UNIVERSIDAD COMPLUTENSE DE MADRID
FACULTAD DE CIENCIAS ECONOMICAS Y EMPRESARIALES

TESIS DOCTORAL

Strategic agility: What factors drive it in the services sector

Agilidad estratégica: ¿qué factores la impulsan en el sector servicios?

MEMORIA PARA OPTAR AL GRADO DE DOCTOR

PRESENTADA POR

Enrique de Diego Ruiz

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DOCTORANDO

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Dedicatoria

A Raquel, quien me ha regalado a mis tres joyas:
Santi, Marta y Mateo

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Acronyms

Acronym	Meaning
AVE	Average Variance Extracted
CB-SEM	Covariance based – Structural Equation Modelling
CSA	Country Specific Advantage
FSA	Firm-Specific Advantage
IS	Information Systems
IT	Information Technology
LOF	Liability of Foreignness
MNC/MNE	Multinational corporation / multinational enterprise
PLS-SEM	Partial Least Squares – Structural Equation Modelling
PRI	Proportional reduction in inconsistency
QCA (fsQCA)	Qualitative comparative analysis (fuzzy-set Qualitative comparative analysis)
R&D	Research & Development
SME	Small & Medium Enterprise
VIF	Variance Inflation Factors
WoS	Web of Science

Abstract

Strategic agility is a topic which has recently benefited from growing interest but is still also a fuzzy concept that remains ill defined, despite having being introduced around two decades ago (Weber and Tarba, 2014). While it is a crucial concept for coping with environmental uncertainty and instability, the topic has yet to reach maturity and in-depth studies are required (de Diego and Almodovar, 2021). This thesis aims to resolve three key issues around the topic:

a. Clarify the scope and concept of strategic agility, by showing gaps in the literature.
b. Review the facilitating factors of strategic agility
c. Provide a deeper understanding of the relationship between selected key factors and strategic agility.

a. Clarify the scope and concept of strategic agility, by showing gaps in the literature

The thesis starts by providing a bibliometric and content analysis to uncover the most impactful papers on strategic agility between 1996 and 2021. To that end, we collected data from Thomson Reuters' Web of Science (WoS) and Elsevier's Scopus, the standard databases that are used for bibliometric analyses (Rodriguez Ruiz et al., 2019). As we found more references in Scopus than in WoS, we selected the former for our analysis. This is consistent with the findings of other authors (Chadegani et al., 2013) and with the fact that almost all journals that are indexed in WoS are also covered by Scopus (Singh et al., 2021). We chose "Keywords" as the object of analysis, as it is one of the most commonly selected metrics to evaluate (Börner et al., 2003), and because they are conducive to analysis and the tracking of the evolution of the main topics in the literature.

We, then, conducted the analysis by using SciMAT software, which helps perform a dynamic view of the topic and allows for a discussion of the evolution of strategic agility over five periods (Cobo et al., 2012). Specifically, we used the equivalence index to normalize the co-occurrence of keywords (Callon et al., 1991), and the simple centers algorithm to cluster subgroups of keywords that are strongly linked to each other. This algorithm is straightforward and widely used in this type of analysis (Bailon-Moreno et al., 2006, Bailon-Moreno et al., 2005, Coulter et al., 1998, Courtial, 1990, Courtial and Michelet, 1994, He, 1999, Lopez-Herrera et al., 2010, Lopez-Herrera et al., 2009). Finally, we divided the study period (1996-2021) into five smaller consecutive periods of time The first one was set to cover a larger number of years as the research topic consolidates as a discipline (Cobo et al., 2011).

The study reveals that there is a recurring theme of the topic of strategic agility and IT (including cloud computing and Industry 4.0), and several other topics to which strategic agility is related. For example, we found studies about leadership (Doz and Brannen, 2012), knowledge management (Malhotra, 2005), and marketing (Johnston, 2009). The study also reveals that strategic agility has been assessed in different industries, such as telecommunications, tourism, automotive, or banking.

To sum up, the study reveals that strategic agility is a line of research that has still not reached maturity or produced a consensus, and that it is linked to several thematic areas.

b. Review the facilitating factors of strategic agility

Since strategic agility is a topic that has not reached maturity yet, there do not seem to be many studies that show how companies achieve it. Thus, the thesis continues by seeking to identify the factors that are related to the manner in which companies achieve strategic agility (focusing on companies in the services sector).

To that end, we carried out a case study of 40 Spanish companies in the services sector, and we used a quantitative comparative analysis (QCA), a methodology that has increasingly been employed by academics (Roig-Tierno et al., 2017), and is particularly relevant as it allows to find different, equivalent solutions. In particular, we use a fuzzy-set QCA (FsQCA) approach because it allows variables in the range between 0 and 1, rather than a crisp approach that only permits "0" or "1" values (Pappas and Woodside, 2021) and because it is a tool that has received increased positive attention recently (Fiss, 2011, Ordanini et al., 2014, Pappas et al., 2016, Woodside, 2014). FsQCA helps to identify the relationships between antecedents and an outcome of interest (Douglas et al., 2020), but the antecedents must be supported by extant theory or by plausible propositions (Greckhamer et al., 2018). Additionally, QCA analyses require data to be calibrated within the 0-1 range and researchers choose threshold data scores to limit what is "fully in", and "fully out" of each set, plus a point of maximum ambiguity (Greckhamer et al., 2018). We calibrated some factors as crisp and others as fuzzy. For fuzzy factors, we used the percentiles 1, 50, and 99 to determine full non-membership, the point of maximum ambiguity and full membership.

FsQCA computes three solutions (Pappas and Woodside, 2021), and we combined the parsimonious and the complex solutions to offer a more detailed view of the findings (Fiss, 2011). This study reveals that there is no necessary condition for reaching strategic agility and that companies may reach it in five different ways, depending on the diverse combinations between six factors: firm size, firm age, whether the firm is international, whether it competes in a turbulent environment, and whether the firm invests in i) capabilities and technologies, and ii) additional revenue models or cost-cutting mechanisms or not. Finally, we illustrated each of these five configurations with a real case study.

c. Provide a deeper understanding of the relationship between selected key factors and strategic agility

Finally, out of the six factors that we identify, three have received the most significant attention in books and journal editorials: turbulence, age, and internationalization. Thus, the thesis concludes with a thorough quantitative study that seeks to identify how each of the variables in the triad is related to the capabilities that comprise strategic agility: strategic sensitivity, leadership unity, and resource fluidity. We leveraged empirical data from 220 Spanish firms in the services sector. Again, we focused on a specific country and sector because doing so reduces potential biases from various industry-specific exogenous factors (Harrigan, 1983). We then used Structural Equation Modelling (SEM) as it has become a quasi-standard in management research (Hair et al., 2011). With this tool, we evaluated the relationship between age, turbulence, and internationalization with each of the capabilities that comprise strategic agility: strategic sensitivity, leadership unity, and resource fluidity (i.e., nine hypotheses).

The conclusion of the study is that internationalization positively affects strategic sensitivity, but has a negative effect on leadership unity, which suggests that international firms are generally more aware of changes in the environment but also find it more difficult to maintain alignment between leadership teams. The study also provides evidence that age is negatively linked to strategic agility and that turbulence is positively linked to strategic agility.

Resumen

AGILIDAD ESTRATÉGICA: ¿QUÉ FACTORES LA IMPULSAN EN EL SECTOR SERVICIOS?

Agilidad estratégica es un tema que ha despertado interés recientemente, pero que sigue siendo un concepto confuso que permanece mal definido, a pesar de que se introdujo hace unas dos décadas (Weber and Tarba, 2014). Si bien es un concepto crucial para hacer frente a la incertidumbre e inestabilidad del entorno competitivo, el tema aún no ha alcanzado la madurez y se requieren estudios en profundidad (de Diego and Almodovar, 2021). Esta tesis tiene como objetivo proporcionar respuestas a tres preguntas clave en torno al tema:

a. Aclarar el alcance y concepto de agilidad estratégica, mostrando lagunas en la literatura
b. Revisar cuáles son los factores facilitadores de la agilidad estratégica
c. Proporcionar una comprensión más profunda de cuál es la relación entre los factores clave seleccionados y la agilidad estratégica

a. Aclarar el alcance y concepto de agilidad estratégica, mostrando lagunas en la literatura

La tesis comienza proporcionando un análisis bibliométrico y de contenido para descubrir cuáles son los artículos con mayor impacto en agilidad estratégica entre 1996 y 2021. Para ello, recopilamos datos de Web of Science (WoS) de Thomson Reuters y Scopus de Elsevier, las bases de datos más comunes para realizar análisis bibliométricos (Rodriguez Ruiz et al., 2019). Como encontramos un mayor número de referencias en Scopus que en WoS, seleccionamos el primero para nuestro análisis. Esto es consistente con los hallazgos de otros autores (Chadegani et al., 2013) y con el hecho de que casi todas las revistas indexadas en WoS también están cubiertas por Scopus (Singh et al., 2021). Elegimos “Palabras clave” como

objeto de análisis, ya que es una de las métricas más comúnmente seleccionadas para evaluar (Börner et al., 2003) y ayuda a analizar y seguir la evolución de los temas principales en la literatura.

A continuación realizamos el análisis de los datos a través del software SciMAT, que ayuda a realizar una visión dinámica del tema de estudio y permite un análisis de la evolución del tema de la agilidad estratégica a lo largo de cinco periodos (Cobo et al., 2012). Específicamente, usamos el índice de equivalencia para normalizar la coocurrencia de palabras clave (Callon et al., 1991) y el algoritmo de centros simples para agrupar subgrupos de palabras clave que están fuertemente vinculadas entre sí. Este algoritmo es sencillo y ampliamente utilizado en este tipo de análisis (Bailon-Moreno et al., 2006, Bailon-Moreno et al., 2005, Coulter et al., 1998, Courtial, 1990, Courtial and Michelet, 1994, He, 1999, Lopez-Herrera et al., 2010, Lopez-Herrera et al., 2009). Finalmente, dividimos el periodo de estudio (1996-2021) en cinco periodos de tiempo consecutivos, donde fijamos el primero para abarcar un mayor número de años a medida que el tema se consolida como disciplina (Cobo et al., 2011).

El estudio revela que hay una recurrencia temática entre agilidad estratégica e IT (incluyendo la computación en la nube y la industria 4.0) y otros varios temas con los que se relaciona agilidad estratégica. Por ejemplo, encontramos estudios sobre liderazgo (Doz and Brannen, 2012), gestión del conocimiento (Malhotra, 2005), y marketing (Johnston, 2009). El estudio también revela que la agilidad estratégica se ha evaluado en diferentes industrias, como telecomunicaciones, turismo, automoción o banca.

En resumen, el estudio revela que la agilidad estratégica es todavía una línea de investigación que no ha alcanzado consenso ni madurez, y que está vinculada a varias áreas temáticas.

b. Revisar cuáles son los factores facilitadores de la agilidad estratégica

Si bien la agilidad estratégica es un tema que no ha alcanzado la madurez, no parece haber muchos estudios que realmente muestren cómo la logran las empresas. Así, la tesis continúa buscando identificar cuáles son los factores relacionados con cómo las empresas logran la agilidad estratégica (enfocándose en empresas del sector servicios).

Para ello, llevamos a cabo un estudio de casos de 40 empresas españolas del sector servicios, y utilizamos un análisis comparativo cualitativo (QCA), una metodología cada vez más utilizada por académicos (Roig-Tierno et al., 2017), y que es particularmente relevante ya que permite encontrar diferentes soluciones equivalentes. En concreto, utilizamos un enfoque QCA de conjuntos borrosos (FsQCA) porque permite variables en el rango [0-1] y no solo "0" o "1" en los *crisp* (Pappas and Woodside, 2021) y porque es una herramienta que ha recibido una mayor atención positiva recientemente (Fiss, 2011, Ordanini et al., 2014, Pappas et al., 2016, Woodside, 2014). FsQCA ayuda a identificar las relaciones entre los antecedentes y un resultado de interés (Douglas et al., 2020), pero los antecedentes deben estar respaldados por la teoría existente o por proposiciones plausibles (Greckhamer et al., 2018). Además los análisis de QCA requieren que se calibren los datos (es decir, dentro del rango [0-1]) y que los investigadores seleccionen valores para limitar que está "totalmente dentro" y "totalmente fuera" del conjunto, así como un punto de máxima ambigüedad (Greckhamer et al., 2018). Calibramos algunos factores como nítidos y otros como borrosos. Para los factores difusos, usamos los percentiles 1, 50 y 99 para determinar la no membresía del conjunto, el punto de máxima ambigüedad y la membresía total.

FsQCA calcula tres soluciones (Pappas and Woodside, 2021), y combinamos la parsimoniosa y la compleja para ofrecer una visión más detallada de los resultados (Fiss, 2011).

El estudio revela que no existe una condición necesaria para alcanzar la agilidad estratégica y que las empresas pueden alcanzarla de cinco maneras diferentes, dependiendo de

diversas combinaciones de seis factores: tamaño de la empresa, edad de la empresa, si la empresa es o no internacional, si compite en un entorno turbulento y si la empresa invierte en i) capacidades y tecnologías y ii) modelos de ingresos adicionales o mecanismos de reducción de costes o no. Finalmente ilustramos con un caso de estudio real cada una de estas configuraciones.

c. Proporcionar una comprensión más profunda de cuál es la relación entre los factores clave seleccionados y agilidad estratégica

Finalmente, de los seis factores identificados, hay tres que están captando la mayor atención de los libros y editoriales de revistas: turbulencia, edad e internacionalización. Así, la tesis concluye realizando un minucioso estudio cuantitativo que busca identificar cómo cada una de las variables de esta tríada se relacionan con las capacidades que componen la agilidad estratégica: sensibilidad estratégica, unidad de liderazgo y fluidez de recursos. Utilizamos datos empíricos de 220 empresas del sector servicios en España y nuevamente elegimos enfocarnos en un país y sector específico ya que reduce los sesgos potenciales de varios factores exógenos específicos de la industria (Harrigan, 1983). Luego utilizamos el Modelado de Ecuaciones Estructurales (SEM) ya que se ha convertido en un cuasi-estándar en la investigación de gestión (Hair et al., 2011). Con esta herramienta, evaluamos la relación entre edad, turbulencia e internacionalización con cada una de las capacidades que componen agilidad estratégica: sensibilidad estratégica, unidad de liderazgo y fluidez de recursos (es decir, nueve hipótesis). El estudio concluye que la internacionalización afecta positivamente a la sensibilidad estratégica, pero negativamente a la unidad de liderazgo, lo que sugiere que las empresas internacionales son generalmente más conscientes de los cambios en el entorno pero, al mismo tiempo tienen más dificultades para mantener alineados a los equipos de liderazgo. El estudio

también proporciona evidencia de que la edad está negativamente relacionada con la agilidad estratégica y que la turbulencia está positivamente relacionada con la agilidad estratégica.

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CHAPTER 1

1.1 Introduction

Strategic agility is a topic which has grown in interest in recent years. The world is navigating particularly turbulent times, with earth-shattering macroeconomic shocks in the early years of the 2020s. Most firms worldwide were badly hit by the global COVID-19 pandemic in 2020, then, the world suffered a severe supply chain crisis until the end of 2022. That year also saw a terrible geopolitical shock - Russia entered into a war with Ukraine, which has driven stagnation in the three largest economies (the United States, China, and the European Union). This has led to high (and sustained) inflation, tight financial conditions, and geopolitical fragmentation.

This context has sparked interest in adapting to (and even profiting from) turbulent times. Thus, strategic agility has attracted considerable interest in the last few years. However, the concept is definitely far from new. The first mention of strategic agility in the literature is from the late 1990s (Abshire, 1996), and was also confirmed by Weber and Tarba (2014) who also noticed that the topic was ill-defined. This is not surprising, given the difficulties that one encounters when reading about the topic in different journals or books, or when inquiring into different companies. While the topic is mentioned and executives usually appear to be interested in it, definitions vary widely across sources. One plausible explanation is that strategic agility lies at the intersection of multiple business concepts, such as operations, strategy, or human resources and particular executives are likely to lean towards particular areas of specialization.

The analysis of the academic literature revealed that some authors propose a definition, and that others use the term without providing a specific one. Moreover, strategic agility is often related with different topics (e.g., knowledge management, competitive advantage) and industries (e.g., telecommunications, tourism, automotive). Few studies indicate what companies should do to achieve strategic agility. Only a few factors, such as age or turbulence

were studied at the outset (Reed, 2020); there were few studies on strategic agility and internationalization. Internationalization seems a particularly interesting area of study as several studies explain how firms that are exposed to international markets experience increases in production and/or innovation (Almodóvar et al., 2021, Almodóvar et al., 2014, Salomon and Jin, 2010, Salomon and Shaver, 2005). Thus, the study is intended to shed some light on whether the international dimension of firms could be associated with an additional capability, such as strategic agility, that can help companies to compete in dynamic, and turbulent environments.

1.2 Importance of strategic agility and research gap

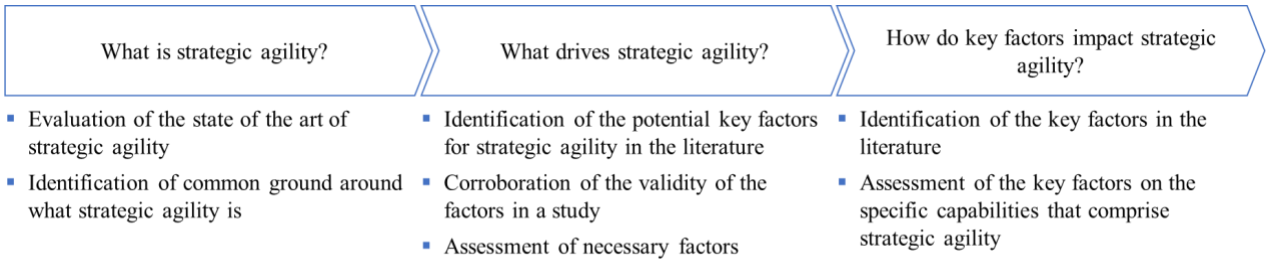
Strategic agility has been called the most demanding item on the leadership agenda for CEOs (Doz and Kosonen, 2008). If one examines this point in the light of the unclear definition of the topic and the vague identification of the drivers of strategic agility at organizations, it becomes clear that further research is required.

This thesis has the following three objectives:

a. Identify the state of the art on the topic of strategic agility and find common ground
b. Evaluate the key drivers of strategic agility for companies
c. Identify the relationship between key factors (such as internationalization) and strategic agility

Figure 1.1 displays the domain under study and the questions that the thesis answers. It should be noted that this thesis focuses specifically on strategic agility rather than on agile methodologies. Agile methodologies are likely to be related to achieving and/or implementing strategic agility in some sectors or contexts and could be an interesting avenue for future research.

FIGURE 1.1 Conceptualization of the thesis



1.3 Structure of the thesis

The thesis is structured into five chapters:

- Chapter 1 presents an introduction to the topic and the rationale for studying it
- Chapter 2 develops a bibliometric approach to the topic of strategic agility, showing the point at which it emerged from the literature and its evolution over time. It also shows the key topics to which strategic agility is linked, providing the state of the art. The conclusion of the chapter is that the topic is not yet mature and that the common ground is that strategic agility is a meta-capability that helps organizations to anticipate and/or react to changes in the environment
- Chapter 3 reviews the literature on the factors of strategic agility and presents a study on companies in the services sector in Spain in order to determine what firms require. The study focuses on a specific sector in order to reduce potential biases from exogenous factors (Harrigan, 1983), and the services sector was chosen as because it accounts for more than two thirds of Spanish GDP. This study leverages Qualitative Comparative Analysis (QCA), a tool that allows for multiple paths to lead to an outcome, and it provides insights on the six factors that firms use to obtain strategic agility, none of which are necessary. Companies use five different combinations of these factors to achieve strategic agility. The chapter ends with real

case studies from firms that have pursued each of the five combinations to achieve strategic agility

- Chapter 4 delves into some of the factors of strategic agility by presenting an in-depth quantitative study of firms from the services sector in Spain. In particular, it assesses the effects of a firm' internationalization, age, and turbulence in each of the capabilities that comprise strategic agility. These include some of the factors that are assessed in Chapter 3 and the triad of variables that are currently attracting attention in books and journal editorials because they are considered fundamental. The study shows that age is negatively related to strategic agility (i.e., the older the firm, the less agile it is likely to be) while the relationship between turbulence and strategic agility is positive (i.e., competing in a turbulent environment fosters all strategic agility capabilities). Finally, the study shows that internationalization affects strategic agility in two contrasting ways. On the one hand, it drives strategic sensitivity. On the other hand, leadership unity becomes more difficult to achieve
- Chapter 5 contains the overall conclusions of the study and identifies additional avenues for research that can be undertaken in the future

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CHAPTER 2

MAPPING RESEARCH TRENDS ON STRATEGIC AGILITY OVER THE PAST 25 YEARS: INSIGHTS FROM A BIBLIOMETRIC APPROACH

2.1 Introduction

Strategic agility has grown as a topic of interest in recent years, with many authors investigating the subject; in particular, strategic agility has gained considerable attention in the current turbulent period caused by the global COVID-19 pandemic (Al-Omoush et al., 2020, Hartwell and Devinney, 2021, Shaikh, 2021, Zahra, 2021) which has accelerated changes already underway in consumer behaviour, and in new communication platforms (Hsu and Tang, 2020).

According to (Weber and Tarba, 2014), the concept of strategic agility was introduced about two decades ago, but it remains ill-defined. Since the work of Abshire (1996), the concept of strategic agility has been used across a series of industries, and authors have related this research line with several topics and organisational areas. Furthermore, authors both use the concept with and without proposing a definition.

Starting with agility as a wider topic, consensus on it seems to exist, that is, agility entails rapid responses to changes in the market. For example, Weill et al. (2002, p. 64) define agility as *"the set of business initiatives an enterprise can readily implement"*; Sambamurthy et al. (2003, p. 238) describe agility as *"the ability to detect and seize market opportunities with speed and surprise"*; Cohen et al. (2004) argue that being agile means delivering quickly and changing quickly and often; Da Silva et al. (2011) mention that agile methods help deal

with growing complexity while reducing time to market; and Aronsson et al. (2011) assert that the focus of agility is being able to compete in a state of constant change and that agile organizations are those that swiftly respond to changes in demand.

The first mention of strategic agility appeared in the late 1990s, when Abshire discussed *"a strategy of agility"* around the U.S. policy and how to maintain the country's leadership in the world. This author explained that the strategic landscape after the Cold War was characterized by an information age that was unpredictable and unstable. Thus, the US needed to use a strategy that was agile enough to seize opportunities and protect against threats (Abshire, 1996). Several authors have since continued contributing to the interrelationship of both terms.

We find authors who use the terminology "business agility" in relation to strategy and the competitive advantage of a firm. For example, Mathiassen and Pries-Heje (2006) assert that agility is fundamental when planning business strategy and, to be properly implemented, agility must be aligned with the IT strategy. These authors highlight the idea that the main path to maintain the competitive strategy is designing an agile business. In this line, van Oosterhout et al. (2006) focus their research on explaining how the business environment is highly dynamic and that businesses need to be not only flexible but also agile. Thus, business agility is defined as the capability of a firm to rapidly transform business models and processes beyond regular "flexibility" to respond to unpredictable external threats with successful internal changes. More recently, Hendriyani and Raharja (2019) even use the expression "business agility strategy" to define the capacity of a Fintech start-up to detect opportunities and threats and develop an appropriate response.

When explicitly discussing strategic agility, some authors use the term without providing a specific definition. For example, Weill et al. (2002) discuss how the IT infrastructure should be responsive to the demands of enterprise-wide and business unit

strategies to ensure strategic agility. Doz and Kosonen (2010) similarly relate strategic agility to the ability to transform and renew business models.

On the contrary, some scholars have clearly defined the topic. For instance, Ekman and Angwin (2007, p.361) refer to strategic agility as an acknowledgement of *"the ever-increasing complexity and turbulence of their environments by developing requisite capabilities of flexibility and responsiveness"*; Lewis et al. (2014, p.58) describe it as *"flexible, mindful responses to constantly changing environments"*; Weber and Tarba (2014, p.5) pertain to strategic agility as the *"ability to remain flexible in facing new developments, to continuously adjust the company's strategic direction, and to develop innovative ways to create value"*; Denning (2018, p.119) argues that *"strategic agility is generating innovations that create entirely new markets by turning non-customers into customers"*; and Clauss et al. (2021b, p.3) refer to strategic agility as *"a firm's ability to renew itself continuously and to maintain flexibility without compromising efficiency"*.

In addition to having several definitions, the concept of strategic agility is often related with other topics. In this sense, Sambamurthy et al. (2003) relate agility with ambidexterity, and Ananthram and Nankervis (2013) argue that strategic agility is synonymous with other topics such as dynamic capabilities. Ambidexterity pertains to the organization's ability to exploit its current capabilities while simultaneously exploring new competencies (O'Reilly III and Tushman, 2013, Pasamar et al., 2019, Raisch et al., 2009, Vargas et al., 2021). Although we can perceive a connection between strategic agility and ambidexterity, they are separate concepts (Clauss et al., 2021b) that are intertwined at different levels of analysis. Regarding dynamic capabilities, they are defined as the firm's ability to integrate, build and reconfigure internal competencies to address changes in the business environment (Schilke, 2018, Teece, 2017). Accordingly, strategic agility is considered a meta-capability that combines several dynamic capabilities (Ahammad et al., 2020, Nyamrunda and Freeman, 2021, Shams et al.,

2021). In this sense, Doz and Kosonen (2010) and Clauss et al. (2021a) propose that strategic agility is formed as a combination of strategic sensitivity, leadership unity and resource fluidity; and very closely related Hock et al. (2016) and Ivory and Brooks (2018) also include strategic sensitivity, resource fluidity, but considers collective commitment as the third dynamic capability that forms part of strategic agility.

A common pattern seems to emerge, which is related to how organizations can adjust their direction and confront environmental changes. However, a common definition for this concept is lacking, even though it is simultaneously the most demanding item on the leadership agenda for CEOs (Doz and Kosonen, 2008), which makes a compelling case to enhance the understanding of what strategic agility implies both for academics and for practitioners. To do so, we first use citation analysis to show that the topic of strategic agility has still not reached the stage of maturity. We subsequently use science mapping analysis to study how the topic has evolved over time and uncover that, while it has attracted significant attention across different sectors, it has still not been fully clarified. Science mapping analysis is a powerful technique that has been previously used (Garcia Buendia et al., 2020, Kamdem et al., 2019), and this method has several advantages over other literature review tools. It allows for handling hundreds of papers to analyze the relationships among elements of the papers (e.g., citations, keywords) and provides comprehensive information about the research area. Finally, we examine all the selected papers to enrich the bibliometric results through the content analysis method that deepens the discussion with the contributions obtained by the academia thus far.

Therefore, the purpose of this study is to analyze the evolution of strategic agility over the 1996-2021 period, attempting to identify a comprehensive definition and the key themes in this field, which have drawn attention of the research community, and the gaps in the literature. The objective of our paper is threefold. First, we aim to understand the level of maturity of the topic of study. In other words, we intend to ascertain whether this topic is a growing one in the

literature or whether it has started to plateau. We also seek to verify the degree of homogeneity of the distributions of authors and journals to explore for other authors the feasibility of publishing on this topic.

Second, we aim to confirm the presence of any key theme to which strategic agility is specifically related and to identify the main gaps in the literature.

Third, we intend to determine the definition that could summarize the meaning of strategic agility.

These three objectives are expected to clarify the topic of study and help in advancing other studies that require a more solid definition on the topic under investigation and its relationship with other subjects.

This paper is organized into several sections. Section 2 introduces the methodology. Section 3 describes the results of the science mapping analysis. Finally, Section 4 presents the conclusions, limitations and potential areas for further research.

2.2 Methodology

Systematic review papers come in several forms such as structured reviews, bibliometric reviews and hybrid-narratives (Dabic et al., 2020). We use a hybrid-narrative approach through which we examine the conceptual structure and set an agenda for future research.

Specifically, we use (a) citation analysis to study the maturity of the topic of strategic agility through time and identify the top journals and the most productive authors in this field, and (b) science mapping to assess the conceptual structure of the topic of strategic agility over time. Science mapping is a powerful technique that makes a spatial representation of how different fields or specialties are related to each other (Cobo et al., 2011b, Morris and Van der Veer Martens, 2008). We also conduct (c) content analysis, a qualitative method that

complements bibliometric techniques by interpreting and discussing the contribution of papers (Furrer et al., 2008, Rodriguez Ruiz et al., 2019).

Five steps comprise the methodology (Cobo et al., 2011a), namely (1) collection of raw data, (2) selection of the type of item to analyze, (3) extraction of relevant information from the raw data, (4) calculation of similarities among items, and (5) use of a clustering algorithm.

(1) Collection of raw data

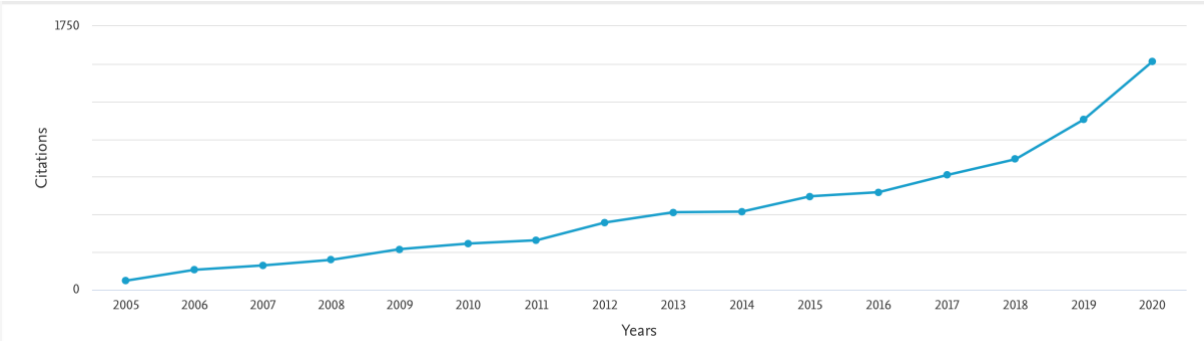
This phase is homogeneous for both the citation and science mapping analyses. Bibliometric analyses typically use Thomson Reuters' Web of Science (WoS) and Elsevier's Scopus (Rodriguez Ruiz et al., 2019). To select the most suitable database for our research, we replicated this first phase in both. To download data from WoS and Scopus, we build a query, including descriptive keywords in the topic to collect the relevant documents from the research field (Cobo et al., 2011a). We search for relevant words (e.g., strategic agility, agile strategies, strategic business agility) in the title, abstract or keywords, limiting the type of document to only the ones that are classified as an "article" or a "review". This step ensures that we only consider those publications that have undergone a peer review analysis, guaranteeing a high level of quality of the publications selected (Fernandez Alles and Ramos Rodriguez, 2009, Ramos Rodriguez and Ruiz Navarro, 2004).

On November 19, 2020, the query is run, retrieving 181 results in WoS *versus* 307 results in Scopus (dated from 1996 to 2021). This result is consistent with the finding of other authors where WoS is less comprehensive than Scopus (Chadegani et al., 2013) and that almost all journals indexed in WoS are also covered by Scopus (Singh et al., 2021). Therefore, after analyzing the characteristics of each source and the results provided, we selected Scopus as our dataset because of its broader coverage of journals and citations (Chadegani et al., 2013, Harzing and Alakangas, 2016, Mongeon and Paul-Hus, 2016, Zhu and Liu, 2020). Therefore,

we choose to work with the dataset of 307 articles provided by Scopus, in place of the 181 provided by WoS. Notably, even when we could manually identify the few papers from WoS that are not included in Scopus with the intention of integrating the results from both article sources, we do not merge the results from Scopus and WoS because the criterion we use to evaluate documents is the number of citations, and this criterion is not homogeneous among sources. WoS and Scopus codify "citations" following different approaches (Martin-Martin et al., 2018); hence, we only use the results from Scopus to obtain unbiased results.

By running the query in Scopus, we also perform a citation analysis, as the Elsevier's website provides a 15-year evolution of the citations in the selected documents. As Figure 2.1 shows, a growing trend in the topic is apparent, and authors link an increase of citations to the evolution of an emerging phase to a mature one (Rodriguez Ruiz et al., 2019, Terjesen et al., 2016). Strategic agility has not yet reached a maturity level.

FIGURE 2.1. Evolution of the citations per year



We use SciMAT to perform our bibliometric analyses because it has a wider range of features than other software tools (e.g., BibExcel), and it enables a longitudinal framework across different time periods (Cobo et al., 2012). Moreover, the tool enriches the results by using impact measures (e.g., h-index, sum of citations) that help improve the interpretation of the results. It also presents key features unseen in other mapping tools, such as a pre-processing

module, the use of bibliometric measures, and a wizard to configure the analysis (Cobo et al., 2012).

After reviewing the 307 documents downloaded from Scopus, we eliminate the ones that are far from the concept of study, eventually obtaining a final dataset of 293 documents (Rodriguez Ruiz et al., 2019, Xue et al., 2020).

The most productive journals and authors in the dataset are outlined in Table 2.1. We observe that the distribution in the journals and authors is quite homogeneous, suggesting that it is a concept covered by several disciplines and that new authors might find that publishing on this research line could be a feasible option.

TABLE 2.1. Journals and authors with the most publications

Journal	**Documents**
California Management Review	8
Strategic Direction	6
Cutter IT Journal	6
European Journal of Information Systems	5
MIS Quarterly Executive	5
Human Resource Management Review	5
International Journal of Supply Chain Management	5
International Journal of Production Economics	4
Journal of Information Technology	4
Management Decision	4
IEEE Software	4
Global Journal of Flexible Systems Management	4
Journal of International Management	4
International Marketing Review	4

Author	**Documents**
Luftman, J.	7
Ambler, S.W.	7
Liu, Y.	5
Zadeh, H.S.	4
Gomes, E.	4
Muthuveloo, R.	4
Doz, Y.L.	4
Kosonen, M.	3
Ben-Zvi, T.	3
Tarba, S.Y.	3
Derksen, B.	3
Santana, M.	3
Vrontis, D.	3
Denning, S.	3

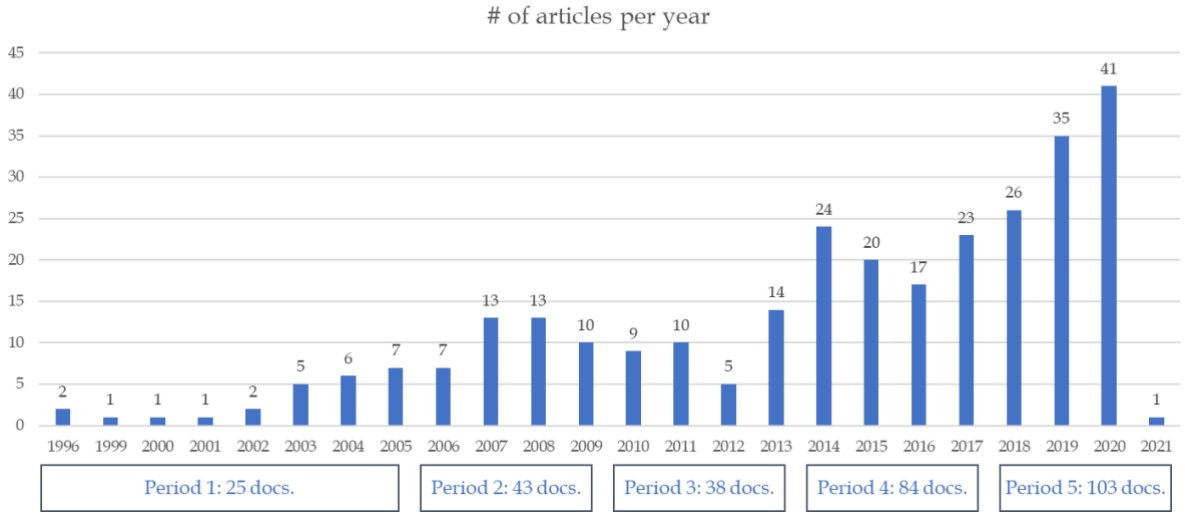
(2) Selection of the type of item to analyze

We continue the science mapping analysis and choose "keywords" as our object of analysis. "Keywords" is one of the most commonly selected metrics to evaluate (Börner et al., 2003), and we use keywords to analyze and track the evolution of the main topics in the literature.

(3) Extraction of relevant information from the raw data

As we download and import the data into SciMAT, we run a deduplicating process over the keywords to group those terms with the same concept (i.e., grouping plural and singular words, integrating acronyms with the respective keywords, adding together different spellings of the same words). Finally, some keywords with a very broad and general meaning, such as "agility", are removed (Cobo et al., 2014).

FIGURE 2.2. Number of publications per year of papers focused on "strategic agility"



To develop the study, the entire time period (1996–2021) is divided into five consecutive periods of time (see Figure 2.2), namely 1995–2005 with 25 documents, 2006–

2009 with 43, 2010–2013 with 38, 2014–2017 with 84, and 2018–2021 with 103 documents. Providing periods of the same length is a common practice, while fixing the first period to cover a larger number of years as the study field begins to consolidate as a discipline (Cobo et al., 2011a).

(4) Calculation of similarities among items

To normalize the co-occurrence of keywords, we use the equivalence index, which is regarded as the most appropriate measure for normalizing co-occurrence frequencies (Callon et al., 1991). This index ranges from 0 to 1, where 1 means that the keywords always appear together and 0 denotes that the keywords are never associated (Cobo et al., 2011a).

(5) Use of a clustering algorithm

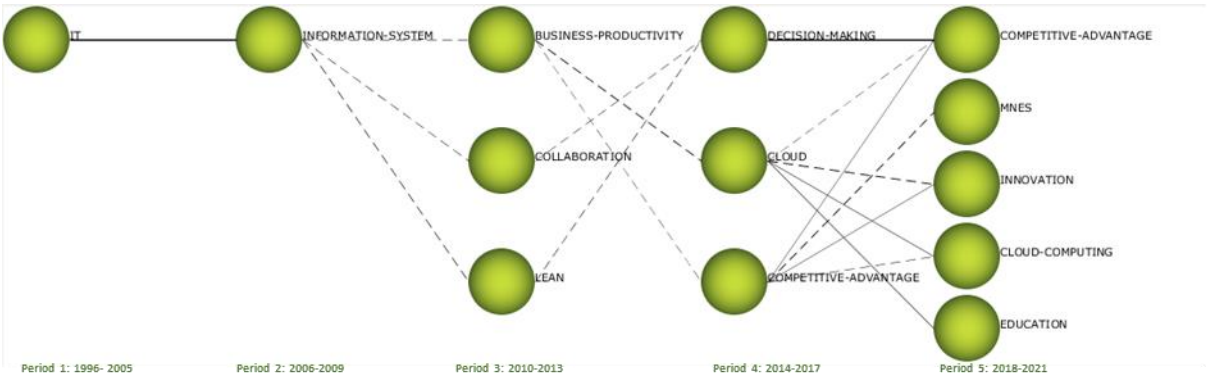
Clustering is the process of identifying those subgroups of keywords that are strongly linked with each other. Clustering has different types, including spectral clustering and modularity maximization (Chen et al., 2010, Chen and Redner, 2010), but we use the simple centers algorithm because it is straightforward and extensively used in the context of co-word analysis (Bailon-Moreno et al., 2006, Bailon-Moreno et al., 2005, Coulter et al., 1998, Courtial, 1990, Courtial and Michelet, 1994, He, 1999, Lopez-Herrera et al., 2010, Lopez-Herrera et al., 2009).

2.3 Science mapping analysis of the topic of strategic agility

2.3.1 Results and discussion

After running the analysis with SciMAT following the approach described above, we obtain two different viewpoints (longitudinal and period views). In the longitudinal representation (see Figure 2.3), we observe a thematic evolution of the research field across the five periods.

FIGURE 2.3. Longitudinal view of the topic across the five study periods



We observe that for the first two periods (1996–2005 and 2006–2009), the academia was focused on discussing strategic agility in relation to two main (and related) topics: “information technology” (IT) and “information systems”. However, from 2010 onwards, various research topics began to emerge, with the most recent years (2018–2021) seeing the greatest proliferation of research topics.

Regarding the period representation, we complement the previous longitudinal approach with a strategic diagram that presents a two-by-two matrix. This figure represents on its abscissa axis the centrality (that measures the degree of interaction of a network with other networks) and on its ordinate axis the density (measures the internal strength of the network)

(Callon et al., 1991, Cobo et al., 2011a, b, 2012). Therefore, the strategic diagram comprises four quadrants illustrating four types of topics according to the quadrant in which they are positioned (Cahlik, 2000, Callon et al., 1991, Coulter et al., 1998, Courtial and Michelet, 1994, He, 1999). The (a) topics in the upper right are the ones known as "motor" themes, being externally related to concepts applicable to other themes that are conceptually closely related; (b) topics in the upper left are isolated themes that are only of marginal importance for the field; (c) topics in the bottom right are important themes for a research field but not developed; and (d) topics in the bottom left are emerging or declining themes.

SciMAT incorporates features that allow for conducting a performance analysis, such as the number of citations or h-index (Cobo et al., 2012). It facilitates the identification of the degree of importance of each theme according to the selected metric. In this case, strategic diagrams show themes in different sizes according to their h-index (i.e., the larger the size of the bubble, the higher is the h-index).

FIGURE 2.4. Strategic diagrams for each study period

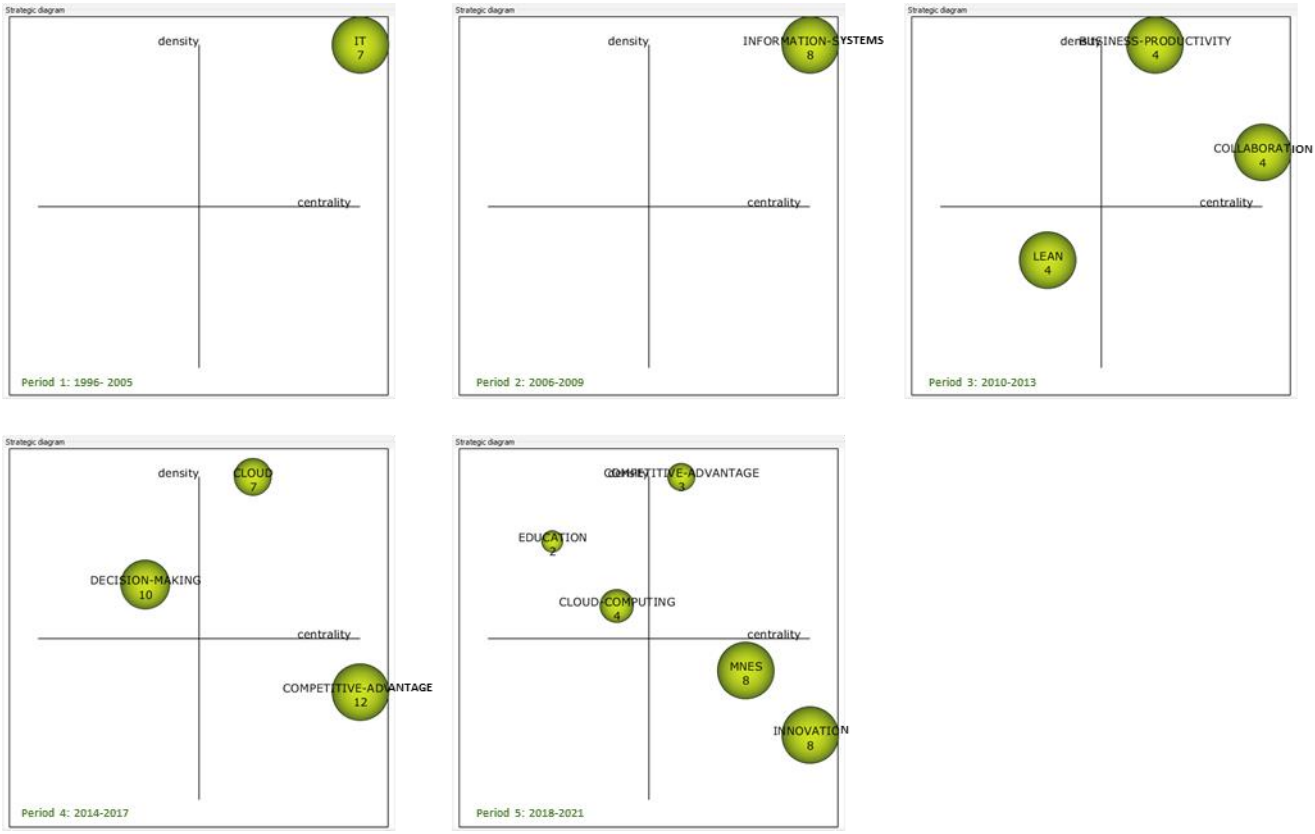


Figure 2.4 depicts the results of the analysis and shows that in the study of strategic agility, “information technology” and “information systems” are key topics during the periods 1996–2005 and 2006–2009, respectively. Although these topics are sometimes used interchangeably (Checkland, 1997), they are not the same. According to Lee (1997) and Onn and Sorooshian (2013), “information technology” is a narrower topic, which refers to the technologies and infrastructures used for processing, storing and transmitting information. By contrast, “information system” is a broader topic that pertains to the management of information, and it includes computer-based and non-technological systems. However, we acknowledge that both topics are referred to in a similar manner with respect to strategic agility because information systems can hardly be properly developed without considering information technology (Zhu, 2009).

From 1996 to 2005, most authors focus their research on discussing how different aspects of "information technology" (IT) are fundamental to the achievement of a more agile strategy (Worthington, 2004). For example, Weill et al. (2002) state that developing an IT infrastructure is a core requirement for attaining strategic agility. In this sense, these authors unpack the elements needed to develop a robust IT infrastructure (i.e., channel management, security and risk management, communication, data management, application infrastructure, facilities management, IT management, IT architectures and standards, IT education, and IT research and development). Sambamurthy et al. (2003) explain that IT includes elements such as data warehousing, web services, and customer relationship or supply chain management technologies; they also propose that investing in IT enhances the strategic agility of a firm, and this undertaking has a positive impact on its financial performance. Ross and Westerman (2004) go one step further by suggesting that outsourcing IT will facilitate strategic agility because accessing specialized IT services when needed enables firms to reduce costs and to fully exploit environmental opportunities.

From 2006 to 2009, the main focus shifted towards the broader concept of "information systems", although references to IT are not abandoned. For example, Fink and Neumann (2007) posit that "information technology" reinforces strategic agility only when "information systems" implement agile procedures. Meanwhile, Ekman and Angwin (2007) jointly study "information systems" and "information technology" and how they are the antecedents of strategic agility in the sense of leveraging resources, mastering change, enriching customers and cooperating to compete.

In the third period, covering 2010–2013, different topics start to emerge, and we observe how "business productivity" and "collaboration" position as the motor themes. In this sense, Kristianto et al. (2010) support that agile strategic inventory allocation reduces the inventory level and increases production output and variety. Bottani (2010) examines the

profiles of agile companies, collaboration being one the metrics, or the one from Aronsson et al. (2011) who study the relevance of combining lean and agile process strategies to develop the supply chain in the health care sector. "Lean" is therefore an emerging theme in this period, and it is jointly analyzed with strategic agility as a response to dynamic and non-stop changes that maintain the competitiveness of firms. Thus, some authors use the term *leagility* as the combination of "lean" and "agility" (Aronsson et al., 2011, Vinodh and Aravindraj, 2013) because agility is a determining factor for a correct supply chain strategy (Fernando and Wulansari, 2020), and supply chain strategies are critical for the competitiveness of firms (de Jesus Marques and Guerra, 2019). Nonetheless, agility is different from leanness. As previously mentioned, agility refers to a rapid response to and the exploitation of profitable opportunities in the dynamic environment; on the contrary, leanness is mainly focused on reducing the number of suppliers, creating beneficial supplier collaborations, identifying the best just-in-time principles, fostering productivity and reducing time (Aronsson et al., 2011, Naim and Gosling, 2011, Naylor et al., 1999). Thus, lean production implies moving away from vertical integration and relying on cooperation (Badillo et al., 2017).

In the fourth study period of 2014–2017, we observe how the topic of "information technologies" is once again present in the analyzed articles; however, during this period, the particular focus is on the "cloud". "Cloud" is the motor theme, with several articles tackling the relationship of the cloud and the achievement of agility. Wang and He (2014) explain how the "cloud" (referring to IT concepts such as SaaS, PaaS and IaaS) is one of the major "information technologies" for achieving strategic agility, and these authors support their proposal in the context of Taiwan. "Competitive advantage" appears as an important topic that is yet to be fully developed, emerging in only a limited number of studies. For example, Kappelman et al. (2014) underscore that cloud computing is one of the largest and most important IT investments undertaken by organizations, and that the "cloud" is used for

reinforcing the "competitive advantage" of a firm and developing strategic agility. Finally, "decision making" appears as a topic of marginal importance. In this vein, Lewis et al. (2014) indicate that leadership is a fundamental attribute of handling tensions in situations in which managers apply a decision-making process characterized by a strategic agility approach. Haider and Mariotti (2016) investigate the managers' process of "decision making" in which strategic agility is considered an essential managerial competency that enables firms to constantly adapt and remain competitive.

In the fifth and final period covering 2018–2021, "competitive advantage" matures to become the motor theme. Nejatian et al. (2019) define strategic agility as a meta-capability comprising three dynamic capabilities, namely strategic sensitivity, leadership unity/collective commitment and resource fluidity (previously identified by Doz and Kosonen (2010) and Doz and Kosonen (2008)), and this meta-capability is crucial to achieving "competitive advantage". Similarly, with a sample of 150 German mid-sized firms, Clauss et al. (2021b) analyze the relationship between ambidexterity (exploitation and exploration approaches) and strategic agility with "competitive advantage". They explain that ambidexterity is intended to neither enhance the "competitive advantage" of firms nor gain superior benefits, so they obtain a negative effect. However, the interaction between strategic agility and the firm's exploitation positively affects the "competitive advantage" of firms, as these firms report more innovations and higher financial returns.

In the lower right quadrant of this last period, we find "MNEs" and "innovation" as themes of relevant importance, which have yet to be fully developed, and only a small number of articles tackle these topics. Regarding "MNEs", Luo et al. (2020) find evidence about the role of strategic agility, foreign subsidiary autonomy and global integration capability in Chinese "MNEs" in the sense of potential boosters of the geographic dispersion on productivity. With regard to "innovation", Kohtamäki et al. (2020) define three practices and

nine micro practices to shape what they consider strategic agility in "innovation". They propose that following these practices, firms will obtain positive profits from entrepreneurial orientation and absorptive capacity. Furthermore, considerable attention is paid to business model "innovation" and the lean and agile principles that must be adopted to foster its accomplishment. Ghezzi and Cavallo (2020) conclude that a lean start-up approach facilitates business model "innovation" (within the perspective of strategic agility) in digital environments.

Finally, "education" and "cloud computing" materialize as isolated themes. Although some articles are still related to cloud computing, they seem to be less predominant than in other periods. On the contrary, the topic of "education" makes its appearance, with authors studying agile strategies for teams in online higher education (Noguera et al., 2018). As a summary, we observe a high number of very different topics related to the research line of strategic agility.

As a complementary analysis, SciMAT plots cluster networks for each theme. We found results similar to the previous ones.[1]

2.3.2 Holistic considerations about the science mapping results

IT as a recurring theme

Overall, we note a recurring theme of the topic of strategic agility and IT. This observation is consistent with the fact that the first mentions of strategic agility occur with IT-related topics (Sambamurthy et al., 2003, Weill et al., 2002). IT remains a concept of study across the five periods, in which it is treated as a more generic topic in the first years, and it specializes towards cloud-related topics in the later years. In the first period (1996–2005), Weill

[1] Figures for cluster networks and comments are available upon request.

et al. (2002) posit that strategic agility requires investing in IT infrastructure; Sambamurthy et al. (2003) argue that IT and IT capabilities enable firms to develop agility; and Ross and Westerman (2004) link strategic agility with utility computing (which in turn they define as a collection of technologies and business practices that enables computing to be delivered seamlessly and reliably across multiple computers).

The second period (2006–2009) includes further studies on the effect of IT capabilities on strategic agility, such as Fink and Neumann (2007) who argue that infrastructure capabilities and strategic agility are directly correlated, and Ekman and Angwin (2007, p.361) who examine the issue of whether information services/IT *"is not only part of the industry-level problem of ever-increasing complexity and turbulence, but also is a part of an organizational-level solution as an enabler of strategic agility"*.

The third period (2010–2013) continues to be characterized by studies relating to strategic agility and IT, such as Mavengere (2013) who asserts that several IT services are required to promote such strategic agility. The other studies that emerge link strategic agility with IT and organization, such as Bottani (2010) who indicates that two attributes (employees' role and competency and technology) are the most relevant in agile companies, and Ananthram and Nankervis (2013) who investigate the links between human resource management (HRM) and strategic agility. In this third period, some articles start exploring the relationships with the cloud (e.g., Luftman et al. (2013), Nguyen et al. (2012)).

In the fourth period (2014–2017), additional studies on strategic agility and IT arise, particularly focusing on the cloud and other additional topics. These topics include (1) small and medium-sized enterprises, where Wang and He (2014) examine the strategies of small cloud service providers in Taiwan as they are associated with firm agility; (2) institutions, where Turner (2014) argues that the cloud has transformed the way that organizations consume IT services as they promise greater agility; and (3) leadership, where Lewis et al. (2014)

conclude that leadership is central to managing the tensions of strategic agility and illustrate their point with several examples, one of which (IBM) is in the IT consulting sector.

Finally, in the fifth period (2018–2021), IT remains a concept of study, but it is decoupled in two areas. First, the authors write about strategic agility and IT in relation to competitive advantages, such as Suradi et al. (2020) who study the mediating effect of strategic agility in supply chain activities and firm performance, and Hamsal et al. (2020) who examine the impact of IT and supply chain management on competitive advantage in the Indonesian retail industry. Second, the authors in the fifth period write about how cloud computing plays a particular role in Industry 4.0, such as Sharma and Sehrawat (2020) who explore cloud computing adoption in the manufacturing sector in India and reveal that this sector is in the transformation phase of Industry 4.0.

All together, we observe that information technologies are fundamental to the development of responsive strategies (Kazakov et al., 2020). Hence, they constitute a key element in the implementation of strategic agility.

Interrelationship of strategic agility with other topics

In addition to the recurring theme of IT across the five periods (including cloud in the later ones), we observe other topics to which strategy agility is related.

Mentions of leadership and organization are made, where Lewis et al. (2014, p.58) argue that *"Leadership is central to managing tensions of strategic agility"* and explain that *"Leadership entails the ability to identify and leverage opportunities and threats, and to exploit internal and external competencies"*. Furthermore, Doz and Brannen (2012) investigate the importance of language in the organization and conclude that language conditions the strategic agility of organizations.

Mentions of manufacturing and supply chain are similarly made, such as Vazquez-Bustelo et al. (2007) who study the main manufacturing strategies and policies of industrial companies in Spain and suggest that firms must adopt agility enablers or practices during turbulent conditions, Qi et al. (2009) who explain how different researchers have extended the idea of agility to supply chains, and Gligor et al. (2015) who conduct an investigation that establishes a positive relationship between an improved ability to meet customer requirements and an increase of supply chain agility in an organization. Other authors discuss the topic of strategic agility intertwined with knowledge management, including Malhotra (2005) who highlights the critical importance of integrating knowledge management with business processes to achieve strategic agility; or marketing, where Johnston (2009) extends the marketing myopia concept to promote strategic agility.

Strategic agility across industries

The academia has evaluated strategic agility across different industries. These industries include (i) telecommunications, where Doz and Kosonen (2008) analyze Nokia's evolution over 20 years and propose a framework for enabling organizations to maintain and regain strategic agility as they mature; (ii) tourism, where Buhalis and O'Connor (2005) argue that agile strategies are required to enhance the innovation and competitiveness of tourism organizations; (iii) automotive, where Elmoselhy (2013) explores how agile strategies could be implemented in the automotive sector, simultaneously with lean ones; (iv) oil and gas, where Shuen et al. (2014) use the dynamic capabilities framework for enhancing the strategic agility of high-tech firms operating in high-velocity markets such as the upstream oil and gas sector; (v) electronics, where (Clauss et al., 2021a) study German firms in the electronics industry and conclude that strategic agility is positively related to business model innovation; (vi) fashion, where Cerruti et al. (2016) examine agile supply partnerships in Italian fashion companies and

empirically evaluate the supply characteristics required to foster an agile strategy; (vii) banking, where (Ezcan et al., 2020) analyze large construction organizations in Turkey to highlight that IT needs to be adopted/diffused to support agility; and (viii) education, where Noguera et al. (2018) review how agile strategies are useful for team regulation and project management.

Comprehensive definition and scope of strategic agility

After reviewing the 293 papers, we define strategic agility as a meta-capability that enables organizations to anticipate, react and seize rapid changes in the environment by redefining their corporate strategies and adapting their competitive and functional strategies to survive and create value.

Strategic agility heavily relies on IT for information surveillance to accurately and rapidly implement new or modified strategies. Depending on the strategic level that is affected, strategic agility can be linked with (a) corporate elements such as collaboration agreements and internationalization (Ahammad et al., 2021), (b) competitive elements such as innovation and productivity (Dabic et al., 2020), or (c) functional elements such as HRM, marketing, and operation systems (Ambituuni et al., 2021, Cheng et al., 2020).

Future lines of research

Through bibliometric and content analyses, we have identified the main topics examined in the strategic agility line of research. We observe that the relationship between strategic agility and IT has gained the considerable attention of the academia; however, the rest of the topics require a higher level of analysis and contrast. In addition, we find that a vast range of topics have not yet been addressed or are just emerging. For example, (Santiago, 2019) explains that human capital is extremely important for firms in order to enhance their

sustainability and growth, and Simoes et al. (2019) highlight the relevance of corporate social responsibility and ethical infrastructure when examining human resource practices. Therefore, a line of research with great potential would be to analyze how to identify the most suitable professional profiles to support the strategic agility of organizations and how to retain such profiles with ethically human resource management practices.

Furthermore, literature on international business analyses how different firm-specific advantages impact on firm's internationalization (Buckley and Casson, 1976, Rugman, 1981), and some recent research analyses the reverse effect of how different outputs of internationalization has a positive impact on enhancing internationalization itself. For example, how different international "contacts" impact positively firm's innovation (Almodóvar et al., 2021, Almodóvar et al., 2014, Jin et al., 2019, Salomon and Shaver, 2005). Therefore, an interesting new approach would be to investigate the effect of strategic agility on the internationalization process of firms, as well as its reverse effect, and to determine whether more internationalized firms require and encourage more agile decision-making.

2.4 Conclusions

A literature review of strategic agility is conducted in this research, in which the authors not only explore the key themes through bibliometric techniques but also perform a revision of the key literature to uncover the relationships between strategic agility and other themes. This research line has become particularly important in recent times, especially since the pandemic caused by COVID-19, which has created strong disruptions in all industries. The agility in response has been decisive for the survival of firms. However, the review of the literature indicates that strategic agility is a concept with ambiguously defined limits and scope, and that many gaps exist in the literature.

The concept of agility began to be discussed in a generic and imprecise manner. It was subsequently applied to different areas of the company. Hence, strategic agility should be a perfectly clear concept placed at the corporate level and implemented at the competitive and functional levels. However, these boundaries are not clearly defined thus far.

In this line, we review the authors and journals on the topic of strategic agility. We find that the concept of strategic agility has yet to reach the maturity stage. In addition, we recognize an increasing interest in the academic literature both in the number of papers published and in the number of citations these papers obtain. However, we do not observe an outlier in authors and journals that write on the topic; instead we find a relatively homogeneous distribution, with a large number of authors publishing in a sizeable quantity of journals. Furthermore, we propose a definition that encompasses the key aspects reviewed in the literature. We consider that strategic agility is a meta-capability that enables organizations to anticipate and/or react to rapid changes in the environment by redefining their corporate strategies and adapting their competitive and functional strategies accordingly, with the purpose of surviving and creating value.

Our study shows that strategic agility is a promising line of research; hence, many aspects merit an in-depth exploration and new ones await development. Through our scientific mapping techniques, we have dynamically analyzed the evolution of strategic agility over five time periods. Our longitudinal view allows us to observe IT as a recurring topic from 1996 to the present day. Thus, from the very beginning, special attention has been paid to how IT development and improvements are key elements in making the company agile in the implementation of its strategies. Over time, strategic agility has been analyzed with respect to the concepts of lean production and collaborative agreements, as well as how strategic agility is related to business productivity. In the fourth stage, we observe that strategic agility is considered a key element to achieve the competitive advantage of a firm. We also observe how

decision making should be conducted so that the company is capable of reacting in a more agile way to changes in the environment, and special attention is paid to cloud technologies to improve the agility of a strategic firm. Finally, in the fifth and final stage, we uncover that more areas begin to emerge. Competitive advantage is again a relevant topic; research focuses on its relationship with business innovation; and it is once again analyzed with respect to cloud computing technologies. Notably, strategic agility is discussed in the international arena by investigating how MNEs strive to become agile. Finally, this area of research is transferred to the specific industry of education.

Our study not only highlights the academics' growing interest in strategic agility and its impact on different key areas of the firm but also identifies areas where the impact of strategic agility has not yet been adequately analyzed. Strategic agility might be examined with respect to the firm's corporate level (e.g., its link with corporate social responsibility, how to implement rapid and precise changes on corporate strategies such as mergers and acquisitions, or even how internationalization might compel firms to become more strategically agile); firm's competitive level (e.g., its impact on radical or incremental innovations, or how to reconfigure the firm's competitive strategy to remain cost or quality leaders); firm's functional level (e.g., how to adapt marketing mix strategies to maintain or enlarge the market share, or how to qualify employees to foster the firm's agility). Further analysis regarding the ways in which companies achieve agile strategic decision making and, in turn, the evaluation of its impact on different measures of firm performance, are needed.

Our study is not without some limitations. First, our sample compiles 293 papers. Although this quantity is an appropriate number to conduct a bibliographic analysis, sample sizes of 1,000 papers are more commonly used (Rogers et al., 2020); hence, having had a larger sample might have been beneficial. Notably, the small number of papers found in Scopus

underlines that this area of research is in a growth phase and that there is still much room for further research.

In addition, the analysis in this study was performed by downloading from Scopus a set of documents that matched specific keywords. Scopus database is the largest searchable citation and source of searching literature (Chadegani et al., 2013), and the overlap with other databases such as WoS is considerable (Jacso, 2005). However, Scopus does not cover the entire universe of publications (Vieira and Gomes, 2009).

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CHAPTER 3

WHAT DRIVES STRATEGIC AGILITY? EVIDENCE FROM A FUZZY-SET QUALITATIVE COMPARATIVE ANALYSIS (FsQCA)

3.1 Introduction

In the current global situation –where health, war and climate change challenges are intensifying the adverse effects on firms of a highly volatile, uncertain, complex and ambiguous environment– several authors have highlighted the relevance of promoting strategic agility in an attempt to foster entrepreneurial and intra-entrepreneurial responses (Ahammad et al., 2020, Gurkov and Shchetinin, 2021, Vaillant and Lafuente, 2019, Vidmar et al., 2020, Xing et al., 2020). Strategic agility is a key issue for CEOs (Doz and Kosonen, 2008a) and entrepreneurs (Kwon et al., 2018), as well as a research line that is gaining attention in the literature (de Diego and Almodovar, 2021), where several scholars have emphasised the importance of strategic agility in different industries (Appelbaum et al., 2017, Cerruti et al., 2016, Ezcan et al., 2020, Nejatian et al., 2018, Noguera et al., 2018).

However, strategic agility is a fuzzy concept, where several authors have used the term without a definition (Weill et al., 2002), while others have partially defined what it encompasses (Denning, 2018, Lewis et al., 2014, Weber and Tarba, 2014). So far, the most comprehensive definition in the literature explains that strategic agility is "a meta-capability that enables organisations to anticipate, react and seize rapid changes in the environment by redefining their corporate strategies and adapting their competitive and functional strategies to survive and create value" (de Diego and Almodovar, 2021). Doz and Kosonen (2010) proposed that this meta-capability results from the combination of three specific capabilities: i) strategic sensitivity, ii) leadership unity, and iii) resource fluidity.

There is an increasing number of papers related to strategic agility, although there do not seem to be many studies that actually show how companies achieve it. Recent bibliometric analyses have shown how authors are writing on the topic of strategic agility across different fields, (e.g., information technology, knowledge management) and industries (e.g., manufacturing) (de Diego and Almodovar, 2021), yet few studies identify which factors are related to how companies achieve strategic agility. This paper thus seeks to identify what these factors are. For this purpose, we analyse in depth 40 companies in the services sector in Spain. Using qualitative comparative analysis (QCA), we then determine which combinations of factors lead to strategic agility. QCA is a methodology that has been increasingly used by authors (Roig-Tierno et al., 2017), and which helps identify logically simplified statements that describe different combinations of conditions that indicate a specific outcome (Ragin, 2008). Use of this methodology is particularly relevant because it allows different alternatives or combinations of conditions to be found that indicate an outcome (in our case, that a company exhibits strategic agility). Additionally, it is a method which has thus far not been applied to the topic of strategic agility, such that a key contribution to the literature is therefore made.

We find that there is no 'necessary condition' to reach strategic agility and that there are five alternatives for reaching it, where different combinations of firm size, firm age, internationalisation, turbulent environments, and investments in i) technology and capabilities and ii) in revenue models and cost reduction mechanisms, are the best indicators of a company exhibiting strategic agility.

The remainder of our research is organised as follows. The next section presents the theoretical background to identify relevant factors related to strategic agility. Section 3 describes the methodology and data collection, while section 4 describes the results of using the QCA tool and its connection to strategic agility. Finally, the conclusions, limitations and possible areas for future research are presented.

3.1.1 Theoretical underpinnings on strategic agility

Strategic agility is a topic that has not yet reached maturity and which is studied from different perspectives (Ambituuni et al., 2021, Clauss et al., 2021b, de Diego and Almodovar, 2021, Elali, 2021, Tsilionis and Wautelet, 2022). Despite being a topic that is gaining attention in the literature, there is no common definition accepted by academia (de Diego and Almodovar, 2021). However, there does seem to be a consensus that strategic agility requires three capabilities (Clauss et al., 2021a, Doz, 2020, Doz and Kosonen, 2008a, b, Nejatian et al., 2019, Reed, 2020): (a) strategic sensitivity, which refers to a capacity for proactive vigilance and awareness over changes in the environment as they develop, together with strategic firm protocols where a highly participative internal dialogue is fostered; (b) leadership unity (also labelled as collective commitment), which refers to a capability for top management to make bold joint strategic decisions quickly and accurately in response to changes in the strategic environment. This capability is derived from a collaborative and mutually dependent team with an integrative leadership style; and (c) resource fluidity, which refers to ability to reconfigure and reallocate resources and capabilities according to new strategies set out by the company, i.e., the capability to realign the structure to the business strategy.

On these grounds, we observe that strategic agility is a construct that spans several areas of the firm. It is thus conditioned by intrinsic firm characteristics and is triggered by various elements, such as a firm's business orientation and a firm's business environment. Among the wide range of factors that could enhance strategic agility, we identify an initiatory group of factors supported by extant theory and which are accompanied by plausible propositions (Greckhamer et al., 2018).

3.1.2 Firm characteristics associated with strategic agility

Firm age has been widely studied in the literature, as it is a proxy for the experience accumulated by the firm (Almodóvar et al., 2021, Rodriguez Ruiz et al., 2019). Several lines of research thus establish a relationship between the firm's age and different forms of business performance. Regarding this literature, several connections are observed in relation to strategic agility. For example, Thornhill and Amit (2003) conducted an analysis of 339 Canadian business bankruptcies. Among the results, they found that the failure of older firms was due to their inability to adapt to the changing environment. Delving more deeply, Loderer and Waelchli (2010) explained that firm age affected economic performance for various reasons. On the one hand, they underlined that the age of the firm generates greater organisational rigidity and, due to this greater rigidity, many resources and capabilities become obsolete, R&D investments decrease, costs increase, and business growth slows down. On the other hand, they explained that the older the firm, the lower the quality of corporate governance. This was because the size of boards of directors and CEO remuneration tended to increase. These factors led to a reduction in a firm’s problem-solving capacity. In a later work, Loderer et al. (2017) analysed listed companies between 1978 and 2013 to find out why older companies had fewer opportunities for growth. Their results pointed to the fact that, with age, firms focused more on exploitation than exploration, becoming more productive with respect to their traditional products, but less proactive in the face of a changing environment. In the same line, Coad et al. (2018) indicated that there is direct causality between age and business performance and that the effects of age might produce organisational rigidity and a firm's routinisation of protocols. All this rationale suggests that firm age has a negative effect on the different capabilities that integrate strategic agility (lower strategic sensitivity, lower leadership unity and lower resource fluidity). Furthermore, firm age has also been studied in the context of strategic agility. For example, Doz (2020) asserted that "*natural evolution leads to growing strategic rigidity as a*

company ages" and Reed (2021) performed a study with 30 firms from multiple industries located in the Space Coast of Florida, and stated that strategic agility declines as firms get older and that firms should use strategic agility before they lose it (or maintain it through exercise and training). Grounded in the former literature, we understand that:

Proposition 1*: Firm age is an influential element in strategic agility.*

Firm size is also a well-known variable in the literature because it is an indicator of potential firm rigidity or flexibility. These studies are relevant insofar as flexibility is a requirement for achieving strategic agility (Roth, 1996, Weber and Tarba, 2014). According to Hannan and Freeman (1984), "the level of structural inertia increases with size for each class of organisation" . This same approach is maintained nowadays through studies such as the one carried out by Corsi et al. (2019), who also explained that organisational inertia (understood as the force that slows down organisational change) increases significantly with firm size. They grounded their research on the assumption that large firms are associated with higher levels of organisational rigidity, while small firms are associated with flexibility. This position has been widely supported or extended in the literature to date. For example, van der Weerdt et al. (2006) proved that firm size had a negative impact on business flexibility (at operational, structural, and strategic levels). Verdú-Jover et al. (2006) went further and analysed 417 European companies (large and small) to ascertain how their size affected their responses to changes in the environment; that is, their flexibility. Their findings showed that small firms were able to process information faster, although they found that large firms were better able to adapt to sudden changes in the environment. The reason behind this contradiction lay in the financial flexibility that large firms generally enjoy. Thus, although small firms are more flexible in nature, on many occasions they are not capable of making the necessary changes required to adapt due to the financial restrictions they suffer, while large firms, although more rigid in

nature, have the necessary financial resources to implement the required changes. More recently, Haneberg (2021) explained that, in line with the literature, smaller firms adapt more easily to changes in the environment because they are naturally more flexible. Based on this approach, they analysed how SMEs were better able to adapt to unexpected crises (such as the COVID-19 crisis) than large firms. All this rationale suggests that firm size has a negative association with strategic agility.

In the strategic agility realm, some research has been carried out on firm size. For example, Oyedijo (2012) examined the relationship between strategic agility and competitive performance and suggested studying whether strategic agility is related to an organisation's size and other attributes. In the same line, Bui et al. (2019) studied the impact of firm size on strategic renewal performance, which they associate with characteristics of strategic agility. Reed (2021) also investigated strategic agility and its relationships with firm size and found that strategic agility did not decrease as firms grow larger.

Grounded in the above literature, we understand that:

Proposition 2*: Firm size is an influential element in strategic agility.*

There are many kinds of strategic resources and capabilities common to businesses, such as technology, product development, production process, manufacturing or logistics (Desarbo et al., 2005) and firms need to use and develop new capabilities in order to benefit from the opportunities that arise from the external environment (Achtenhagen et al., 2013, Teece et al., 1997).

Authors have researched different resources and capabilities and their relation to strategic agility, such as human resources (Pina e Cunha et al., 2020), manufacturing procedures (Ofoegbu and Akanbi, 2012), and operations (Shin et al., 2015). However, the most studied capability as a potential source of strategic agility seems to be information technologies

(IT), which has been reviewed in depth since the early 2000s. For example, Weill et al. (2002) asserted that senior executives make few choices that are more critical than deciding which IT investments will be needed for future strategic agility, and Ekman and Angwin (2007) studied 145 companies to gauge to what extent information systems and information technology (IS/IT) acted as an antecedent for strategic agility. They found that IS/IT was an important enabler for organisations belonging to a high-turbulence industry. Kappelman et al. (2014) underscored that cloud computing (referring to IT infrastructure capability) was one of the most important investments undertaken by organisations and used to develop strategic agility.

As with capabilities, resources can be of many types (Wernerfelt and Montgomery, 1988) and technology is one of the types of resources that most studies review. For example, Clauss (2017) asserted that new technologies are required to take into account opportunities (e.g., new product offering requiring a production technology, new revenue models requiring technical systems for paying).

In relation to strategic agility, the latest studies review how 'new capabilities' and 'new technologies' influence strategic agility. Clauss et al. (2021a) considered these two elements as constructs where capabilities referred to employees receiving training to develop new competences, and employees having up-to-date knowledge and competences permanently assessed so as to adapt to changing market requirements, while technologies referred to firms' up-to-date technical resources and innovative technical equipment to extend product and service portfolio.

Grounded in the previous literature, we understand that:

Proposition 3*: A firm´s capabilities and technologies are influential elements in strategic agility.*

3.1.3 A firm's business orientation associated with strategic agility

Despite internationalisation not being a common antecedent in the strategic agility literature, we find studies which highlight that strategic agility and firm internationalisation are two closely related elements (Demir et al., 2021, Shams et al., 2021). Furthermore, we found specific literature that explains how firms exposed to international markets are expected to learn and develop new capabilities; for example, new capabilities in innovation (Almodóvar and Nguyen, 2022, Almodóvar et al., 2014, Salomon and Jin, 2010, Salomon and Shaver, 2005). We might therefore expect international exposure not only to develop innovative skills but also to trigger new capabilities (for example, the meta-capability of strategic agility) to manage the diverse and rapid-changing international environment.

Proposition 4*: Firm internationalisation is an influential element in strategic agility.*

We observe a recent increase in business model research in academia (Clauss et al., 2021a) with one of the lines of research being how firms function, create and capture value (Spieth et al., 2014). There seems to be a consensus that business models consist of three dimensions: (a) value proposition, (b) value creation, and (c) value capture (Clauss, 2017, Spieth and Schneider, 2016, Teece, 2010). Value proposition refers to how a product/service is composed, what role a firm has in production and delivery, what channels it uses and who is offered the company's product/service (Morris et al., 2005); value creation refers to how value is created both at the firm and the external level (taking into account customers and suppliers) (Clauss, 2017); and the value capture dimension refers to how a firm makes money, considering new cost and revenue-related decisions, such as margins, quality and prices (Osterwalder and Pigneur, 2010). The 'value capture' dimension has been linked to strategic agility as it allows a firm to respond to changes in the environment through new revenue models and cost structures (Clauss et al., 2021a).

Clauss et al. (2021a) performed a study on 432 German firms in the electronics industry and reviewed the mediating role of 'value capture' in the relationship between strategic agility and firm performance. They considered 'value capture' as the combination of (a) new cost structures, and (b) new revenue models, (as Clauss (2017), who first used these combinations to create the construct). Contrary to their expectations, they found a negative effect between 'value capture' and firm performance. They therefore conducted additional semi-structured interviews to explore the relationship further. These interviews provided two key insights: first, that 'value capture' requires mutual adjustment from other parts in the system, and second that local optimisation problems can occur (e.g., local optimisation problems occurring due to different skillsets / required knowledge)

We can therefore expect 'value capture' (as a combination of new cost structures and revenue models) to have an effect on strategic agility. Specifically,

Proposition 5*: A firm's model for capturing value is an influential element in strategic agility.*

3.1.4 A firm's business environment associated with strategic agility

Turbulence in the environment is a relevant aspect because the purpose of strategic management is not to achieve certainty but to prepare the firm to face and survive uncertain environments (Von Oetinger, 2004). Turbulences can thus be caused by a variety of factors. Arifiani et al. (2021) pointed out that the most important sources of turbulence are the emergence of new technologies, changing market demands, increased intensity of competition (e.g., due to the entry of new competitors), and the appearance of new regulations. Complementing this approach, Rego et al. (2021) explained that the emergence of new technologies and changing market demands are two highly interconnected and mutually interdependent sources of environmental turbulence.

Regarding the connection between facing a turbulent environment and the need to activate protocols that lead to strategic agility, we consider that the appearance of innovations

in the market brings together the effects of the above-mentioned two interconnected sources. In this line, we find some preliminary works –such as the research of Vagnoni and Khoddami (2016)– who explained that, among the various elements that cause a turbulent environment, the appearance of innovations in the market was highly relevant. The authors discussed that, in response to this situation, managers needed to implement alertness protocols to speed up the strategic changes required to respond to this threat. Another source of turbulence is the entry of new competitors into the industry, and this is a well-known threat that diminishes the attractiveness of industries (Porter, 2008). In fact, Ahmed et al. (1996) explained that, in the face of competitive pressures, firms need to develop rapid and quality responses and to increase their organisational flexibility in order to protect themselves against this new threat. Finally, Arifiani et al. (2021) stated that firms need to improve their strategic planning capabilities, and to be more creative and flexible in order to adapt to possible disruptive changes, such as new regulations. Summarizing these approaches, and in a more general manner, Pawłowski (2021) explained that there is a key relationship between unexpected and rapid changes in the environment (turbulent environments) and pointed to the need to increase the firm's flexibility in order to adapt and take advantage of new opportunities. In light of this area of work, we observe that turbulent environments negatively impact firms' activities and performance, such that enhancing strategic business agility is therefore a necessity (Fallmyr and Bygstad, 2014, Joiner, 2019, Lee and Wang, 2013).

In the strategic agility research line, several authors have analysed turbulent environments as an antecedent for agility (Reed, 2021, Vazquez-Bustelo et al., 2007, Weber and Tarba, 2014). In this line, Afuah and Tucci (2003) asserted that fast-changing environments require being agile in perceiving and responding to changes in the environment to create innovations. van Oosterhout et al. (2006) studied changes in the environment (e.g., social/legal, competitive environment, customer needs) as factors required for agility. More recently,

Ilmudeen (2021) explained that firms need to become more agile in order to be able to respond to turbulent environments. He therefore interviewed 254 senior executives from Chinese firms, and found that in turbulent environments, firms need to improve their dynamic capabilities facilitated by information technologies if they are to become more agile. Grounded in this literature, we understand that:

Proposition 6*: A firm's turbulent environment is an influential element in strategic agility.*

3.2 Methodology

After reviewing how academia explores the topic of strategic agility and the potential factors that are likely to interact with it, we built a survey that questioned respondents on the different factors related to strategic agility and the variable itself.

We study different cases and assess different potential configurations of factors for strategic agility, and therefore use QCA to explore the data. QCA has been used in the literature to assess different factors, in our case, internationalisation (Ciravegna et al., 2018, Fainschmidt et al., 2020, Verbeke et al., 2019), firm size (Greckhamer et al., 2007), and firm age (Ho et al., 2016), although there seem to be no studies addressing strategic agility.

In order to study the data, we use specific software (fsQCA 3.0) that helps identify whether each of the factors is required to reach the solution and which combinations of factors are sufficient to be a configuration that leads to strategic agility. The data required for the necessity and sufficiency analysis came from two sources: the survey and Orbis. This allowed us to ensure consistency in data and to obtain additional information (e.g., financial information). In order to use QCA, data had to be calibrated into the range [0-1], and we then analysed the results (different combinations of factors to show the alternative paths to strategic agility).

Finally, we interviewed one company that is representative of each alternative path so as to provide a tangible example of how specific companies operate and how they exhibit strategic agility.

3.2.1 Data gathering

We prepared a survey with 40 questions that included both open and Likert scale questions. The survey was framed to the respondents as "Survey on company variables and competitions for organisations in Spain", and questions were grouped into eight different blocks: i) general company information, ii) financials, iii) internationalisation, iv) revenue models, v) cost structures, vi) strategy, vii) capabilities/technologies, and viii) environment/competition, such that respondents would not know the key variables being tested in our study.

We sent the survey to 71[2] companies in Spain, specifically targeted to founding members of the companies or senior leadership (e.g., C-level executives or management committee members). Out of the surveys sent, we obtained 60 responses (response rate of 76%) from December 2021 to January 2022. We carried out telephone follow-ups to corroborate the accuracy and veracity of the data. Data from the survey were subsequently enriched and double-checked with company data from Orbis; namely sector of activity, operating revenue, net income, number of employees and date of incorporation. Finally, some firms were studied in more detail by reviewing media reports and undertaking semi-structured interviews.

Out of the 60 responses, we considered only a subset for the analysis, leaving out companies with one employee and those from a sector of activity other than services (e.g.,

[2] As standard practice in QCA studies –a case-based method– company selection does not correspond to a representative sample of the Spanish services sector in the traditional sense, but to a heterogeneous and relevant sample of the sub-sectors: Health Social Services, Business Services, Property Services, Financial Services.

textiles, industrial, metals, wholesale, computer software), leaving a final number of 40 respondents (Table 3.1)

TABLE 3.1 Characteristics of firms in the study

Sector of activity	Health Social Services, Business Services, Property Services, Financial Services
Employees	2 – 123k
Operating revenue (USD)	$1,7k – $6b
Net Income (USD)	-$1,3b – $2,5b
Date of incorporation	1870 – 2020

3.2.2 QCA and factors related to high levels of strategic agility

QCA is a powerful tool for analysing causal complexity; that is, when i) an event occurs given a combination of causal factors, ii) different combinations of causal factors can lead to the same outcome, and iii) causal factors may work differently in different cases (i.e., depending on combinations with other factors) (Greckhamer et al., 2007).

There are different types of QCA analyses. We use a fuzzy-set QCA (FsQCA) approach because it allows variables to obtain all the values within the range [0-1] (Pappas and Woodside, 2021) and because it has received increased attention recently (Fiss, 2011, Ordanini et al., 2014, Pappas et al., 2016, Woodside, 2014).

FsQCA aims to identify necessary and sufficient conditions and the relationships that associate with the outcome of interest (Douglas et al., 2020). However, in order to avoid "researcher degrees of freedom" (Gelman and Loken, 2014), antecedent conditions selected for the configurational model must be supported by extant theory or be accompanied by plausible propositions for new theory (Greckhamer et al., 2018). In other words, the model should only include those antecedent conditions that prior theory, informed reasoning or prior surprising findings suggests are likely to interact with each other (Douglas et al., 2020).

We therefore study the relations between the following factors (antecedents) and strategic agility:

1) Firm age: this is a factor frequently studied in the literature (Reed, 2021) and is commonly measured as the number of years since a firm's foundation (Autio et al., 2000), which is how we measure this factor.
2) Firm size: also a common factor in studies and which is measured in several ways, such as number of employees, annual revenue or assets (Reed, 2021). We measure the factor using the number of employees since there is less sensitivity to its reporting by some firms.
3) Internationalisation: we measure internationalisation by asking survey respondents whether their firm operates only in Spain or whether it has any kind of activity overseas (exports or subsidiaries). Given that there are hardly any previous studies on internationalisation and strategic agility, we decided to generalise and to take into account any kind of international exposure.
4) Turbulent environment: we measure environmental turbulence by asking survey respondents whether they have experienced either new entrants, innovations, or new regulations that altered the environment. Although some studies, such as Reed (2021), also take into account the customer dimension, we decided to remove this question in the questionnaire following the latest studies by Arifiani et al. (2021) and Rego et al. (2021), who pointed out that the most important sources for turbulence are innovations, new competition and new regulation, and that innovations and changing market demands are two highly interconnected and mutually interdependent sources of environmental turbulence.

5) Capabilities or technologies: following Clauss et al. (2021a), we included the same questions in the survey so as to understand whether a firm invests in new capabilities and technologies.
6) Value capture: following Clauss et al. (2021a), we included the same questions in the survey so as to understand whether a firm develops new revenue models and seeks cost-saving opportunities.

Finally, following Clauss et al. (2021a), we measure strategic agility by asking survey respondents nine questions, three for each of the components (strategic sensitivity, leadership unity, and resource fluidity)[3].

3.2.3 Data calibration

Data must be "calibrated" to enable Boolean analysis. That is, fsQCA requires each of the factors to be within the range [0-1], and the purpose of calibration is to choose threshold data scores that the researcher considers will reflect that the respondent is either "fully in" the set, or "fully out" in terms of "membership". Between these threshold scores, there is ambiguity as to whether the score is in or out of the set, and a point of maximum ambiguity must be set (Greckhamer et al., 2018).

Calibration for each variable depends on whether variables are binary, multi-value, or continuous. For binary variables (crisp factors), researchers establish 1 as representing "fully in" and 0 as representing "fully out". For fuzzy factors such as multi-value sets (e.g., a 5-point Likert scale) or continuous variables (e.g., revenue), researchers must apply theoretical and context knowledge to identify the most appropriate threshold scores that imply full membership, full non-membership and the point of maximum ambiguity (Greckhamer et al.,

[3] In appendix A, we include the exact wording of the questions linked to the variables of this research.

2018, Hannan, 2010, Ragin, 2008, Verkuilen, 2005). We calibrate crisp factors with 1 or 0 according to the criteria in table 3.2.

TABLE 3.2 Calibration of the crisp factors

Factor	Name of the factor in the model	Source	Full membership (Calibration to 1)	Full non-membership (Calibration to 0)
Internationalisation	International	Survey (one question)	Companies that operate in more than one country	Companies that operate only in one country
Turbulent Environment (New entrants, innovation, or regulation)	EntInnReg	Survey (three questions)	Companies that have responded positively to either of the three questions	Companies that have responded negatively to all three questions
Size	SmallSize	Survey (one question) & Orbis	Companies that have less 250 employees or less	Companies that have more than 250 employees

For fuzzy factors, we use percentiles 99, 50 and 1 to find which values in our dataset correspond to the thresholds for full membership, point of maximum ambiguity, and full non-membership (see table 3.3). With these thresholds per factor, we calibrate the data (Ragin and Davey, 2016).

TABLE 3.3 Calibration of the fuzzy factors

Factor	Name of the factor in the model	Source	Full membership	Point of maximum ambiguity	Full non-membership
Firm Age	YoungAge	Orbis (current year minus year of foundation)	Value according to the percentile 1 of the data (1.39 years)	Value according to the percentile 50 of the data (14.5 years)	Value according to the percentile 99 of the data (189.01 years)

Capabilities or technologies	CapOrTech	Survey (three questions on 'New capabilities' and three on 'New technologies' which were then averaged)	Value according to the percentile 99 of the data (4.67)	Value according to the percentile 50 of the data (3.83)	Value according to the percentile 1 of the data (2.80)
New cost structures / revenue models	ValueCapture	Survey (three questions on 'new revenue models' and three on 'new cost structures' which were then averaged)	Value according to the percentile 99 of the data (5)	Value according to the percentile 50 of the data (3.58)	Value according to the percentile 1 of the data (1.2)
Strategic agility	STRATEGICAGILITY	Survey (nine questions on strategic agility (strategic sensitivity, leadership unity and resource fluidity) which were then averaged)	Value according to the percentile 99 of the data (4.89)	Value according to the percentile 50 of the data (3.72)	Value according to the percentile 1 of the data (2.08)

3.2.4 Setting the consistency threshold and conducting "necessity analysis"

Table 3.4 shows that there are no 'necessary conditions' for Strategic Agility to occur, as we have no condition that exhibits a consistency above 0.90 with non-trivial coverage (Schneider, 2018, Schneider and Wagemann, 2012).

TABLE 3.4 Analysis of Necessary conditions for the outcome variable STRATEGICAGILITY

Conditions tested	Consistency	Coverage
	STRATEGICAGILITY	
SmallSize	0.482	0.517
~SmallSize	0.518	0.556
International	0.649	0.557
~International	0.351	0.503
EntInnReg	0.806	0.577
~EntInnReg	0.194	0.416
YoungAge	0.809	0.716
~YoungAge	0.552	0.751

CapOrTech	0.786	0.823
~CapOrTech	0.573	0.630
ValueCapture	0.791	0.827
~ValueCapture	0.600	0.661

Once data is calibrated, we set the "consistency threshold" at 0.90, which is above the acceptable level of dissimilarity of within-case relationships between the outcome (Rihoux and Ragin, 2009) and above the 'best-practice' threshold of 0.80, which provides greater homogeneity within configurations (Douglas et al., 2020).

Table 4 shows the truth table after calibration and setting the consistency threshold. Additional to the consistency threshold, we also take into account the proportional reduction in inconsistency (PRI) threshold, which is an important measure to avoid simultaneous subset relations of configurations in the outcome and its negation. We set this threshold at 0.75 to eliminate configurations with low PRI scores that indicate inconsistency (Greckhamer et al., 2018) and at a level classified as preferable in the literature (Frambach et al., 2016). Table 3.5 in bold font shows those cases with a PRI consistency above the threshold, and which are therefore the ones used by fsQCA to identify solutions.

TABLE 3.5 Truth table in fsQCA, where cases in bold exceed the PRI consistency threshold

SmallSize	International	EntInnReg	YoungAge	CapOrTech	ValueCapture	STRATEGIC AGILITY	Raw consist.	PRI consist.	SYM consist
1	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
1	**0**	**0**	**1**	**1**	**1**	**1**	**0.992**	**0.988**	**0.988**
0	**1**	**1**	**1**	**1**	**1**	**1**	**0.958**	**0.914**	**0.914**
1	**1**	**1**	**1**	**1**	**1**	**1**	**0.956**	**0.875**	**0.875**
1	**1**	**1**	**1**	**1**	**0**	**1**	**0.942**	**0.871**	**0.871**
0	**1**	**1**	**0**	**1**	**1**	**1**	**0.930**	**0.853**	**0.870**

1	**1**	**1**	**0**	**0**	**0**	**1**	**0.939**	**0.838**	**0.838**
1	**0**	**0**	**1**	**1**	**0**	**0**	**0.876**	**0.811**	**0.811**
0	**1**	**1**	**1**	**0**	**1**	**1**	**0.913**	**0.787**	**0.787**
1	0	1	1	1	0	1	0.926	0.592	0.879
0	1	1	0	0	1	0	0.831	0.524	0.524
1	1	1	1	0	0	0	0.804	0.431	0.431
1	1	0	0	0	1	0	0.893	0.348	0.348
0	1	1	0	0	0	0	0.828	0.253	0.274
0	1	1	0	1	0	0	0.764	0.243	0.246
0	1	1	1	0	0	0	0.783	0.235	0.235
1	0	1	1	0	1	0	0.715	0.230	0.230
0	0	1	1	0	1	0	0.781	0.178	1
1	0	0	1	0	0	0	0.413	0.110	0.110
0	0	1	0	0	1	0	0.897	0	0
1	0	1	0	1	1	0	0.872	0	0
0	1	0	0	0	0	0	0.857	0	0
0	0	1	1	1	1	0	0.813	0	0
1	1	0	0	0	0	0	0.758	0	0
1	1	0	1	0	0	0	0.682	0	0
0	0	0	0	0	0	0	0.623	0	0
1	1	0	1	0	1	0	0.607	0	0
1	0	0	0	0	0	0	0.402	0	0

3.3 Results: Obtaining the configurations/solutions and illustration of a real case

FsQCA computes three solutions (a combination of configurations supported by a high number of cases, with a consistent rule of "the combination leads to the outcome") (Pappas and Woodside, 2021). The complex solution presents all possible combinations of conditions,

including combinations not observed in the data. This solution is further simplified into the parsimonious and intermediate solutions.

The parsimonious solution is a simplification of the complex solution, which includes "core conditions" –in other words, those that cannot be left out from any solution (Fiss, 2011). The intermediate solution is obtained by performing counterfactual analysis on the complex and parsimonious solutions, including only theoretically plausible counterfactuals (Liu et al., 2017, Ragin, 2008). We combine the parsimonious and intermediate solutions to offer a more detailed and aggregated view of the findings (Fiss, 2011). This combination of the two solutions led to five different configurations or recipes that firms use to achieve strategic agility (see Table 3.6, where we have visually represented the different configurations). It should be noted that our model has a consistency of 0.93, which is considered useful and can serve to advance theory (Woodside, 2017).

TABLE 3.6 FsQCA findings for Strategic Agility

	Configuration				
Antecedents	1	2	3	4	5
Small Size	⊗	⊗	●	●	●
International	●	●	⊗	●	●
Entrants, Innovation or Regulation	●	●		●	●
Young Age	●		●	●	⊗
Capabilities or Technologies		●	●	●	⊗
Value Capture	●	●	●		⊗
Consistency	0.920	0.918	0.997	0.952	0.939
Raw Coverage	0.261	0.309	0.173	0.121	0.043
Unique Coverage	0.051	0.098	0.173	0.089	0.012
Overall solution consistency	0.9333				
Overall solution coverage	0.6654				

Note: black circles (●) indicate the presence of a condition, circles with an "x" (⊗) indicate its absence. Large circle: core condition. Small circle: peripheral condition. Blank spaces denote "do not care" conditions

Configurations 1 and 2: larger international firms competing in turbulent environments that actively invest in new revenue-increasing and cost-decreasing opportunities.

Firms in these configurations are characterised by having >250 employees, being international, and competing in turbulent environments (i.e., firms have faced entrants that altered the status quo of incumbents, or innovation/ regulation has changed the 'rules of the game'). Additionally, firms in these configurations develop new revenue opportunities (e.g., complementing/replacing one-time transaction revenues with long-term recurring revenue models) and actively seek cost reduction opportunities. Configurations 1 and 2 are very similar, with 1 referring to firms that are young, and configuration 2 to those firms that additionally make an effort to keep up to date in technologies and capabilities (e.g., employees receive constant training, competencies reflect changing market requirements, technical employment is up-to-date).

DeliveryCo[4] is one of the companies representative of configuration 1. This company was established in 2015 and grew quickly to have over 4,000 employees as of 2022. The company competes in the delivery business, both for takeaway food and as a general courier service, but has recently expanded into other businesses, most notably quick commerce, and small home repairs. DeliveryCo was born in Spain, but quickly internationalised and as of 2022 is operating in 22 European countries. The environment in which DeliveryCo competes is very turbulent, with new disruptive entrants (e.g., companies backed by private equity that have both a well-crafted plan and resources to compete in the industry), innovation (e.g., self-driving and autonomous vehicles that could displace traditional delivery services), and regulation (e.g., country and EU-level legislation that govern how delivery companies can operate). DeliveryCo has been very active in developing new revenue models and cost structures. The company

[4] Firms have been disguised to protect confidential data.

frequently develops and tests new ideas in the markets (e.g., high-quality food delivery, mobility scooters), launched a recurring revenue model (monthly flat-fee that allows customers to avoid delivery fees), and actively seeks price differentiation taking into account their costs (e.g., delivery fees for restaurants vary according to time and distance from the client). Finally, DeliveryCo exhibits all the components of strategic agility i) strategic sensitivity, ii) leadership unity, and iii) resource fluidity as the company is very sensitive to external changes and quickly anticipates/reacts to these changes, management is able to make bold and fast strategic decisions collaboratively, and resources are fluidly reallocated as required.

BankCo is one of the companies that represent configuration 2. It has been competing in the banking industry for over 100 years and has over 100,000 employees worldwide, as it operates in several countries. The environment where BankCo competes faces both new entrants (e.g., fintech companies), innovation (e.g., decentralised finance, blockchain), and regulation (e.g., General Data Protection Regulation in Europe). BankCo has been very active in developing capabilities and technologies and in developing new revenue models and cost structures. As regards the former, BankCo ensures that its employees receive frequent training to develop new competences, and the company considers that its employees have more up-to-date knowledge than its competitors. Likewise, BankCo invests in keeping the company's technical resources up to date and the company considers its technical equipment to be very innovative. As regards revenue models and cost structures, BankCo is frequently developing new revenue opportunities (e.g., innovative credit cards) and is actively seeking cost reduction opportunities (e.g., closing branches, resizing departments). As with DeliveryCo, BankCo exhibits all the components of strategic agility.

Configuration 3: young and small national firms that actively invest in revenue increasing and cost decreasing opportunities

Firms in this configuration are characterised by their lack of international presence, being small and young, regardless of how stable or turbulent the environment is. However, these firms actively seek opportunities to develop new revenue and reduce costs.

ConsultingCo is an example of these companies. ConsultingCo was created in 2018 and operates with five employees only in the Spanish market. The company performs consulting projects across several domains (e.g., commercial assessments and introduction of software applications in the Spanish market,). The company actively develops new revenue opportunities by seeking attractive models for its customers. For example, it started billing clients on the number of hours dedicated to a project and then changed to commission-based work, where ConsultingCo earns according to variable metrics and the success of the project. Likewise, the company is actively working on making its cost structure as variable as possible (e.g., by moving from a leased office to working in a shared business centre, or by having a reduced cost base where only the partners are on the payroll of the company and where all additional consultants required for each project are hired on a project basis).

ConsultingCo actively invests in capabilities (providing its consultants with several training activities depending on the projects they are involved in) and technologies (providing necessary technology to report progress on the project and to show the client what additional areas are pending). ConsultingCo exhibits all the components of strategic agility, where they pay special attention to strategic sensitivity (by actively looking at what competitors are offering and by capturing client feedback), and resource fluidity (by adjusting resources to ensure the talent staffed in each project matches what the client requires).

Configuration 4: small and young international firms that compete in turbulent environments

This configuration is comprised of firms that are relatively young and small but which have, nevertheless, already sought to internationalise. Likewise, these companies compete in turbulent environments.

HRCo exemplifies this configuration. It is a very new company (founded in 2020) that was born with the aim of enabling people to access their earned salary at any point in the month (i.e., on the fifth day of a given month, an employee can access five days' worth of salary). As of late 2021, the company had 30 employees and operated in three countries: Spain, Italy, and Colombia. HRCo competes in a turbulent environment, mostly driven by the appearance of new entrants in their industry (e.g., a large international fintech has recently offered a "Pay by Day" feature that directly competes against HRCo). As regards strategic agility, HRCo exhibits all of the components, although the company's stronger perception of leadership unity is the component that most stands out (i.e., HRCo is particularly strong at having top management making bold and fast strategic decisions collaboratively).

Configuration 5: older small international firms that compete in turbulent environments

While configurations 1, 2, 3, and 4 exhibit high raw coverage values, configuration 5 has only 0.043. However, this does not mean that it is not important (Rubinson et al., 2019). Although it is the least common path for strategic agility for firms, configuration 5 shows an alternative for some firms.

Firms in this configuration are those that are older, small, and that are international companies who compete in turbulent environments. However, these companies do not make a particular effort to keep up to date in technologies and capabilities. Nor do they develop new revenue-increasing or cost decreasing opportunities.

CloudCo exemplifies this configuration. It is a company established in 2001 that competes in the industry of software for contact centres (i.e., as contact centres unify different channels, such as telephone, WhatsApp, or chat, this software helps unify the different alternatives). As of late 2021, CloudCo has a little over ten employees, but operates in several countries, particularly in Latin America, such as Mexico or Colombia. CloudCo competes in a very turbulent environment, where it has to cope with new entrants, frequent innovation and regulatory changes. New entrants frequently appear, particularly from countries that have a low-cost high-skilled workforce, such as India. CloudCo actively monitors 150 competitors, and every month they have new additions. Innovation also poses a threat to their business, and the company is particularly concerned about artificial intelligence. They face a risk of very intelligent systems being able to independently attend to customers (i.e., a machine-centred WhatsApp that is able to have a natural dialogue with a user calling a contact centre, without noticing that the counterpart is not human). Regulation is the biggest threat, as perceived by CloudCo. Every country has a different regulation that they have to keep up to date with, and data protection laws are constantly appearing. As for strategic agility, CloudCo exhibits all of its components, with the company having a stronger perception of leadership unity as the most important component.

3.4 Conclusions

The objective of this paper is to assess what factors are related to strategic agility. As practical knowledge on the topic suggested there might be several alternatives for firms to achieve strategic agility, we used QCA, a technique that allows different combinations of factors to be identified that lead to the outcome. We surveyed 40 companies in the services sector in Spain in an effort to understand their specificities in terms of firm size, firm age, internationalisation, environmental turbulence, investment in capabilities and technologies as

well as revenue-increasing and cost-cutting mechanisms. Finally, we concluded the study with semi-structured interviews for one company representative of each configuration. This paper makes important contributions to the literature. First, it shows that there is no single factor that is necessary for firms to accomplish strategic agility. Second, we show there are different combinations of factors that lead firms to display strategic agility. This means that different types of firms can reach strategic agility in alternative ways. Third, we present real cases that illustrate each configuration with a real example.

3.4.1 Theoretical and Managerial implications

Through our research, we seek to shed light on an underexplored phenomenon of great relevance to academia; namely, strategic agility. However, the main theoretical contribution is that we provide a better understanding of the phenomenon at hand, with our results indicating that there are various firm configurations which are strongly linked to high levels of strategic agility. The results we obtained display high consistency, suggesting that the model is useful and can serve for theory advancement (Woodside, 2017). Specifically, we unveil five paths or configurations that favour firms to achieve strategic agility.

- Configurations 1 and 2 are the most common and refer to larger international firms that compete in turbulent environments. These firms deal with new entrants, innovations and/or regulations and make several efforts to identify ways to increase revenues and reduce costs. Configuration 1 refers to firms that are young (i.e., established in the last couple of years), and configuration 2 refers to firms that invest in capabilities or technologies, in addition to making efforts in terms of revenue increasing and cost decreasing initiatives.
- Configuration 3 refers to young, small firms with no international presence. Regardless of whether the environment is calm or turbulent, firms in this path provide their

employees with the up-to-date capabilities and innovative technologies required to perform their job. Likewise, firms actively develop new revenue opportunities and seek cost-saving opportunities.

- Configuration 4 is the path followed by young and small firms that have an international vocation and that compete in turbulent environments.
- Configuration 5 is the least common and refers to older firms, but who still have a small number of employees and who have decided to compete in the international arena and face a turbulent environment.

From a managerial perspective, a desire for practical knowledge on the topic provided the incentive for this study and thus sought to identify practical implications beyond the purely academic. In particular, identifying the paths or configurations is interesting not only for academics but also for practitioners, since they can compare the situation in their current firms with that of the real cases provided in each of the configurations This will help them identify the gaps and will offer an indication of how they can reach strategic agility in their companies.

3.4.2 Limitations and future research

Our study provides important contributions but is not free from limitations. We use a sample of 40 respondents from a specific sector and country, which implies that the sample may not be representative of a wider population and that conclusions cannot be extrapolated in a general sense.

Our sample size is appropriate, since QCA is a reasonable choice of method for sample sizes of 12 or more, with the minimum sample size depending on the number of causal conditions in the model (e.g., seven causal conditions requiring a sample of about 30) (Marx,

2006). However, having access to a larger sample may standardise the results provided by each company (provided that more responses per company are averaged).

QCA requires identifying the potential factors to be studied beforehand. Following Greckhamer et al. (2018), we selected the antecedent conditions for the model through an exhaustive review of the literature and explained propositions on why we think these conditions need to be analysed.

Additionally, QCA requires data to be 'calibrated' in order to enable Boolean analysis. The purpose of this is to choose threshold data that the researcher can use to judge whether a response is 'fully in' or 'fully out' of the set. The number of potential calibrations is virtually endless. We chose to use data frequency distribution and to use percentiles 1 and 99 to determine cut-off points, and we stated and applied this rationale across conditions to avoid distortion of results (Douglas et al., 2020).

Finally, our model showed a coverage of 0.66, which means that approximately two-thirds of the outcome of interest (strategic agility) is explained by the configurations. This is a comparable measure to the R-square reported on regression-based methods (Woodside, 2013). While the coverage obtained is high, there is still a part of the outcome of interest that is not explained. We therefore acknowledge that we do not examine all possible antecedents of strategic agility, such that future research lines might focus on additional factors that are worth studying. For example, there is emerging evidence that there might be some relationship between entrepreneurship and strategic agility, with (e.g., (Kwon et al., 2018) providing evidence from South Korea). New studies might thus assess entrepreneurship and entrepreneurial intentions as the first step in the process (Palmer et al., 2019), considering the tensions between academic identity and entrepreneur identity (Shi et al., 2021).

Strategic agility is an emerging topic (de Diego and Almodovar, 2021) and, therefore, several research questions can be pursued to explore the topic in greater depth. For example,

researchers may wish to perform more in-depth studies on each of the factors that lead to strategic agility (e.g., firm size, firm age, internationalisation). More explicitly, the antecedent "internationalisation" was not analysed before in this context and it has proved its relevance. Future research might therefore further investigate more specific aspects of firms' internationalisation in order to discern its effects on strategic agility.

Likewise, it would be interesting to identify differences in factors leading to strategic agility when comparing sectors and to assess the differences between the services sector and, for example, the manufacturing sector. Finally, there might be opportunities to analyse cross-cultural differences between countries by performing the same study on companies in different geographical areas and by comparing those results to the ones presented here for Spanish firms.

Appendix A Questionnaire used for data calibration

QUESTION	**TYPE**
Section on internationalisation	
How many countries does your company operate in (taking into account: (1) countries where you have subsidiaries plus (2) countries where you export)?	Open
Section on revenue models	
We recently developed new revenue opportunities (e.g., additional sales, cross-selling)	5-point Likert
We increasingly offer integrated services (e.g., sale of product plus a maintenance contract) in order to realise long-term financial gains	5-point Likert
We recently complemented or replaced one-time transaction revenues (e.g., single sales) with long-term recurring revenue models (e.g., leasing)	5-point Likert
Section on cost structures	
We actively seek for opportunities to save manufacturing costs	5-point Likert
Our production costs are constantly examined and if necessary, amended according to market prices	5-point Likert
We utilise opportunities, which arise through price differentiation	5-point Likert
Section on strategy	
We are very sensitive for external changes (regarding customers, competitors, technologies, etc.) and integrate these into strategic planning of our company	5-point Likert
We utilise different mechanisms to become aware of strategic developments early (i.e., we survey our clients, perform market studies, assess competitors, assist to conferences)	5-point Likert

Requirements for strategic adaptations are communicated fast and comprehensively through the organisation	5-point Likert
Our top management is able to make bold and fast strategic decisions	5-point Likert
Our management collaborates for strategic decisions	5-point Likert
Strategic decisions are collectively solved by our management without being bogged down in top-level "win-lose" politics	5-point Likert
We are able to reallocate and utilise capital resources fluidly	5-point Likert
Our people and their competencies are highly mobile within our organisation	5-point Likert
Our organisational structure allows for flexible redeployment of our resources	5-point Likert
Section on capabilities / technologies	
Our employees constantly receive trainings in order to develop new competences	5-point Likert
Relative to our direct competitors, our employees have very up-to-date knowledge and capabilities	5-point Likert
We permanently reflect which new competencies need to be established in order to adapt to changing market requirements	5-point Likert
We keep the technical resources of our company up-to-date	5-point Likert
Relative to our competitors, our technical equipment is very innovative	5-point Likert
We regularly utilise new technical opportunities in order to extend our product and service portfolio	5-point Likert
Section on environment / competition	
In the last 3 years, have there been new entrants to your industry with the ability of altering the status quo of the incumbents?	Dichotomous
In the last three years, has there been any innovation that has 'changed the rules of the game' significantly in your industry (e.g., electric vehicles in Automotive industry)?	Dichotomous
In the last three years, has there been any significant regulation/law that has 'changed the rules of the game' significantly in your industry (e.g., GDPR in Financial Services industry)	Dichotomous

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CHAPTER 4

THE EFFECTS OF A FIRM'S INTERNATIONALIZATION, AGE AND ENVIRONMENTAL TURBULENCE ON THE CAPABILITIES THAT COMPRISE STRATEGIC AGILITY

4.1 Introduction

The recent literature has consistently highlighted the increasing complexity that surrounds firms, which face environments that are changing constantly and rapidly (Clauss et al., 2021b, Debellis et al., 2021). Moreover, scholars have realized that the scale and scope of the challenges that firms result in unprecedented complexity, which can render traditional business formulas for market adaptation inapplicable (Tarba et al., 2023). Most notably, these major challenges have become more acute in the field of international business (Fernhaber and Zou, 2022) due to the large number of diverse environments that the firm must navigate. In this strand of the literature, Van Tulder et al. (2020) highlighted the increasing multipolarity of the world and the fact that the only constant is drastic and unexpected change. Thus, they showed that internationalization and increasing environmental turbulence require firms to react in creative and flexible ways to adapt and survive. Hence, Tarba et al. (2023) explicitly highlighted the relevance for Multinational Enterprises (MNEs) to develop a specific kind of meta-capability in order to survive: strategic agility.

Strategic agility is a topic that is increasingly attracting the attention of academics and practitioners because, especially in volatile and ambiguous environments, firms try to become more strategically agile (de Diego and Almodovar, 2021). Several studies have assessed strategic agility, although there is no common definition of the topic. However, there seems to be some consensus that strategic agility requires a combination of three capabilities (Clauss et al., 2021b, Doz and Kosonen, 2010, Hock et al., 2016): (a) The active sensing and anticipation

of changes in the environment (strategic sensitivity); (b) the ability of the leadership team of a firm to make bold decisions, quickly (leadership unity); and (c) the internal capability to reallocate resources rapidly wherever they are needed (resource fluidity).

This study seeks to identify and analyze, both theoretically and empirically, a group of variables that may be associated with gains in strategic agility. We do not attempt to identify all possible drivers of strategic agility. Instead, this it is a first attempt to examine the phenomenon in depth, starting the study with the triad of variables that are now attracting attention in books and journal editorials because they are considered fundamental. First, we focus on whether the internationalization of a firm triggers the development of strategic agility. Internationalized firms not only need to be able to react flexibly and quickly to the changes that are brought about by the incessant dynamism of the market and the strategies that are implemented by competitors, but must also acquire the capability to identify, react and implement changes in the highly diverse scenarios that unfold on the international markets (Weber and Tarba, 2014). Second, Fernhaber and Zou (2022 p. 13) wrote on the relevance of including insights from entrepreneurial spirit when researching the firm's international dimension; they wrote that *"examining one without the other gives an incomplete picture on how to address grand challenges"*. In the same vein, among all the possible variables that can be used to characterize a firm, Reed (2020, 2021) underlined the relevance of the firm's age because of the quasi-identification between the early period of a firm and entrepreneurial spirit. Young firms exhibit a strong entrepreneurial orientation characterized by aspects such as proactivity as well as by risky and rapid decision-making. We, therefore, chose firm age as the second variable to study. Third, and last, we pay special attention to the turbulent environment of a firm. Traditionally, environmental turbulence has been studied as a variable that moderates the effect of strategic agility on firm performance (Adomako et al., 2022, Ahammad et al., 2021, Clauss et al., 2021a, Reed, 2020, 2021); however, we consider this variable to exert a

direct influence on strategic agility itself. Furthermore, we go a step further in the study of these triggers of strategic agility, and we analyze the effect that this triad of variables has on each of the capabilities that make up this construct. To the best of the authors' knowledge, this research is the first to develop a theoretical framework and an empirical analysis that shed light on the effects of internationalization, environmental turbulence, and firm age on strategic sensitivity, leadership unity and resource fluidity.

The study is supported by a survey of 220 Spanish firms from the services sector, which is conducive to the attainment of its objective. It uses structural equation modelling (SEM) to identify the role of the triad of variables on the three different capabilities that make up strategic agility. The results that are obtained in this way highly relevant to both academics and practitioners.

The rest of the paper is structured as follows: the second section focuses on the theoretical underpinning of strategic agility and presents the different hypotheses. In the third section, we explain the methodology of the analysis and the data collection procedure. Fourth, the results of the research are presented and discussed. Finally, we provide conclusions, limitations and avenues for future research in the last section.

4.2 Theoretical background

4.2.1 Literature review on strategic agility

Strategic agility is a topic that still has not reached maturity, and different authors have defined and used the term differently (de Diego and Almodovar, 2021). However, there seems to be a consensus that strategic agility requires a combination of three capabilities: actively sensing and anticipating changes in the environment, making bold and rapid decisions, and reallocating resources quickly where they are most needed (Doz and Kosonen, 2010).

Strategic sensitivity is the first capability, which refers to the manner in which companies anticipate and adapt to changes in the environment. Firms that exhibit strategic sensitivity strive to expand their awareness of external changes, such as moves by competitors, shifts in customers' desires, or the availability of new technologies. In that sense, firms dedicate time and resources to listen to their clients (e.g., through surveys), to perform market studies, or to assess competitors (e.g., Where are they making investments?, What seem to be their areas of interest?, What recent strategic moves have they made?) (Doz and Kosonen, 2008b, Mavengere, 2013). The insights that emerge (e.g., on customers, competitors, technologies) are then communicated quickly so that the relevant layers of management can act upon the information.

The second capability, originally dubbed as leadership unity, but also referred to as 'collective commitment' (Ivory and Brooks, 2018), is about top executives communicating and integrating and aligning their interests. Specifically, it "*hinges on the ability of members of the top team to understand and trust each other"* (Doz and Kosonen, 2010, p. 376). This capability is important because organizations with a high level of leadership unity (or collective commitment) face minimal organizational resistance (Brueller et al., 2014) and make quick and bold strategic decisions (Doz and Kosonen, 2008b). Firms that excel at leadership unity have top management collaborating and solving challenges without meddling in 'win-lose' politics (Arbussa et al., 2017).

Finally, the third capability, resource fluidity, refers to the rapid redeployment of resources and the reconfiguration of business systems (Doz and Kosonen, 2008a), and this is an organizational and coordinative capability (Junni et al., 2015), which is particularly important because most firms suffer from resource rigidity (Gilbert, 2005). One explanation is provided by the fact that a large number of organizations were built in an age of stability, not of changing interdependencies and dynamic, volatile environments (Birkinshaw et al., 2008,

Hamel, 2007). Resource fluidity is about shifting resources in real-time rather than executing a pre-determined plan and is it enabled by an adaptive learning strategy-making perspective (Doz, 2020). Firms that excel at this capability are able to reallocate resources quickly (e.g., capital, people, competencies). Since strategic agility comprises three different capabilities, it is possible that the strengths and directions of the effects of the various triggers differ.

4.2.2 Internationalization and strategic agility

Some authors have studied internationalization and strategic agility together. For example, Demir et al. (2021) used data from SMEs in different countries to show that the two are inseparable in the pursuit of international success. Hagen et al. (2019) studied strategic agility as an antecedent to internationalization, focusing on early ventures in particular, to show that strategic agility helps improve risk profiles in entrepreneurial internationalization. Conversely, de Diego et al. (2022) considered internationalization as a precursor to strategic agility. We consider the potential impact of internationalization on strategic agility, which is similar to the mechanism by which internationalization fosters innovation and productivity. Several studies have argued that firms that are exposed to international markets are more productive or innovative (Almodóvar et al., 2021, Almodóvar et al., 2014, Salomon and Jin, 2010, Salomon and Shaver, 2005). Thus, it might be expected that the international dimension of firms is associated with new capabilities, such as strategic agility, that enable business to adapt to dynamic international environments.

International firms need to make sense of strategic situations in more than one country, and thus, they need to be aware of trends and changes in the market. Moreover, leaders at international firms are likely to find it more difficult to align and integrate their views, because

local leaders need to balance municipal interests against global ones (Dunning and Mucchiellli, 2001).

Some studies, such as Doz and Kosonen (2010), elaborate on the manner in which firms need to anticipate changes in the environment in order to maintain their strategic advantage and create value. Lewis et al. (2014) expanded on this idea by explaining that organizations need to combine backward- and forward-looking and engage ideas both top-down and bottom-up. Therefore, it can be expected that multinational corporations (MNCs) exhibit higher levels of strategic sensitivity.

The extant literature highlights the proposition that, when firms internationalize, there is a deliberate intention to exploit the resources and the capabilities of the firm that may be a source of competitive advantage (the internalization theory refers to this concept as firm-specific advantages (FSAs)) and to take advantage of the opportunities that the host country offers (what is identified such as country-specific advantages (CSAs)) (Buckley and Casson, 1976, Hennart, 1982, Rugman, 1981, Rugman et al., 2011). In order to leverage this combination of FSAs and CSAs, firms must be able to identify the liability of foreignness (LOF) that is specific to this host country and develop specific strategies oriented to reduce this threat (Rugman and Verbeke, 2007, Rugman et al., 2011, Zaheer, 1995). Each country exhibits different levels of complexity in terms of the type of LOF, the potential opportunities (CSAs) and the FSAs that are transferable or operational on its territory. This means that firms need to sharpen their perspicacity, attention and awareness in these newer and less familiar environments (Debellis et al., 2021). Under these circumstances, the abilities to anticipate (strategic foresight) and to implement action plans (strategic insight) become crucial (Doz and Kosonen, 2008b). Consequently, the internationalization of the firm must promote mechanisms that entail the collection of valuable information on competitors, customers, suppliers, and such

like, and to stimulate a mindset sensitive to external changes. These steps are necessary for the firm to design and adapt its strategic planning to the reality of the various international markets.

Hypothesis 1: Internationalization is positively related to strategic sensitivity.

Firms need to achieve leadership unity in order to successfully implement the strategic changes that the different international environments demand. For implementation to succeed, therefore, trust and empathy among the members of the organization are of crucial importance. If these conditions are met, firms could make bold strategic decisions quickly and encourage their members to engage collectively with the strategies that have been set (Debellis et al., 2021, Gurkov et al., 2017). However, the complexity involved in bringing the international dimension into leadership makes its "unity" greatly hindered.

The executives who responsible for different international markets are unlikely to work face-to-face. This may be due to the geographical distance or, simply, to the growing trend for teleworking. This trend explains the increasing use of remote communication channels (instant messaging, e-mails, phone calls and video conferences). Remote channels have the disadvantage of leading to a loss of communication quality (Loode, 2021), which can be aggravated by the different cultures, disciplines, or levels of professional experience of the executives (Horney et al., 2010). This situation leads to higher communication complexity, which makes mutual understanding and comprehension more difficult. Therefore, trust, empathy and the interconnectedness of executives that are assigned to home and host countries are hampered considerably by this increased communication complexity. Negotiations and decision-making between executives within a firm are not without conflict (Morrill, 1995). These conflicts increase when the cultural dimension is introduced (Morris et al., 1998) because the management of different cultures creates substantial difficulties for the co-management of operations (Morrill, 1995).

Therefore, as the internationalization of the firm expands in scale and scope, the intrinsic complexity of collaborating and reaching a consensus among executives will increase dramatically. As a result, leadership unity is likely to be undermined.

Hypothesis 2: Internationalization is negatively related to leadership unity.

As indicated above, the main trigger for the internationalization process of firms is the availability of FSAs that may yield competitive advantages (Almodóvar and Rugman, 2014, 2015, Rugman, 1981, Rugman et al., 2011). Thus, firms that are entering new markets often try to exploit these FSAs in order to replicate the home competitive advantage in the host country. However, Rugman and Verbeke (1992, 2001, 2007) explained that only some of these FSAs is mobile or transferable across borders, as they may lose their value. Therefore, they classified FSAs into two groups. On the one hand, non-location-bound FSAs are mobile FSAs because they are not linked to the place of origin of a firm. They can be exploited globally because they retain their relevance and value wherever they are transferred. Thus, this type of FSAs is often incorporated into the final products that are being exported because they do not require significant adaptation to the host country (Verbeke and Asmussen, 2016). On the other hand, location-bound FSAs are linked to the country of origin because the firm needs to be nationally responsive in order to exploit national differences. This implies that firms cannot easily transfer these FSAs to other countries without loss of value. Thus, if relocation or mobility between countries is necessary, these FSAs require significant adaptation. Location-bound FSAs reach their full potential in the context of foreign subsidiaries.

Rugman and Verbeke (2001) developed the subsidiaries' approach to internationalization and the concept of subsidiary-specific advantage (SSAs). This theoretical development explains how foreign subsidiaries are capable of developing their own sources of competitive advantage in order to be responsive in host countries. This case is the most complex because foreign subsidiaries are characterized by dual embeddedness (externally

embedded in the host countries and internally embedded within the MNEs (Nguyen and Almodóvar, 2018, Nguyen et al., 2022). This implies that they must follow a strategy of global integration with the parent firm, but they must also follow a strategy of local responsiveness that is specific to the foreign environment. Such SSAs are, mostly, location bounded. They are, therefore, highly difficult to transfer.

The foregoing indicates that the firms' internationalization process of firms is characterized by a flow of resources and capabilities that the firm considers to be sources of competitive advantage. Not all of them are mobile and transferable. In fact, the higher the degree of commitment abroad, the more likely it is that the number of FSAs or SSAs that cannot be transferred across borders will increase.

Hypothesis 3: Internationalization is negatively related to resource fluidity.

4.2.3 Age and strategic agility

Several studies have examined the impact of age on strategic agility. There is a general consensus in favor of the proposition that strategic agility is negatively impacted by age. In other words, younger firms tend to be more agile than older ones. However, few studies assess directly or indirectly, the manner in which each of the capabilities (strategic sensitivity, leadership unity, and resource fluidity) are affected by age.

Loderer and Waelchli (2010) explained that the aging of the firm results in organizational rigidity. Consequently, many resources and capabilities become obsolete. Furthermore, Loderer et al. (2017) concluded that age makes organizations less proactive in dynamic environments, which could result in reduced strategic sensitivity.

Hypothesis 4: Age is negatively related to strategic sensitivity.

Doz (2020) asserted that there are many impediments to collective commitment (or leadership unity). These include strong ambitions on the part of executives, and their personal needs for autonomy. As companies evolve, they build distinct functions, specialized and decentralized divisions, subsidiaries or joint ventures, which satisfy the executives' desires for achievement and autonomy. Thus, it is likely that older companies exhibit lower levels of leadership unity than younger ones. Moreover, Reed (2021) stated that firms should leverage strategic agility while they are young, because it declines as they grow older.

Hypothesis 5: Age is negatively related to leadership unity.

Gilbert (2005) argued that most companies suffer from rigidity in resource-allocation outcomes and further studies have shown that the concepts and processes of managers and organizations are usually formulated in an age of stability, not of changing interdependencies and shifting environments (Birkinshaw et al., 2008, Hamel, 2007). Thus, we can expect that older firms lack the mechanisms that are necessary to ensure an adequate resource-sharing mechanism. Finally, Doz and Kosonen (2008b) asserted that resource fluidity also deteriorates over time.

Hypothesis 6: Age is negatively related to resource fluidity.

4.2.4 Turbulence and strategic agility

Stable environments enable strategies to be maintained over time; if they need to be amended, the process occurs slowly (Grant, 2003, Mintzberg, 1993). Therefore, firms that operate in stable environments are bound to become more rigid. Consequently it is important to determine whether the reverse is equally certain and whether turbulence is likely to foster strategic agility.

Some studies have hypothesized a relationship between environmental turbulence and strategic agility, which some authors have considered to be a moderating effect. For example, Clauss et al. (2021a) treated environmental turbulence as a moderating effect in the relationship between strategic agility and business model innovation and Reed (2020) treated it as a moderator of the relationship between firm age and strategic agility. Other studies have suggested that environmental turbulence is an antecedent to strategic agility. For example, Anggraini and Sudhartio (2019) studied the impact of how strategic agility on the performance of the banking sector in Indonesia and found that environmental turbulence has a positive impact on strategic agility, which in turn has a positive impact on competitive advantage and firm performance. de Diego et al. (2022) identified a set of drivers for strategic agility and considered environmental turbulence to be one of them. They found that none of the drivers in question are necessary conditions for drive agility; instead, different combinations of drivers lead companies to become agile.

We understand that firms whose environments are dominated by turbulence are continuously subject to drastic changes (e.g., the emergence of disruptive innovations, new competitors, and new laws that change the rules of the game) that require changes to their strategies in order to survive. In the literature, Hall and Rowland (2016) found that a turbulent environment pushes firms to become more agile, and several other scholars have written in support of the proposition that environmental turbulence is a relevant factor that impacts strategic agility (Clauss et al., 2021b, Ilmudeen, 2021, Reed, 2021, Vazquez-Bustelo et al., 2007). It is, therefore, to be expected that environmental turbulence should have a positive impact on strategic agility, both as and in relation to each of its constituent capabilities.

In turbulent environments, the need to increase strategic sensitivity is of paramount importance. Doz and Kosonen (2008b) explained that, as the turbulence of the environment increases, strategic thinking must come to rest on superior foresight and insight. In this

situation, the pace of strategic thinking is highly uneven. The firm may face periods of apparent calm, over which strategic sensitivity is necessary, but will not be accompanied by any concrete action. These periods will be followed by abrupt changes that will require agile action plans, but the previous inactivity may compromise the correct formulation of the new strategy. Therefore, foresight is of vital importance to anticipate disruptions and shifting trends. Moreover, if environmental change is to be met with adequate adaptations, forecasting needs to be complemented by strategic insight which enables opportunities to be seized.

We understand that, when environments are highly turbulent, strengthening foresight and enhancing insight are critical. Therefore, turbulence in the environment encourages firms to develop their strategic sensitivity further.

Hypothesis 7: Turbulence is positively related to strategic sensitivity.

Turbulent environments should encourage top managers to improve their leadership and teamwork skills and to prioritize mutual benefit (Hall and Rowland, 2016, Johansen and Voto, 2014). In addition, drastic changes in the environment may affect the traditional business model, so executives must be prepared to make difficult decisions and to accept collective compromises that may be challenging and risky. Consequently, building and developing the unity of the leadership team is essential to responding to the challenges that arise from a environmental turbulence (Doz and Kosonen, 2010).

Hypothesis 8: Turbulence is positively related to leadership unity.

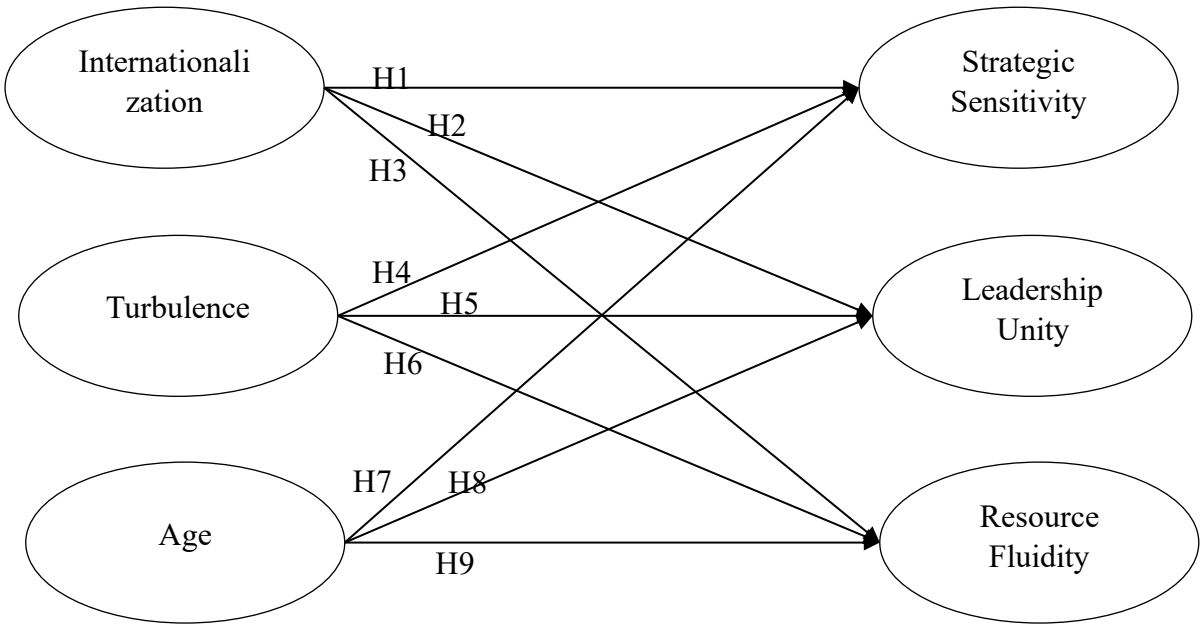
Emphasizing resource fluidity contributes to the organization, initiation, scaling up and operation of new growth initiatives and businesses on the part of the firm (Doz and Kosonen, 2008a). As firms compete in turbulent environments, they are likely to seek opportunities to survive and be competitive. Therefore, it is likely that these firms will make an additional effort to reallocate resources towards launching and running new initiatives and businesses. We

understand that turbulence encourages firms to be fluid in their use of resources and to reallocate them where they are most needed.

Hypothesis 9: *Turbulence is positively related to resource fluidity.*

Figure 4.1 shows the conceptual model of the nine hypotheses that we want to test.

FIGURE 4.1: Conceptual model



4.3 Methodology and data gathering

4.3.1 Sample

This study draws on empirical data from a survey of 220 Spanish firms that operate in the services sector. Our sample covers firms with different ranges of employee numbers: 72% are SMEs (less than 250 employees), 17% from 251 to 1000, and 11% over 1000 employees. We deliberately chose to focus on one specific sector in order to enhance the validity of the study because this design choice reduces potential biases from various industry-specific exogenous factors (Harrigan, 1983). The data for the study was collected in 2022 by a leading market study company (publicly traded on the French stock exchange) that sought respondents

from senior levels of management (i.e., C-Level, director or equivalent). The questions were presented to the respondents in randomized order (preventing measurement items not being adjacent to each other) in order to ensure data validity.

4.3.2 Measurement instrument

The measurement of each of the capabilities that make up strategic agility (strategic sensitivity, leadership unity and resource fluidity) has been applied widely in the literature. Thus, there is a high degree of consensus that each capability is captured by three questions that are measured on a Likert scale (Clauss et al., 2021a, de Diego et al., 2022). Likert scales are a type of psychometric scale commonly used in questionnaires to gauge respondents' attitudes, opinions or perceptions. The scale typically consists of a statement or a question, which is followed by a selection of options that range from one extreme to another. The questions that were used in this study are specified in Table 4.1.

The internationalization metric was measured by reference to the Uppsala internationalization model (Johanson and Vahlne, 1977, Johanson and Wiedersheim-Paul, 1975), which proposes a sequential approach (in terms of the level of commitment and the length of time the over which firm operates abroad) that accounts for the internationalization process. Therefore, we created a Likert variable that proceeds from a state of no internationalization towards one that entails a high degree of engagement. More specifically, it covers: (1) firms with no international presence; (2-3) firms that exhibit different seniority in exporting and have no foreign subsidiaries; (4-7) firms that, in addition to exporting, have foreign subsidiaries (we consider different levels of seniority).

We follow de Diego et al. (2022) in measuring Turbulence, where they considered different factors that could disrupt an industry, such as: the appearance of new entrants, new

regulations or innovations. Finally, we measured age by asking respondents about the time when their company was established and subtracting that value from 2022, a method that has also been used in other studies, such as (Almodóvar et al., 2021). Table 1 shows the specific survey questions that we used for each of the measurement items.

4.3.3 Model

Structural Equation Modelling (SEM) is a statistical technique that is used to analyze and estimate the causal relationships among multiple variables by combining factor analysis and multiple regression analysis. It is the best known and most widely used path modelling technique in the international business literature (Shackman, 2013) and has become a quasi-standard in management research when it comes to analyzing the cause-effect relations between latent constructs (Hair et al., 2011). Other recent studies on strategic agility have used this technique (Clauss et al., 2021a, Reed, 2021). We used SEM with the Partial Least Squares (PLS) approach (in place of a Covariance Based (CB) one) because our model includes formative constructs (Hair et al., 2011) and because the distinction between formative and reflective measures is important for the proper specification of the measurement model. (Anderson and Gerbing, 1988).

In terms of constructs, we considered *Turbulence* to be a formative construct that accounts for new entrants, new regulations and innovations. As long as new entrants, new regulations or innovations exist, we believe that the construct should be affected. In other words, none of the indicators are interchangeable because each contributes a specific meaning to the latent variable.

We considered the three capabilities of strategic agility (strategic sensitivity, resource fluidity, and leadership unity) as three reflective constructs that comprise three indicators each. We expected all the indicators to be correlated (i.e., an increase in strategic sensitivity would

be reflected in an increase in all three indicators). Due to the high correlations between the indicators, they interchangeable and dropping an indicator should not alter the conceptual meaning of the construct (Jarvis et al., 2003).

Finally, we modelled *Internationalization* with a newly created variable that captures the commitment of the firm to internationalization, and we modelled *Age* with one indicator that reflects the period, in years, over which the firm has been operating. The values for each of the constructs are specified in Table 4.1.

TABLE 4.1: Constructs for latent variables and measurement items

Construct / Latent variable	Measurement item	Survey questions	Values	Mean	Standard Deviation	Excess Kurtosis	Skewness	Reference
Internationalization	One indicator that aggregates two questions	When did your company start to sell products or services outside of Spain (e.g., through exports)? When did your company make its first direct investment outside of Spain (e.g., part of the supply chain, research facilities, subsidiary?	1-7	3.618	2.462	-1.704	0.075	Inspired by Johanson and Vahlne (1977), Johanson and Wiedersheim-Paul (1975)
Turbulence	One indicator	In the last three years, have there been new entrants to your industry with the ability to alter the status quo of the incumbents?	1-7	5.177	1.229	0.577	-0.698	de Diego et al. (2022)
	One indicator	In the last three years, has there been any innovation that has 'changed the rules of the game' significantly in your industry (e.g., electric vehicles in the Automotive industry)	1-7	5.145	1.497	0.553	-0.889	
	One indicator	In the last three years, has there been any significant regulation/law that has 'changed the rules of the game' significantly in your industry (e.g., GDPR in the Financial Services industry)	1-7	5.195	1.359	0.493	-0.741	
Age	One indicator:	When was your company founded? *The values were obtained by subtracting the reported age from the year of the study (2022)*	0-222	26.64	27.39	13.377	2.95	(Almodóvar et al., 2021, Reed, 2021)
Strategic Sensitivity	One indicator	We are very sensitive to external changes (regarding customers, competitors, technologies, etc.) and integrate these into the strategic planning of our company	1-7	5.223	1.379	0.586	-0.857	(Clauss et al., 2021a, Clauss et al., 2021b, de Diego et al., 2022, Ferraris et al., 2022)
	One indicator	We utilize different mechanisms to become aware of strategic developments early (i.e., we survey our clients, perform market studies, assess competitors, assist to conferences)	1-7	5.177	1.443	0.126	-0.761	

	One indicator	Requirements for strategic adaptations are communicated fast and comprehensively through the organization	1-7	5.264	1.329	-0.045	-0.611
Leadership Unity	One indicator	Our top management is able to make bold and fast strategic decisions	1-7	5.4	1.366	0.273	-0.784
	One indicator	Our management collaborates for strategic decisions	1-7	5.659	1.224	0.585	-0.868
	One indicator	Strategic decisions are collectively solved by our management without being bogged down in top-level "win-lose" politics	1-7	5.286	1.545	0.21	-0.861
Resource Fluidity	One indicator	We are able to reallocate and utilize capital resources fluidly	1-7	5.386	1.214	0.837	-0.73
	One indicator	Our people and their competencies are highly mobile within our organization	1-7	5.268	1.285	1.181	-0.888
	One indicator	Our organizational structure allows for flexible redeployment of our resources	1-7	5.464	1.266	1.292	-1.007

4.4 Results

We assessed the validity of the constructs on the basis of common reliability and validity measures (Hair et al., 2011). Table 2 shows the loadings of the indicators; all but one (*Innovation*) are above the threshold value of 0.7, showing good indicator reliability (Chin, 2010). The indicator *Innovation* has a loading of 0.573, which is, above 0.5, indicating that it makes a sufficient contribution to the formation of the construct and, thus, should therefore be retained (Hair et al., 2022). Table 3 shows that composite reliability is above the threshold of 0.7, and that the Average Variance Extracted (AVE) is above 0.5 (Hair et al., 2011).

In order to ensure adequate discriminant validity of the constructs, we tested the cross-loadings (i.e., to ensure that no item loads higher on another construct than it does on the one with which it is associated), which is presented in Table 4 (Hair et al., 2011). For the formative constructs, we tested multi-collinearity. The variance inflation factors (VIF) are all well below the conservative threshold of 3, at which collinearity issues can still occur (Hair et al., 2022). The results are presented in Table 4.5.

TABLE 4.2: Outer loading of indicators

Variable	*Age*	*Internationalization*	*Leadership Unity*	*Resource Fluidity*	*Strategic Sensitivity*	*Turbulence*
Resource Fluidity 1				0.855		
Resource Fluidity 2				0.799		
Resource Fluidity 3				0.892		
Internationalization		1.000				
Age	1.000					
New Competitors						0.859
Innovation						0.573
Regulation						0.822
Strategic Sensitivity 1					0.730	
Strategic Sensitivity 2					0.860	
Strategic Sensitivity 3					0.838	
Leadership Unity 1			0.867			
Leadership Unity 2			0.885			
Leadership Unity 3			0.835			

TABLE 4.3: Construct reliability and validity

	Cronbach's alpha	*Composite reliability (rho_a)*	*Composite reliability (rho_c)*	*Average variance extracted (AVE)*
Leadership Unity	0.828	0.831	0.897	0.744
Resource Fluidity	0.808	0.827	0.886	0.722
Strategic Sensitivity	0.742	0.766	0.852	0.659

TABLE 4.4: Cross-loadings of indicators

Variable	*Age*	*Internationalization*	*Leadership Unity*	*Resource Fluidity*	*Strategic Sensitivity*	*Turbulence*
Resource Fluidity 1	-0.103	0.060	0.653	**0.855**	0.622	0.408
Resource Fluidity 2	0.007	0.134	0.642	**0.799**	0.540	0.392
Resource Fluidity 3	-0.090	0.137	0.750	**0.892**	0.697	0.496
Internationalization	0.261	**1.000**	-0.008	0.131	0.253	0.287
Age	**1.000**	0.261	-0.097	-0.077	-0.038	0.066
New Competitors	0.036	0.257	0.445	0.440	0.449	**0.859**
Innovation	0.047	0.290	0.266	0.265	0.356	**0.573**
Regulation	0.076	0.188	0.414	0.431	0.431	**0.822**
Strategic Sensitivity 1	-0.017	0.113	0.489	0.480	**0.730**	0.355
Strategic Sensitivity 2	0.012	0.332	0.530	0.581	**0.860**	0.470

Strategic Sensitivity 3	-0.090	0.142	0.683	0.715	**0.838**	0.457
Leadership Unity 1	-0.080	-0.003	**0.867**	0.645	0.609	0.442
Leadership Unity 2	-0.061	0.028	**0.885**	0.731	0.637	0.476
Leadership Unity 3	-0.113	-0.050	**0.835**	0.709	0.561	0.390

TABLE 4.5: Indicator collinearity for formative constructs

Variable	*VIF*
New Competitors	1.317
Innovation	1.275
Regulation	1.353

4.4.1 Hypothesis testing

Hypothesis 1 posits a positive relationship between internationalization and strategic sensitivity. Our results indicate that the path coefficient is 0.138, providing support for the hypothesis. This suggests that the internationalization of the firm promotes mechanisms that foster the acquisition of information about competitors, customers, suppliers, etc. and that it stimulates a mindset that can adapt to the different international markets in which the company competes. Hypothesis 2 posits a negative relationship between internationalization and leadership unity, and the results also provide support for this hypothesis, with a path coefficient of -0.142. This helps corroborate the proposition that the international dimension of leadership causes "unity" more complex. Hypothesis 3 posits a negative relationship between internationalization and resource fluidity, but our results are not statistically significant (the path coefficient is 0.012, but the p-value of 0.846 is very high, which makes the results non-significant).

Hypotheses 4, 5 and 6 posit that age has the opposite effect on turbulence where older companies are expected to exhibit lower levels of strategic agility. Our results show negative path coefficients of -0.108, -0.096, and -0.115 between internationalization and strategic

sensitivity, leadership unity and resource fluidity, respectively. These results are consistent with those obtained in other studies (Loderer et al., 2017, Loderer and Waelchli, 2010, Reed, 2021) and confirm that younger firms tend to be more agile than older ones. As firms grow old, organizational rigidity appears, as do more complex structures, while the number of resource-sharing mechanisms decreases.

Finally, hypotheses 7, 8 and 9 posit that a turbulent environment has a positive relationship with strategic agility, our results confirm. In particular, the path coefficients are as follows: 0.499 for the relationship between turbulence and strategic sensitivity, 0.555 for the relationship between turbulence and leadership unity, and 0.517 for the relationship between turbulence and resource fluidity. This is consistent with other studies in that turbulence is a relevant factor that impacts strategic agility and makes firms more agile. (Clauss et al., 2021a, Hall and Rowland, 2016, Ilmudeen, 2021).

Overall, our model explains reasonably a high degree of variance: 30.4% for strategic sensitivity, 29.2% for leadership unity, and 27.5% for resource fluidity. These values are at least in line with those obtained in other recent studies such as (Clauss et al., 2021a, Reed, 2021), and sometimes exceed them, providing adequate support for the results. Appendix A for a detailed graphical representation of the model, as well as the path coefficients, loadings and p-values.

4.5 Discussion and conclusions

4.5.1 Implications for scholars

As a topic, strategic agility has not reached maturity (de Diego and Almodovar, 2021), and this paper provides new insights as well as a more profound understanding of the subject. Specifically, it contains an in-depth study of the triad of variables that are currently attracting

the most attention (in books and journal editorials) on strategic agility: age, turbulence, and internationalization. The objective of this paper was to show how these three variables are linked to the three capabilities that comprise strategic agility, namely: strategic sensitivity, leadership unity, and resource fluidity. Our empirical findings show that age is negatively related to the three capabilities, and that turbulence is positively related to the three different capabilities. The relationship between internationalization and strategic agility is more complex. On the one hand, internationalization is related to higher levels of strategic sensitivity. On the other hand, it is also associated with lower levels of leadership unity.

4.5.2 Implications for practitioners

Managers who seek to foster strategic agility at their firms should be aware of the opposite impacts of two key variables: age and turbulence. Older companies will likely find it harder to remain agile than younger ones, and businesses that compete in turbulent environments are likely to be more strategically agile than those that compete in stable environments.

This said, it is the study of a third variable -internationalization- where we think that stands to benefit the manages who consult this study the most. The paper provides insights particularly useful for international firms because they have to counterbalance two opposing effects when they aim to achieve strategic agility. While strategic sensitivity is likely to be enhanced (i.e., by awareness of strategic or technological developments and moves by competitors in different locations), leadership unity is likely to be dampened.

The managers of international firms or of firms seeking to internationalize should consider these opposing effects on strategic agility in order to try to i) leverage increases of strategic sensitivity and ii) counterbalance the decrease in leadership unity that is linked to internationalization (de Diego et al., 2023).

4.5.3 Limitations and future lines of research

We did not attempt to identify all of the possible drivers of strategic agility; instead, we focused on those variables that are attracting the most attention. Thus, further studies could consider other variables and assess the impact on strategic agility. For example, new studies could evaluate some of the factors that were identified by (de Diego et al., 2022), such as size, investment in capabilities and technologies, investment in additional revenue models or cost-cutting mechanisms, or entrepreneurship.

Furthermore, we have deliberately relied on sector-specific data from one country, but future studies could test the generalizability of the results to other sectors and countries. Specifically, future research could examine the differences between different sectors, including the relationship between strategic agility and financial performance.

Finally, the size of our sample is sufficient for a PLS-SEM study (Hair et al., 2011), but larger sample sizes could yield clearer results on the relationship between internationalization and resource fluidity.

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CHAPTER 5

5.1 Conclusions

As of 2023, strategic agility is not a new topic – there is considerable awareness of the subject. The turbulent world in which firms must compete in has caused attention to return to strategic agility. Many firms try to become strategically agile, and an increasing number of authors are publishing works on the topic (de Diego and Almodovar, 2021). However, many questions remain. This thesis was an attempt to answer some of the most pressing questions in this domain:

a. What is the state of the art in the topic of strategic agility?
b. What are the key drivers that lead companies to achieve strategic agility?
c. How do key factors (such as internationalization) impact strategic agility?

The thesis began by demonstrating how strategic agility has not reached maturity and is linked to several thematic areas (de Diego and Almodovar, 2021). It confirmed the conclusions of Weber and Tarba (2014) who asserted that the topic is ill-defined. By conducting a thorough bibliometric study and reviewing publications on the topic over the last 25 years, we showed how it emerged and how it evolved over time, demonstrating that the limits and the scope of the concept are ambiguously defined. In the literature, the first references to strategic agility are mostly to Information Technology. Then other different topics, such as innovation or competitive advantage began to emerge. We also showed how the topic has been used in different ways by different authors. Some have proposed their own definition, such (Denning, 2018, Ekman and Angwin, 2007, Lewis et al., 2014, Weber and Tarba, 2014), while others such as Weill et al. (2002) have used the term “strategic agility” without defining it.

The bibliometric research also helped to show that the literature on strategic agility hasn’t reached maturity. We observed an increase in the number of publications and in the number of citations that they have obtained. Overall, the bibliometric analysis demonstrated

that strategic agility is a promising avenue for research, with many problems still awaiting further analysis.

The thesis continued by assessing the factors that are related to strategic agility. A thorough review of the literature identified factors that may plausibly drive strategic agility. Then, since practical knowledge about the topic suggested that there could be different alternatives, we leveraged QCA (a technique that allows for equifinality) in order to evaluate the results of a study undertaken in 40 companies in the services sector in Spain. Furthermore, we conducted semi-structured interviews at representative firms that have experienced each of the alternative combinations of factors that lead to strategic agility. This research shows that six key factors drive companies to achieve strategic agility. No single factor is necessary. Instead, use five different combinations of factors in order to achieve strategic agility.

The thesis concluded with an in-depth, quantitative study of the effect of the triad of variables that have gained the most attention in books and journal editorials on strategic agility. That triad comprises internationalization, age, and environmental turbulence. There have been some initial studies of age (Reed, 2020, 2021) and turbulence (Clauss et al., 2021, Hall and Rowland, 2016) but no papers have linked internationalization and strategic agility. As internationalization has been shown to have a positive link to other variables, such as innovation, it seemed plausible that strategic agility could also be affected. Thus, in the quantitative study, the capabilities that comprise strategic agility were disaggregated, and the relationship between all combinations of the triad of variables were evaluated by reference to the three capabilities. The study concluded that age has a negative impact on strategic agility, and that the impact of turbulence on the same variable is positive. However, internationalization affects strategic agility in two opposing ways (de Diego et al., 2023), although it enhances strategic sensitivity, it also hampers leadership unity.

The thesis follows the traditional monograph route. Although its chapters rely on published articles with the thesis' supervisor and other co-authors, it's not a thesis that follows the PhD-by-publication approach. At the time of completion of the thesis, Chapters 2 and 3 had already been published, and Chapter 4 was under review by a leading academic journal. A version of this chapter targeted towards a more business focused audience had already been published by California Management Review Insights.

5.2 Contributions of the study

The thesis has been developed with the objective of bridging the gap between scholars and practitioners. Both constituencies have increasingly demonstrated increasing interest in the topic. Awareness of strategic agility is evident from the academic literature, and companies are striving continuously to identify means of competing optimally in an unstable and unpredictable environment. In that sense, all of the studies are intended to advance theoretical knowledge and at the same time, to identify find practical implications for companies.

5.2.1 Contributions to scholarship

The main theoretical contribution of this study is that it provides a superior understanding of the topic of strategic agility from different perspectives.

First, the thesis identified commonalities in the definition of the topic and provided a detailed description of the state of the art in the subjects that have attracted the most academic interest, of the key topics that are related to strategic agility and, of the key gaps. Specifically, chapter 2 provided a comprehensive definition of strategic agility and showed that the topic still has not reached maturity. It also described its relationship to a large number of concepts.

Second, the thesis provides a theoretical and practical perspective on the key drivers of strategic agility at companies. The literature on the most plausible drivers was reviewed, and the usage of QCA showed that none of them are necessary. Instead, there are five equivalent combinations that companies can adopt. The configurations had high consistency which suggests that the model was useful and can serve for theory advancement (Woodside, 2017). The QCA study that is presented in chapter 3 represents a novel approach to strategic agility. Most studies rely on other techniques and the use of a configurational approach changes the paradigm of research on the subject.

Finally, chapter 4 provided a thorough review of the triad of variables that have attracted the most attention in books and journal editorials. By using PLS-SEM, we showed how age, turbulence, and internationalization are linked to each of the capabilities that comprise strategic agility, namely: strategic sensitivity, leadership unity, and resource fluidity.

The thesis also provides an empirical contribution. In particular, the study from chapter 4 is the first to measure strategic agility by examining each of the capabilities that constitute it. It is also the first paper that reports empirical results on the relationships between internationalisation, age, and turbulence. Moreover, this is likely to be the first study of strategic agility in Spain that focuses on companies in the services sector.

5.2.2 Contributions to practitioners

Managers will benefit in particular from the latter chapters of the study, which contain practice-oriented discussions of the drivers of strategic agility and detailed explanations of the impact of internationalization on each capability.

We charted paths to the configurations that companies are currently adopting in order to achieve strategic agility (with real examples). Managers can compare the situation at their

firms with each of the configurations that were presented and identify gaps, thus obtaining an indication of the steps that they must take to achieve strategic agility in their firms (de Diego et al., 2022).

The thesis provided detailed information about one of the variables that lead to strategic agility: internationalization. It has two opposing effects on strategic agility (one of the capabilities is enhanced, but another is hampered). Thus, companies that are international or which are be seeking internationalization can consider these effects to leverage the increase in strategic sensitivity and must strive to counterbalance the decrease in leadership unity that is linked to internationalization (de Diego et al., 2023).

5.3. Limitations and future lines of research

The thesis has some limitations. First, the bibliometric study in Chapter 2 might have benefited from a larger sample. The standard sample in studies of this type is 1,000 papers (Rogers et al., 2020) Given that strategic agility is a relatively new topic, only 293 valid references were included in the study.

Second, the case study of 40 companies (Chapter 3) yielded profound insights into a specific sector and a specific country, but it may not be representative larger populations. The size of the sample is appropriate for QCA, given that the minimum sample is dependent on the number of causal conditions (Marx, 2006). However, a virtually infinite number of calibrations could have yielded different results. Specifically, our model had a relatively high coverage (0.66), which is a measure that is comparable to the R-squared values that are reported when regression-based methods are used (Woodside, 2013). While this value is high, some of the variation in strategic agility remains unexplained by the model, suggesting that it has other antecedents.

Finally, the results from the quantitative study of the impact of turbulence, age, and internationalization on strategic agility (Chapter 4) provided profound insights for companies in the services sector in Spain. However, it has the same limitations as the QCA study, in that the results are not necessarily representative of a wider population. The size of the sample used (220) is sufficient for a PLS-SEM study (Hair et al., 2011), but a larger sample could have produced clearer results on the relationship between internationalization and resource fluidity. Also, the study focuses on three key antecedents to strategic agility, but there are others, such as the ones identified in Chapter 3 (e.g., size, investment in capabilities and technologies). Studying the relationship between them and strategic agility could be an interesting avenue for future research.

5.4 Bibliography

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