = Neither agree nor disagree; 5 = Slightly agree; 6 = Agree; 7 = Strongly agree.

Market Uncertainty (adapted from Jaworski & Kohli, 1993)

MU1 - Customer preferences change increasingly frequently; it is difficult for us to understand the direction of change in terms of new expectations and needs.

MU2 - Changes in our competitive environment lead us to modify the revenue mix generated across the market segments/strategic areas in which we operate.

MU3 - Changes in our competitive environment lead us to explore or operate in new market segments.

MU4 - Demand volumes are difficult to predict, making it hard to prepare a reliable sales budget.

MU5 - Competitors' pricing strategies are difficult to counter, posing a potential threat to our profitability and market positioning.

Supply & Cost Uncertainty (adapted from Daft et al., 1988)

SCU1 - We experience increasing difficulties in consistently and reliably sourcing the raw materials required for our production processes.

SCU2 - The cost of raw materials has increased.

SCU3 - Energy costs have increased.

SCU4 - The cost of business-related services (e.g., maintenance, information systems, consulting, legal expenses) has increased.

SCU5 - The bargaining power of our suppliers has increased making it more difficult to obtain discounts or favorable payment terms.

Technological Uncertainty (adapted from Calantone et al., 2003)

TU1 - Technology in our industry is evolving increasingly rapidly.

TU2 - New technologies have emerged that require a radical rethinking of our organizational processes and products/services.

TU3 - We are implementing all necessary changes in our organizational structure, processes, and product/service systems required by current technological evolution.

TU4 - Technological evolution requires the development of new competencies.

TU5 - We possess competencies aligned with current technological evolution, or we can adapt without significant difficulty. [reverse coded]

Competitive / Product Dynamics (adapted from Calantone et al., 2003)

CPD1 - Competitors' innovations quickly render our products/services obsolete.

CPD2 - We need to shorten the life cycles of our products/services to remain competitive and better meet customer needs.

Financial Uncertainty (adapted from Cyert & March, 1963)

FU1 - The availability of credit/capital for our company is uncertain and variable.
FU2 - The cost of capital (interest rates/spreads) is difficult to predict.
FU3 - Banks' and investors' conditions change rapidly.
FU4 - We are able to obtain adequate financing when needed. [reverse coded]
FU5 - Financial market volatility significantly affects our plans.
FU6 - It is often difficult to promptly and effectively identify emerging internal financial needs.

Strategic Planning (adapted from Boyd & Reuning-Elliott, 1998)

SP1 - Strategic objectives with a time horizon are formalized and shared within the company (a written strategic plan exists).
SP2 - Before making major decisions, ad hoc analyses are conducted to assess industry opportunities and threats as well as the company's strengths and weaknesses.
SP3 - The strategic plan is regularly updated.
SP4 - Strategic planning guides the allocation of resources and investments.
SP5 - We believe that strategic planning helps mitigate the effects of uncertainty in our competitive environment.

Organizational Structure & Processes (adapted from Galbraith, 1973)

ORG1 - Roles, responsibilities, and decision-making autonomy are clearly defined and documented in a structured and regularly updated organizational chart.
ORG2 - The company's key processes are standardized and well understood by employees.
ORG3 - Different business areas collaborate consistently to achieve shared objectives.
ORG4 - Each business area is led by a responsible manager, and clear performance indicators (KPIs) are defined and shared for each manager.
ORG5 - We believe that an appropriate organizational structure helps mitigate the effects of uncertainty in our competitive environment.

Human Capital & Capabilities (adapted from Teece, 2007)

HC1 - We pay close attention to recruiting new employees aligned with our organizational needs.
HC2 - There is good alignment between employees' competencies and their roles within the company.
HC3 - For key roles, structured development and training paths are in place.
HC4 - Training in technological and digital topics is continuous.
HC5 - We believe that an adequate competency base helps mitigate the effects of uncertainty in our competitive environment.

Leadership, Interaction & Learning (adapted from Simons, 1995)

LEAD1 - There are regular and structured meetings across business areas that guide and support decision-making and corrective actions.
LEAD2 - Performance indicators (KPIs) have been defined to motivate employees within the organization.
LEAD3 - Managers use KPIs to promote learning and alignment among employees.
LEAD4 - Managers hold frequent meetings focused on performance indicators and corrective actions.
LEAD5 - We believe that leadership and teamwork mechanisms help mitigate the effects of uncertainty in our competitive environment.

Management Control Systems (adapted from Van der Stede, 2001)

MCS1 - A cost accounting system is in place and regularly used to provide reliable information on product/service profitability.
MCS2 - A budgeting system exists, including variance analysis by responsibility centers and cost factors.
MCS3 - Compliance with budget targets is binding.
MCS4 - Budget variances are analyzed to understand their causes and define corrective actions.
MCS5 - Rewards and evaluations significantly depend on budget achievement.
MCS6 - The budget is regularly revised (at least quarterly), and its accuracy is monitored.
MCS7 - Dashboards including financial and economic KPIs are updated and disseminated.
MCS8 - Dedicated management control software (e.g., business intelligence or executive information systems, excluding simple spreadsheets) is in use.
MCS9 - We believe that management control systems help mitigate the effects of uncertainty in our competitive environment.