THE IMPACT OF FOUNDER CEOS ON FIRM GROWTH:

An Analysis Through the Lens of Penrosean and Upper Echelons Theories

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Thesis Abstract

This research investigates the impact of founder CEOs (FCEOs) on the firms they establish, with a particular focus on firm growth, profitability and productivity (as a robustness outcome). Drawing on Penrose's *The Theory of the Growth of the Firm* (1959), Upper Echelons Theory (Hambrick and Mason, 1984; Hambrick, 2007) and the Resource-Based View (Barney, 1991), the study examines founder motivations and how CEO attributes shape performance. Using a thirty-year longitudinal dataset of UK-incorporated firms listed on the Main Market of the London Stock Exchange as at 31 December 2018, the analysis employs firm fixed-effects panel models, with propensity-score matching as a complementary check, to compare FCEOs with non-founder CEOs (NFCEOs).

The findings indicate a founder growth premium whereby FCEO leadership is associated with higher growth particularly in younger and smaller firms. By contrast, there is no contemporaneous founder premium in respect of profitability, and productivity shows no systematic founder differential. Generic CEO markers such as highest degree, broad functional knowledge and industry experience, display weak average associations with growth and profitability once firm heterogeneity is absorbed, and founder interactions on these markers are not robust. In-firm time (the share of a CEO's career spent within the focal firm) dampens the founder–growth association, whereas tenure in the CEO role shows no systematic link with growth and only a weak average association with profitability. The matched comparison corroborates the fixed-effects results by preserving the growth premium without a profitability premium..

The study contributes a long-horizon assessment of founder leadership grounded in Penrosean growth logic and contextualised by Upper Echelons Theory and the Resource-Based View. Practically, it argues for sequencing (managing founder leadership as a growth mechanism with a planned transition to capability consolidation) and for governance and selection practices that emphasise complementarity with firm-specific architectures rather than portable credentials. These insights inform theory and practice on when and how founders create value.

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'For a long time now I have tried simply to write the best I can. Sometimes I
have good luck and write better than I can' (Hemingway, 2003)

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List of abbreviations and acronyms

ATET   Average treatment effect on the treated

BE   Between-effects

CEO   Chief Executive Officer

CFO   Chief Financial Officer

COO   Chief Operating Officer

ΔSR   Change in sales revenue

CTO   Chief Technical Officer

EDA   Exploratory data analysis

FCEO   Founder Chief Executive Officer

FE   Fixed effects

LSE   London Stock Exchange

LV   Level variance

MD   Managing Director

NFCEO   Non-founder Chief Executive Officer

NPV   Net present value

RBV   Resource-Based View

RE   Random effects

ROA   Return on assets

ROI   Return on investment

ROP   Return on people

SIC   Standard industry classification

TCE   Transaction cost economics

TFP   Total factor productivity

TMT   Top management team

UET   Upper Echelons Theory

UK   United Kingdom

VIF	Variance Inflation Factor
VRIN	Valuable, rare, inimitable and non-substitutable

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Chapter 1

Introduction

'I was not impressed by the reasoning behind, nor the evidence to support, the assumption that the managers or directors of large corporations in the modern economy saw themselves in business largely for the benefit of shareholders……….Profits were treated as a necessary condition of expansion–or growth–and growth, therefore, was a chief reason for the interest of managers in profits.' (Penrose, 1995, p236)

This observation by Penrose challenges the traditional shareholder-centric view of firm objectives, positioning growth (not merely profitability) as the central driver of managerial decisions. Penrose's seminal work, *The Theory of the Growth of the Firm* (1959), provides a critical lens through which the motivations of firm founders can be understood. Penrosean theory suggests that managers, particularly founder CEOs (FCEOs), prioritise the pursuit of growth, with profits serving as an enabling condition rather than the ultimate objective. Notably, it also highlights the managerial constraints that shape growth trajectories, such as limited resources and the tension between innovation and stability. This insight underscores the importance of understanding the unique attributes of FCEOs in the context of firm growth.

The relationship between founders and the firms they establish is deeply personal and intricate, reflecting their initial motivations for starting the business. These motivations are multifaceted, encompassing aspirations for growth, power and profit. Penrose's work provides a foundation for understanding these motivations and argues that growth is a primary driver for firms, with profits serving as a necessary condition for expansion. Penrosean theory is not merely about growth but also highlights the managerial constraints that shape growth trajectories. These include limited managerial resources and the tension between pursuing innovation and maintaining stability as firms mature. This perspective is essential to understanding why FCEOs are particularly effective in the early stages of firm growth but may face challenges as firms evolve.

This growth-centric perspective is particularly relevant to FCEOs, who balance entrepreneurial ambitions with personal goals, such as maintaining control and influence over their creations. The motivations of FCEOs extend beyond profit, encompassing aspirations for power, growth and long-term success. Wasserman (2008; 2013) highlights that FCEOs are often driven by the need to create and lead an organisation, a motivation that is deeply rooted in the initial stages of firm development. During the start-up phase, a FCEO's focus is typically on realising their vision, leveraging their specialised knowledge and capitalising on market opportunities. Success in these early years often

reinforces their perception of their leadership abilities. However, as the firm grows, FCEOs face a critical dilemma: whether to prioritise control over the firm (the *king* motivation) or to seek external resources to accelerate growth (the *rich* motivation), potentially at the cost of ceding some control, a framework originally articulated by Wasserman (2008) and subsequently developed by others, including Winston Smith (2012). This dilemma is particularly acute when FCEOs recognise that internal resources may be insufficient to fully exploit market opportunities.

The central research question that guides this study asks 'Under what conditions do FCEOs enhance or constrain firm performance, compared to non-founder CEOs (NFCEOs)?' In addressing this question, the thesis evaluates the performance impact of FCEOs relative to NFCEOs using a theoretical framework anchored in Penrosean theory and supported by Upper Echelons Theory (UET) and the Resource-Based View (RBV). This integrative approach enables a nuanced understanding of how CEO-level attributes interact with organisational complexity over time.

In this thesis the primary lens is Penrose's theory of firm growth, which views expansion as the development and deployment of managerial services and capabilities (Penrose, 1959). UET is used to explain how CEO attributes shape those services and the direction of search (Hambrick and Mason, 1984), and the RBV clarifies when such attributes operate as firm resources and when advantages erode (Barney, 1991). Within this triad, CEO education, functional knowledge, industry experience and in-firm time are treated as human-capital attributes that map onto executive characteristics (UET) and firm resources (RBV).

The research pursues four core objectives. First, it develops a theoretical model that combines these lenses to explain how CEO characteristics shape firm outcomes. Second, it theorises how contextual moderators (notably firm age and size) condition the performance effects of CEO type. Third, it tests these relationships empirically using a longitudinal panel of UK-listed firms between 1990 and 2018, focusing on growth and complemented by analyses of profitability and labour productivity. Finally, it derives theoretical and practical implications for strategic leadership, governance and succession planning in founder-led firms.

A quantitative, longitudinal research design was selected to reflect the temporal and comparative nature of the research question. Specifically, fixed-effects regression modelling is employed to estimate within-firm variation over time while controlling for unobserved heterogeneity at the firm level. This design enables the analysis of performance dynamics attributable to CEO type, across diverse organisational contexts and time periods. A long-horizon panel of UK-listed firms was constructed to support statistically robust comparisons between FCEOs and NFCEOs, drawing on publicly available and standardised financial and biographical data. While qualitative approaches may offer insight into the motivations or cognitive orientations of individual leaders, they are less suited to the generalisable performance patterns that this study seeks to identify.

The decision to seek external funding in exchange for equity introduces profit-driven investor expectations, reframing founder objectives from growth primacy towards profitability accountability. This shift in ownership structure often exposes the limitations of FCEOs in general management and their ability to deliver the profitability expected by shareholders (Wasserman, 2013; Bottazzi, Da Rin and Hellman, 2016).

A significant body of research has explored the capabilities and limitations of FCEOs as their firms transition from start-ups to more established entities. Penrose's theory provides a lens through which to understand the inherent growth motivations of FCEOs, suggesting that their focus may shift from purely entrepreneurial endeavours to managing growth sustainably. However, Penrose's framework, while valuable, requires augmentation to account for managerial heterogeneity, including variations in individual skills, expertise and leadership capabilities. UET (Hambrick and Mason, 1984) offers a complementary perspective by emphasising the impact of a CEO's background, including their general and specific human capital, on firm outcomes. While UET is not formally derived from Penrose's (1959) work, it aligns conceptually by focusing on how a CEO's experiences, education and functional expertise shape strategic decisions and, consequently, firm performance.

Despite the extensive research on FCEOs, findings remain inconsistent, particularly concerning their long-term impact on firm performance. Some studies suggest that FCEOs are poorly equipped to manage their firms beyond the early stages, leading to stagnation or decline (Kelly, Athanassiou and Crittenden, 2000; Nelson, 2003b; Ling, Zhao and Baron, 2007; Mathias, Williams and Smith, 2015). Others, however, argue that FCEOs can successfully adapt to the challenges of growth, with no significant difference in performance compared to professional CEOs (Willard, Krueger and Feeser, 1992; Jayaraman *et al.*, 2000; He, 2008). This divergence in findings suggests the relationship between FCEOs and firm performance is more complex than previously understood, necessitating further investigation through a holistic framework.

The underlying premise of this research is that measuring the impact of FCEOs on the organisations they create using profitability alone misses the motivational aspects of FCEO entrepreneurship. Given the uncertainty of firm start-up, and the inability of FCEOs to fully predict market reaction to a new product or service, their motivations are unlikely to be directly profit-related, albeit this might change over time as growth leads to public listing and the accumulation of equity holders who are primarily motivated by profit. Viewing FCEOs through a Penrosean lens, whereby they are primarily motivated by achieving growth rather than realising benefits for equity holders, is particularly relevant to the research question and to how results are interpreted in what follows. Accordingly, growth is treated as the primary outcome and profitability as a secondary outcome. Productivity, which is proxied by return on people (ROP) and defined as sales revenue per employee, is examined in robustness checks. This placement reflects that employment is both a covariate in the main specifications and the denominator of ROP, which risks conditioning on a post-treatment quantity.

This study makes significant theoretical, empirical and practical contributions to the understanding of CEO leadership and firm performance. By integrating Penrosean theory, UET and the RBV, it provides a comprehensive framework for assessing how FCEOs influence firm growth trajectories over time. The empirical analysis, based on a unique 30-year longitudinal dataset of UK publicly listed firms, offers robust evidence on how CEO characteristics shape firm performance over extended periods. Additionally, this research delivers actionable insights for corporate boards, investors and policymakers regarding succession planning, leadership transitions and governance mechanisms in founder-led firms. Accordingly, this thesis positions founder leadership as a central explanatory variable in understanding firm performance dynamics. While the literature review begins with foundational concepts in firm growth, productivity and resource-based theories, it builds progressively toward a focused examination of the role of founders in shaping firm outcomes.

In summary, this research aims to shed new light on the role of FCEOs in the growth and performance of the firms they create, offering both academic contributions and practical insights.

Chapter 2

Literature review

This chapter reviews the theoretical and empirical foundations relevant to the study of FCEOs and firm growth. It explores key frameworks, such as resource-based and human capital theories, highlighting the role of internal resources, leadership and managerial capabilities in driving firm performance. The chapter examines firm growth dynamics, including the impact of firm age, size and leadership, emphasising the unique contributions of FCEOs compared to non-founder CEOs (NFCEOs). It also identifies gaps in the literature, particularly around the long-term effects of founder leadership on growth, setting the stage for the study's hypotheses and analysis.

2.1   Theory of the firm

At the outset, the review points to four issues that guide the chapter and the study. First, founder leadership is rarely examined with growth and profitability separated and tracked within the same long-horizon design. Second, embeddedness is often proxied by tenure alone rather than distinguished from in-firm time. Third, evidence on the moderating roles of age and size is thin and dispersed. Fourth, human capital indicators at CEO level are measured coarsely and are rarely linked to firm specific complementarities. These gaps frame the material that follows and motivate the hypotheses and identification strategy. Accordingly, this section explains why internal coordination and managerial services matter for growth and frames founder leadership within that logic.

The existence, growth and boundaries of firms have been central concerns in economic and management theory because they shape how firms achieve competitive advantage and long-term sustainability. Traditional economic models assumed that market mechanisms alone were sufficient to coordinate production and allocate resources efficiently. However, Coase (1937) challenged this assumption by arguing that firms emerge when internalising production proves more efficient than relying on repeated market transactions. He introduced the concept of transaction costs, which encompass the costs associated with searching for suppliers, negotiating contracts, enforcing agreements and managing uncertainty. When these costs exceed those of internal coordination, firms organise production hierarchically to achieve efficiency. While Coase's work provides a foundational explanation for why firms exist, it does not fully account for the strategic role of managerial decision-making, particularly the influence of FCEOs on firm growth and performance (Foss, 1996; Argyres and Zenger, 2012).

Building on this foundation, Williamson (1975, 1979, 1985) developed Transaction Cost Economics (TCE), which formalised Coase's insights and provided a more structured framework for understanding firm boundaries. Williamson argued that firms internalise production to mitigate market inefficiencies, particularly in cases where contracts are incomplete, investments are highly specific or

opportunistic behaviour is likely. His work highlighted the role of asset specificity, which refers to investments that cannot be easily repurposed outside a given transaction. When asset specificity is high, market transactions become riskier, increasing the likelihood of opportunistic behaviour by one party. In such cases, firms are more likely to internalise transactions to avoid dependency on external actors. However, Williamson also recognised that firms are not free from inefficiencies, as internal bureaucratic costs and coordination challenges increase with firm size. This results in a trade-off between the costs of market transactions and the costs of internal governance, with firms continually optimising their structures based on these competing pressures (Williamson, 1991).

While TCE has remained a dominant framework for explaining firm existence and boundaries, alternative theories offer different perspectives on why firms emerge and how they evolve. Alchian and Demsetz (1972) critique the Coasean view, arguing that firms do not fundamentally differ from markets but instead function as nexuses of contracts designed to optimise team production. Unlike Williamson, who emphasised hierarchical governance, Alchian and Demsetz suggest that firms primarily exist to facilitate monitoring and incentive structures that improve productivity. These incentive structures include performance-based pay, profit-sharing, promotion opportunities and equity ownership i.e. mechanisms that align employee interests with firm success and reduce free-riding in team production settings. Their perspective challenges the assumption that firms arise solely to minimise transaction costs, instead proposing that firms emerge as an efficient solution to collective production problems. This debate has been further explored in the work of Cheung (1983), who argues that firms and markets should not be viewed as entirely distinct entities but as points on a continuum of governance mechanisms. Jensen and Meckling (1976) similarly describe firms as contract-based entities, where ownership structures and agency relationships define managerial decision-making.

A complementary perspective to transaction cost economics and contract-based theories is provided by the RBV, which shifts the focus from cost minimisation to strategic resource accumulation. Penrose (1959) argued that firms expand not merely to reduce transaction costs but as a result of their ability to develop and leverage unique internal resources. This perspective was later formalised by Wernerfelt (1984) and Barney (1991), who emphasised that firms sustain competitive advantage by possessing VRIN resources. Unlike TCE, which focuses on governance mechanisms, the RBV suggests that firm boundaries are shaped by the firm's ability to develop, protect and deploy strategic assets over time. Peteraf (1993) further refined this view by arguing that firm growth is contingent not only on possessing superior resources but also on the managerial capabilities required to exploit them effectively. Michie and Oughton (2024) build on this argument by linking RBV to contemporary debates on firm competitiveness, suggesting that firms with stronger internal capabilities are better positioned to adapt to changing market conditions.

Dynamic capabilities build on the RBV by focusing on how firms renew and reconfigure their resource base. In this perspective performance depends on the capacity to sense and seize opportunities

and to reconfigure assets and routines in response to change, as discussed by Teece, Pisano and Shuen (1997) and Eisenhardt and Martin (2000). This aligns with Penrose's account of managerial services and provides a route by which founder leadership can affect growth before efficiency.

In addition to the RBV, contract theory has provided further insights into firm organization. Hart and Moore (1990) argue that firms arise not solely to minimise transaction costs but to govern long-term relational exchanges that cannot be fully captured in formal agreements. This perspective extends Coase's framework by recognising that ownership structures, control rights and authority mechanisms influence firm boundaries. Roberts (2007) further explores how firms are structured to balance contractual governance with the need for flexibility in dynamic environments, reinforcing the idea that firm organisation is shaped by both cost considerations and strategic objectives.

Although these theoretical perspectives were initially developed in the context of traditional manufacturing firms, they have taken on new dimensions with the rise of digital platforms and network-based business models. The increasing role of technology and platform-based coordination mechanisms challenges traditional assumptions about transaction costs and firm boundaries. Douma and Schreuder (2017) discuss how firms are evolving into more complex contractual arrangements that extend beyond traditional hierarchical control. Parker, Van Alstyne and Choudary (2016) argue that digital platforms have transformed firm structure by reducing certain transaction costs, such as search and negotiation costs, while increasing others, such as those associated with data governance and regulatory compliance. The implications of these changes extend beyond e-commerce, as demonstrated by the work of Rochet and Tirole (2003), who highlight how two-sided markets redefine firm boundaries by shifting transaction costs onto external participants, creating governance structures that blend market interactions with firm-based oversight.

Aghion, Antonin and Bunel (2021) explore how firms operating in digital ecosystems face new challenges in balancing efficiency with control, particularly as firms increasingly rely on external partnerships and knowledge-sharing networks. Jacobides, Cennamo and Gawer (2018) further develop this argument by suggesting that modern firms increasingly act as ecosystem orchestrators, rather than traditional hierarchical organisations. The case of Tesla's open innovation strategy, where it shares patents with competitors, illustrates how firms today may not solely seek to minimise transaction costs but also aim to shape industry ecosystems in a way that benefits their long-term strategic positioning.

Despite its enduring relevance, TCE has been critiqued for its limitations in explaining knowledge-intensive and innovation-driven firms. Denning (2013) argues that it does not fully capture firms that prioritise knowledge creation over cost minimisation, a critique particularly relevant in industries such as biotechnology and artificial intelligence. Granovetter (1985) similarly challenges the assumption that firms always seek to minimise transaction costs through formal mechanisms, highlighting the role of social networks and trust-based governance structures. Open innovation models,

as discussed by Chesbrough (2003), further suggest that firms do not always seek to internalise knowledge-based activities but instead engage in external collaborations and knowledge-sharing partnerships, implying that firm boundaries are increasingly fluid rather than rigidly defined.

The evolution of firm governance structures can also be observed through historical shifts in production models. Toyota's lean production system, which integrates suppliers closely while avoiding full vertical integration (Ōhno, 1988), demonstrates that firms can achieve efficiencies through structured external partnerships rather than complete internalisation. Similarly, changes in manufacturing paradigms from Fordist mass production[1] to post-Fordist modular production[2] networks illustrate how firms adapt governance models to changing technological and competitive conditions. The pharmaceutical industry provides another example, as large firms such as Pfizer and Novartis increasingly externalise research and development activities to biotech startups rather than conducting all research in-house, suggesting that firm boundaries shift depending on industry-specific risks and technological uncertainty.

Coase's (1937) foundational insights on transaction costs remain central to understanding firm existence, yet modern firms operate under increasingly complex governance conditions. Williamson's (1975) transaction cost framework remains influential in explaining firm boundaries, but alternative perspectives, including the RBV and contract theory, provide complementary explanations for firm growth and structure. As firms continue to evolve, the distinction between markets and hierarchies is becoming more fluid, requiring a more dynamic understanding of firm organisation and performance.

2.2   Firm performance

Firm performance is a complex and multidimensional construct that has been widely debated (Venkatraman and Ramanujam, 1986; Richard *et al*., 2009; Bititci *et al*., 2012; Taouab and Issor, 2019). Because measures vary by context, and profitability indicators such as ROA may not capture longer-term expansion or adaptability, this thesis treats performance along two core dimensions: growth, measured as the log change in sales revenue (ΔSR) and profitability, measured by return on assets (ROA). The empirical emphasis is on growth, with profitability analysed to delineate the scope and profile of performance differences.

Firm performance is often divided into three primary dimensions: financial, operational and strategic outcomes (Kaplan and Norton, 1992; Richard *et al*., 2009). Financial performance indicators such as profitability, return on investment (ROI) and earnings per share remain dominant in managerial and investor decision-making (Jensen and Meckling, 1976; Barney, 1991). However, these indicators

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[1] Fordist production refers to the mass production model pioneered by Henry Ford in the early 20th century, characterised by large-scale, standardised manufacturing processes and vertical integration.

[2] Post-Fordist production describes a shift toward more flexible, decentralised production systems that emphasise modularity, specialisation and external partnerships, enabling firms to respond more rapidly to changing technologies and market demands.

provide only a static snapshot and may not reflect a firm's long-term sustainability (Bititci *et al.*, 2012). Operational performance measures, such as productivity and efficiency, provide insight into how well a firm utilises its resources (Driffield, Mickiewicz and Temouri, 2013), while strategic performance focuses on market position, innovation and competitive advantage (Porter, 1985; Teece *et al.*, 1997). The relationship between these dimensions is complex. Firms may demonstrate strong financial results in the short term while experiencing declines in operational efficiency or losing ground in longer-term strategic positioning (Coad, Cowling and Siepel, 2016). Conversely, firms investing in innovation and market expansion may report lower immediate profits but achieve sustained growth over time (Brännback, Carsrud and Kiviluoto, 2014). This dynamic interplay suggests that firm performance should be evaluated holistically rather than relying on isolated metrics.

Time plays a crucial role in assessing firm performance as different metrics yield insights at varying points in a firm's lifecycle (March and Sutton, 1997; Chandler, Hagström and Sölvell, 2001). For instance, profitability and growth may not align in the short term, with firms prioritising expansion before realising financial returns (Coad *et al.*, 2016). This time-lag effect highlights the importance of considering longitudinal data when evaluating performance trends. Research on firm age and performance presents conflicting perspectives. Some scholars argue that firm longevity leads to superior performance due to accumulated experience, brand reputation and resource advantages (Stinchcombe, 1965; Capasso, Gallucci and Rossi, 2015). Others contend that older firms may become rigid and less adaptive to market changes, suffering from declining agility and innovation capacity (Hannan and Freeman, 1984; Barkema and Schijven, 2008). The balance between experience-based advantages and structural inertia varies across industries and firm strategies (Nelson and Winter, 1982; Agarwal and Gort, 1996).

Productivity serves as a fundamental driver of firm performance, representing how effectively a firm converts inputs into outputs (Girma, Thompson and Wright, 2006; Driffield *et al.*, 2013). While closely related to profitability, productivity does not always translate into immediate financial gains. High-productivity firms often experience stronger long-term growth potential, even if short-term profit margins fluctuate (Aiello and Ricotta, 2016). Total Factor Productivity (TFP) is widely used as a comprehensive measure of firm efficiency, capturing the portion of output not explained by capital and labour inputs (Farinãs and Ruano, 2005; Gal, 2013; Du, Mickiewicz and Douch, 2021). Research indicates that firm productivity typically increases within the first four years of existence, driven by learning effects and process improvements, but may decline over time due to inefficiencies and market saturation (Cucculelli *et al.*, 2014; Du *et al.*, 2021). This aligns with the broader debate on whether firm age positively or negatively correlates with performance.

The relationship between firm profitability and growth has been the subject of extensive research (Penrose, 1959; Chandler, McKelvie and Davidsson, 2009). While traditional economic theories suggest that profitable firms reinvest earnings to fuel expansion (Jensen and Meckling, 1976;

Wernerfelt, 1984), empirical evidence suggests that growth trajectories often deviate from this expectation. Coad *et al*. (2016) argue that growth-first strategies, particularly in high-growth firms, lead to profitability only after an initial phase of reinvestment. In contrast, stable firms may prioritise cost control and efficiency over aggressive expansion, resulting in steady but limited growth (Brännback *et al*., 2014). The role of financial structure (such as the mix of debt, equity and retained earnings) can also influence a firm's ability to sustain growth, although this thesis does not explicitly examine capital structure effects. Future research may usefully explore how different financing strategies interact with CEO-led growth pathways.

Emerging research suggests that firm performance does not follow a normal (Gaussian) distribution but rather a Laplace distribution (double exponential), in which extreme positive or negative outcomes occur more frequently than under normal assumptions (Stanley *et al*., 1996; Bottazzi and Secchi, 2006; Coad *et al*., 2016). Unlike the normal distribution, which clusters observations around the mean with thin tails, the Laplace distribution is characterised by 'fat tails', indicating a higher probability of firms exhibiting highly atypical outcomes. This implies that while most firms exhibit stagnant or moderate performance, a small proportion experience extreme results, either achieving exceptionally growth or undergoing significant decline (Bottazzi, Cefis and Dosi, 2002; Fagiolo and Luzzi, 2006; Bottazzi *et al*., 2010; Duschl and Peng, 2015; Yu *et al*., 2015). From a managerial perspective, this distributional reality highlights the critical role of strategic decision-making in determining firm trajectories. Firms that successfully navigate periods of volatility (through innovation, differentiation or effective resource deployment) may emerge as outliers, while others that fail to adapt may face stagnation or exit (Killingsworth, 2018). Recognising this performance asymmetry is essential for interpreting empirical results and for selecting analytical methods that are robust to non-normality.

A key challenge in measuring firm performance is balancing financial indicators with broader strategic and operational metrics. Porter (1985) argues that sustainable competitive advantage stems from superior strategic positioning rather than short-term profit maximisation. Teece *et al*. (1997) further emphasise the role of dynamic capabilities in achieving long-term performance gains, suggesting that firms investing in innovation, knowledge development and organisational flexibility are better equipped for sustained success. While profitability remains a critical measure, firms must integrate multiple performance dimensions to make informed strategic decisions. This study adopts a holistic view of firm performance, incorporating financial (profitability, ROA) and strategic (growth, competitive positioning) indicators to assess the impact of founder CEOs on firm success over time.

2.3   Metrics of firm growth

Firm growth is a crucial indicator of business success, yet there is considerable debate regarding the most appropriate metric for its measurement. Traditionally, scholars have relied on changes in either employment or sales revenue to assess firm expansion (Janssen, 2009; Delmar and Wiklund, 2008;

Dunkelberg and Cooper, 1982; Kirchhoff, 1992). While these measures both capture the same observable reality, an increase in firm size, there is an ongoing discussion about the causality between employment growth and revenue growth. Some researchers argue that firm expansion begins with an increase in demand, leading to higher sales revenue, which subsequently enables firms to hire additional employees (Janssen, 2009). This perspective suggests a logical chronological sequence in which revenue growth precedes employment growth, reflecting the ability of firms to scale operations in response to market opportunities. Although this study focuses on change in sales revenue as the primary growth indicator, the role of asset accumulation, particularly in terms of fixed and intangible assets, represents an important but unexamined dimension of firm expansion. Nonetheless, change in sakes turnover remains the most widely used and comparable indicator in empirical studies, particularly when examining longitudinal firm performance. The alternative view posits that employment growth drives sales by enhancing production capacity, customer service and operational efficiency (Delmar and Wiklund, 2008). However, empirical evidence indicates that firms can achieve revenue growth without expanding their workforce by leveraging outsourcing, subcontracting and productivity improvements (Janssen, 2009). This nuance complicates the traditional employment-turnover relationship and underscores the importance of selecting the most appropriate metric based on research objectives.

There is also a distinction in preference between academia and business practice when selecting firm growth indicators. Economic and sociological research frequently prioritises employment growth due to its broader societal implications (Child, 1973; Dunkelberg and Cooper, 1982; Kirchhoff, 1992). Job creation is often perceived as a visible, politically significant outcome of successful business operations, providing a tangible indicator of economic development. Moreover, firm owners and executives may prefer employment figures when presenting corporate success to external stakeholders, as it reflects their ability to contribute positively to the labour market. However, employment-based growth measures are subject to significant limitations, particularly in contemporary business environments where firms increasingly rely on flexible labour arrangements and digital automation (Brynjolfsson and Hitt, 1996). The growing prevalence of outsourced services and gig-economy workers further weakens the link between employment growth and firm expansion, making sales revenue a more consistent and scalable indicator.

Within the realm of business administration and managerial decision-making, financial metrics such as sales revenue and profitability are more commonly used to assess firm growth (Hughes, 1998). Practitioners argue that revenue growth more accurately reflects a firm's capacity to generate demand, adapt to market conditions, and sustain competitive advantage (Porter, 1996). This aligns with the view that business research should generate actionable insights that inform managerial decision-making and corporate strategy (Drucker, 2006). By focusing on sales revenue rather than employment, firms can better evaluate their market performance and strategic positioning without distortions introduced by fluctuating labour structures.

The decision to prioritise sales revenue as the primary growth metric in this thesis is grounded in both theoretical and practical considerations. First, revenue growth is a direct reflection of market competitiveness, customer acquisition and product-market fit, all of which are critical for assessing business success (Delmar and Wiklund, 2008). Second, financial indicators provide a more stable and comparable benchmark across industries, reducing the measurement inconsistencies associated with employment-based metrics. Third, focusing on sales revenue aligns with the objective of this research to provide insights relevant to firm leaders and policymakers who seek to enhance business performance in a pragmatic and financially sustainable manner.

Despite the advantages of revenue-based metrics, it is important to acknowledge that financial growth does not always translate into improved organisational performance. Research suggests that firms experiencing rapid revenue expansion may encounter operational inefficiencies, cash flow constraints and strategic misalignment, particularly if growth is not accompanied by effective managerial oversight (Davidsson *et al.*, 2006). In contrast, moderate and sustainable growth is often linked to long-term profitability and resilience in volatile market environments. This highlights the need to interpret firm growth holistically, considering both revenue trends and complementary factors such as profitability, productivity and strategic decision-making.

To deepen the analysis of growth quality, it is essential to look beyond top-line revenue and examine the internal drivers of value creation. Decomposing profitability into its underlying components helps distinguish between firms that scale sustainably through operational efficiency and those whose expansion masks inefficiencies. This analytical shift is particularly relevant when evaluating CEO influence, as different leadership types may vary in how they balance growth with cost discipline and productivity.

The discussion on profit decomposition further aids in understanding firm growth dynamics. Grifell-Tatjé and Lovell (1999) describe productivity as an outcome of operational efficiency and the ability to embrace successful technical change within a firm. Expanding on this notion, Girma *et al.*, (2006) provide empirical support to the idea that productivity improvements, driven by strategic internal stakeholder actions, primarily enhance the position of firm management, employees and shareholders. The long-term financial health of a firm is arguably more closely connected to productivity, as it underpins the firm's ability to generate future revenues, thereby enhancing its net present value (NPV). This contrasts with short-term profitability, which may not fully capture a firm's intrinsic value over time.

Figure 1 provides a decomposition of firm profitability, separating revenue growth from cost management strategies. The analysis reveals that while revenue growth often correlates with increasing profits, firms can also achieve profit growth through operational efficiencies, cost reduction strategies and productivity improvements. This distinction is critical in understanding how FCEOs and NFCEOs

may adopt different strategies for enhancing firm profitability. The findings reinforce that firm survival is not solely dependent on revenue expansion but also on effective resource allocation and cost control mechanisms (Coad *et al.*, 2016).
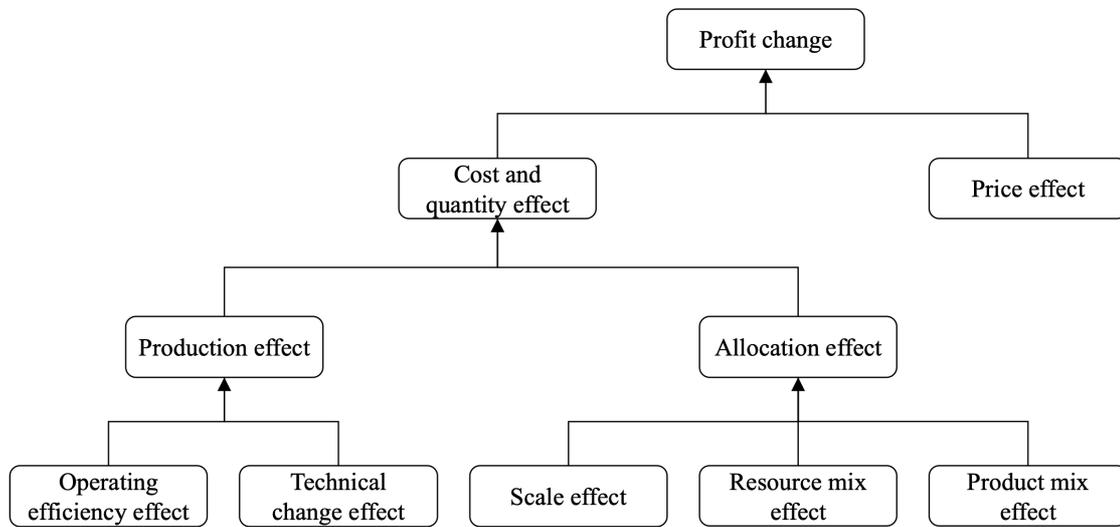
Figure 1 – Profit decomposition (adapted from Grifell-Tatjé and Lovel1, 1999)

The asymmetric distribution of firm growth further complicates performance evaluation. As noted earlier, growth outcomes rarely follow a normal (Gaussian) pattern but are better characterised by a Laplace distribution (as shown in Figure 2), where extreme values, both rapid expansion and sharp decline, occur more frequently than expected (Stanley *et al.*, 1996; Bottazzi and Secchi, 2006; Bottazzi *et al.*, 2010; Duschl and Peng, 2015; Yu *et al.*, 2015). This results in a small subset of firms driving disproportionate gains, often through innovation, disruption or strategic risk taking (Bottazzi *et al.*, 2002; Fagiolo and Luzzi, 2006; Delmar, Davidsson and Gartner, 2003). To account for this skewed distribution, analytical models must distinguish between structural performance differences across firms and variations within firms over time. One such method is LV decomposition, which separates variance into between-firm and within-firm components. This enhances model precision by addressing the influence of outliers while preserving the integrity of longitudinal comparisons (Bottazzi and Secchi, 2006; Duschl and Peng, 2015).
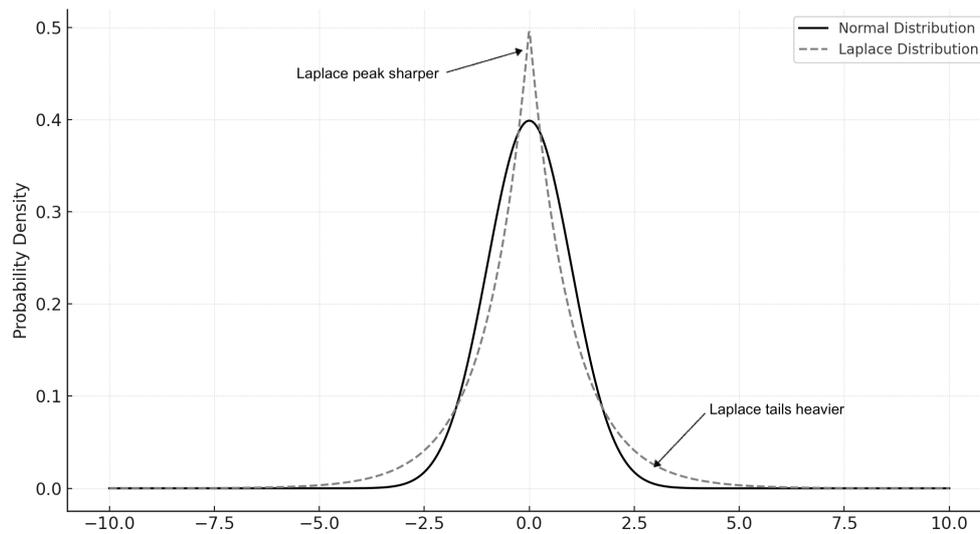
Figure 2 – Normal (Gaussian) versus Laplace distribution

Given these insights, firm growth should not be assessed solely through isolated financial metrics. Instead, a comprehensive evaluation should consider the interplay between sales revenue and profitability to develop a more nuanced understanding of firm success. This study adopts a multi-dimensional approach, using revenue growth as the primary indicator while recognising the importance of complementary measures such as profitability margins. This ensures that the findings remain both academically rigorous and practically relevant to business leaders and policymakers seeking to enhance firm performance over time.

Having considered the multidimensional nature of firm performance, the following section explores firm growth as a key trajectory through which organisations attempt to enhance their long-term value and competitive positioning. Section 2.5 then examines firm age and firm size as structural conditions that shape the expression of growth and profitability, motivating their role as contextual controls in the empirical analyses.

2.4   Firm growth

This section defines the growth construct used in the thesis and explains why it is analysed separately from profitability and labour productivity so that founder and non-founder effects can be identified on distinct outcomes.

At the heart of entrepreneurship is the economic imperative to turn ideas into marketable products and services. This process involves the generation of wealth through the creation and sale of goods or services and the reinvestment of profits into further production. The foundations of this activity were theorised by economists such as Cantillon in his paper *Essai sur la nature du commerce en general* (1755) and Say in *A Treatise on Political Economy* (1803). Say's notion of entrepreneurship involved the sale of goods or services at prices higher than their cost of production, with profits reinvested to generate future products and services. Although Say did not directly address growth, later academics,

particularly Schumpeter (1934, 1942), inferred that growth was implicit in this entrepreneurial cycle (Brännback *et al*., 2014).

Schumpeter (1934) expanded Say's ideas by suggesting that entrepreneurship involves creating new products or services, leading to the acquisition of (quasi)rents, and introducing the concept of 'creative destruction'. Schumpeter argued that economic change is driven by the dismantling of old markets and the creation of new ones, facilitated by entrepreneurial activity. This 'destruction' happens not just in the literal sense of company failure but also within firms as they innovate and transform their internal processes to remain competitive. Schumpeter viewed entrepreneurship as a vital force in this transformation, and leadership (particularly by founders) plays a pivotal role. However, Schumpeter did not suggest that growth was the primary goal of entrepreneurship; instead, it was one potential outcome of successful entrepreneurial efforts (Brännback *et al*., 2014).

While Schumpeter's theory of creative destruction highlighted the need for firms to continuously innovate to maintain their position in dynamic markets, it was Penrose (1959) that introduced a more comprehensive analysis of firm growth. Penrose emphasised the importance of internal factors in explaining why some firms grow and others do not. She argued that firm growth was not merely the result of external factors such as market demand or economies of scale but that it was largely shaped by internal dynamics, principally managerial capabilities and the utilisation of resources. Penrose's insights have since become a foundation for understanding firm growth, particularly through the lens of the RBV, which was later expanded upon by scholars such as Wernerfelt (1984), Barney (1991) and Kor and Mahoney (2000).

Penrose's theory challenged traditional views, which linked firm size and growth to external factors like economies of scale. She proposed that internal factors (such as managerial foresight, ambition and strategic decision-making) were equally important, if not paramount. Specifically, Penrose distinguished between short-term profit maximisation and long-term value creation, arguing that while profitability was crucial, sustainable growth was driven by investments in managerial capacity and internal capabilities. Porter (1985) later expanded on this by suggesting firms that invested in developing competitive advantages through internal resources could achieve sustainable profit growth, even if this required foregoing short-term profitability.

One of Penrose's most important contributions was her analysis of managerial constraints. As firms grew, their operations became more complex, increasing the demand for managerial oversight. Penrose argued that the firm's growth was limited by the capacities of its management, a concept which could be referred to as 'Penrosean limits'. Managers have finite abilities to coordinate and control, and growth imposes strains on these resources. This limitation suggests that firms can only expand as fast as their managerial resources allow. Leadership plays a crucial role in addressing this constraint, as

effective leaders are required to assimilate new knowledge and manage the increasing complexity of a growing firm.

This managerial limitation can be understood through the concept of absorptive capacity, which was introduced by Cohen and Levinthal (1990) and refers to a firm's ability to recognise, assimilate and apply new knowledge. Firms that develop strong absorptive capacities are better equipped to manage the complexities of growth, as they can integrate new resources and knowledge into their existing structures. This capacity for knowledge assimilation is vital for firms seeking to grow, as it enables them to adapt to market changes and leverage new opportunities.

Penrose's theory also laid the groundwork for later discussions on dynamic capabilities, particularly those outlined by Teece (2014), who argued that firms must continually adapt their internal processes and managerial skills to remain competitive in evolving markets. Dynamic capabilities refer to a firm's ability to reconfigure its internal resources to adapt to external changes, thereby sustaining long-term competitive advantage. This concept complements Penrosean theory by highlighting the importance of managerial agility in sustaining growth.

2.4.1   The role of leadership in resource utilisation and firm growth

Leadership plays a central role in driving firm growth. Penrose (1959) emphasised that leaders were not just managers of resources but also visionaries who shaped the strategic direction of the firm. Effective leadership thus is essential in aligning resources with market opportunities and ensuring that they are utilised efficiently. This idea aligns with the RBV (Barney, 1991), which speculates that leadership is an intangible resource that contributes to the firm's competitive advantage. More recent studies continue to reinforce this view, emphasising the strategic function of leadership in dynamic environments. For instance, Teece, Peteraf and Leih (2016) argue that leadership underpins dynamic capabilities by enabling firms to respond swiftly to shifting competitive landscapes.

Building on this foundation, Penrose's (1959) theory positions internal factors such as managerial capacity, human capital and experiential knowledge as key enablers of sustainable growth, reinforcing the notion that strategic leadership is instrumental in unlocking resource potential.

Leadership is particularly important in managing internal knowledge, which Penrose viewed as a key driver of growth. Internal knowledge, often tacit and experiential, cannot be easily acquired through market transactions. Instead, it must be developed within the firm through experience. Leaders who possess firm-specific knowledge are better equipped to mobilise resources and capitalise on market opportunities, as they understand the unique strengths and weaknesses of the firm. This perspective is reinforced by studies on knowledge management, which suggest firms that invest in developing internal knowledge are more likely to achieve sustained growth (Nonaka and Takeuchi, 1995; Szulanski, 1996). Echoing a Penrosean logic, Shepherd *et al*. (2023) find that behaviourally integrated leadership teams

decide more quickly and with higher quality in uncertain contexts, improving the mobilisation of internal knowledge into coordinated growth.

Firm growth, therefore, relies on the ability of leaders not only to identify opportunities but also to act on them by leveraging internal resources effectively. Penrose (1959) argued that leaders played a catalytic role in this process, as they were responsible for mobilising the firm's resources and aligning them with external opportunities. Complementary research supports this view, suggesting that leaders with entrepreneurial orientation and strategic foresight are more likely to achieve sustainable growth (Baker and Sinkula, 2009; Eisenhardt and Sull, 2001). In addition, Carmeli and Schaubroeck (2006) show that top management team (TMT) behavioural integration (a construct closely tied to leadership cohesion) enhances decision quality, which in turn supports growth and adaptive performance. Teece *et al*. (2016) also highlight the importance of managerial cognition and leadership agility as central to executing innovation-based growth strategies.

In addition to leadership orientation and internal knowledge mobilisation, strategic planning mechanisms, particularly business planning, have also been linked to variations in firm performance and will be revisited later in the context of entrepreneurial decision-making and growth management.

2.4.2   Profitability as a feedback mechanism for growth

Building on the previous discussion of leadership and resource mobilisation, this section considers how profitability functions as a strategic signal within growth-oriented firms. Profitability, while often viewed as the ultimate goal of firms, is not merely an end in itself in Penrose's framework. Instead, profitability serves as a key feedback mechanism that informs leaders about the effectiveness of their resource utilisation and market alignment. Penrose (1959) argued that profitability was an indicator of how well a firm was using its resources and how effectively it was adapting to external market conditions. This view is supported by more recent studies, which suggest that profitability is part of a dynamic cycle: firms that achieve profitability can reinvest in their internal capabilities, which in turn enhances their ability to compete and grow (Sirmon *et al*., 2011).

Grant (2016) argues that profitability should be viewed as a strategic indicator, guiding firms in their resource allocation decisions. Firms that focus solely on short-term profitability may neglect the long-term investments needed to build internal capabilities, which are essential for sustained growth. This balance between profit and growth is crucial for understanding firm behaviour. Firms that prioritise long-term growth often invest in intangible assets such as leadership, human capital and knowledge management. These investments may not yield immediate financial returns but are essential for building the foundation for future profitability (Grant, 2016).

In this sense, profitability acts as a feedback loop, guiding leaders in their strategic decisions and helping them adjust their resource allocation strategies. Firms that reinvest profits into their internal capabilities are better positioned to maintain their competitive advantage and achieve sustained growth.

This perspective aligns with Penrose's theory, as it highlights the importance of internal resource development in driving long-term profitability and growth.

2.4.3 The importance of human capital in firm growth

Penrose (1959) placed great emphasis on the role of human capital in driving firm growth. In her view, human capital, particularly at the leadership level, was crucial for leveraging the firm's internal knowledge and resources. This internal knowledge, often referred to as 'sticky' knowledge (Szulanski, 1996), is difficult to codify and transfer, making it a valuable resource for firms seeking to grow. Leaders who possess firm-specific knowledge are better positioned to make strategic decisions that align the firm's resources with market opportunities.

Later studies on human capital theory, including Becker (1964), expanded on Penrose's insights by suggesting that the skills and experiences of individuals within the firm are critical to its success. Leaders who invest in developing their employees' knowledge and skills are more likely to achieve sustained growth, as they create a more adaptable and capable workforce. This focus on human capital aligns with Penrose's emphasis on managerial constraints, as firms with better-developed human capital are more likely to overcome the limitations imposed by their managerial capacities.

Human capital is particularly important in periods of consolidation, where firms can focus on internal development and embed new knowledge into their operations. Penrose (1959) argued that firms require periods of stability to fully integrate new resources and develop the administrative structures necessary for growth. This idea is supported by Hahn (1973), who suggested that a firm's strategic value was not solely derived from its outputs but also from its internal processes and knowledge. By focusing on internal development during periods of stability, firms can enhance their long-term growth potential and build their internal capabilities to compete effectively in the market. The internal development of human capital during these periods is essential for firms to build the skills, knowledge and managerial structures required for sustainable growth (Nonaka and Takeuchi, 1995).

Penrose's focus on human capital and leadership highlights the importance of experiential learning within the firm. Leaders and managers who have gained firm-specific knowledge through direct experience are better equipped to navigate complex markets and make strategic decisions that promote growth. This idea of 'sticky' knowledge, which is difficult to replicate or transfer, ensures that leadership remains a unique and valuable resource within the firm (Szulanski, 1996).

2.4.4 Managerial constraints and firm growth

Penrose (1959) identified managerial constraints as one of the key factors limiting firm growth. As firms expand, they require greater managerial oversight and the complexity of their operations increases. This expansion puts a strain on managerial capacity, as leaders must coordinate a broader

range of activities and resources. Penrose argued that firms can only grow as fast as their managerial resources allow, a concept that has been central to understanding the limitations on firm growth.

Managerial constraints are not only a function of the number of managers but also their quality and capabilities. Leaders with broader knowledge and more experience can handle larger and more complex organisations, allowing the firm to grow more rapidly. This perspective aligns with research on dynamic capabilities (Teece, 2014), which suggests that the ability of firms to reconfigure their internal resources in response to changing market conditions is crucial for sustaining growth.

Furthermore, Penrose (1959) highlighted that managerial constraints are not static; they can be developed over time. Firms that invest in their managerial capacities, by training leaders and developing new administrative structures, can overcome these constraints and continue to grow. This idea of developing managerial capabilities is supported by modern human capital theory, which emphasises the importance of leadership development in achieving long-term firm success (Becker, 1964).

This managerial perspective reinforces the leadership themes introduced earlier in Section 2.4.1, particularly the idea that internal knowledge and leadership quality are central to unlocking firm growth potential. The conceptual links here also underpin later discussions on CEO typologies and founder-led strategic capacity.

While Penrose's analysis primarily focused on the limitations of managerial resources, recent studies have expanded this framework by examining the impact of leadership heterogeneity on firm growth. UET (Hambrick and Mason, 1984) suggests that the characteristics of senior managers (such as their experiences, education, and values) play a significant role in shaping firm strategies and outcomes. Leaders with diverse backgrounds and broader experiences are more likely to make innovative decisions and adapt to market changes, thus enhancing the firm's growth potential (Carpenter, Geletkanycz and Sanders, 2004).

Ultimately, firm growth extends beyond increases in size or operational scale. It depends on the strategic alignment of internal capabilities with external opportunities, a process shaped by leadership, human capital and organisational knowledge. Firms that actively develop these intangible assets are better positioned to navigate complexity, maintain growth trajectories and deliver sustainable long-term performance.

2.4.5   The moderating role of business planning in firm performance

Business planning has long been recognised as a critical strategic tool in fostering firm performance, particularly among younger firms. Delmar and Shane (2003) highlighted the role of business planning in accelerating growth, noting that more extensive planning often correlates with larger firm sizes. This perspective positions business planning as a mechanism for organising resources, reducing uncertainty and providing a roadmap for achieving strategic objectives. The benefits are especially pronounced

during the early stages of a firm's development, where structured planning can help navigate nascent challenges.

However, contrasting viewpoints argue that the rigidity of business planning might not yield proportional benefits for all firms. Mintzberg (1994) suggested that young firms, in particular, might benefit more from agility and adaptability rather than adhering strictly to predefined plans. This sceptical perspective emphasises the need for flexibility in responding to market changes and seizing unexpected opportunities, which may be constrained by an over-reliance on formal planning processes.

Gartner and Liao (2011) extended this debate, finding that while business planning aided in resource allocation and provided a clear strategic direction, it may also inhibit innovative thinking and exploration of novel opportunities. The efficacy of business planning, therefore, appears to depend on the industry context and the strategic objectives of the firm (Brinckmann, Grichnik and Kapsa, 2010). These findings underscore the potential dual role of business planning as both an enabler and a constraint, depending on the firm's operational and strategic environment.

Although the moderating effect of business planning is a pertinent consideration in the literature, this study does not directly test its impact. Instead, the discussion serves to highlight the broader strategic context within which other firm-level and CEO-specific characteristics operate. Future research could explore the dynamic interplay between business planning and firm performance metrics, particularly in the context of founder-led firms.

2.4.6 Integrating firm growth with leadership and managerial theories

Penrose's theory of the firm has been further developed and expanded by integrating insights from other managerial and organisational theories. TCE, discussed previously, provides a complementary framework for understanding the role of leadership in firm growth. The integration of TCE with Penrose's framework offers a nuanced understanding of how managerial capabilities influence firm growth. Different leaders vary in their ability to govern complex organisational structures and manage the diverse and often conflicting needs of transactional relationships within the firm. For example, a CEO's strategic foresight and ability to reduce transaction costs can significantly impact the firm's growth trajectory, even under similar external conditions (Barney, 1991).

In addition, UET (Hambrick and Mason, 1984) extends Penrose's insights by emphasising the role of leadership heterogeneity. Leaders' backgrounds, experiences and values shape their strategic priorities and influence the firm's performance. Research has shown that firms led by CEOs with diverse experiences are more likely to pursue innovative strategies and adapt more effectively to external changes (Carpenter *et al*., 2004). This leadership heterogeneity not only affects the firm's ability to grow but also its ability to manage the challenges associated with rapid expansion.

2.4.7 The role of human capital and resource allocation

Penrose's theory of the firm emphasised the importance of resource allocation and utilisation in driving firm growth. In her view, the firm's resources, including its human capital, were central to its ability to grow and compete in the market. Firms with better-developed human capital were suggested to be more likely to overcome the managerial constraints that limit growth and achieve long-term success.

The RBV (Barney, 1991; Wernerfelt, 1984) built on Penrose's insights by arguing that firms with unique and valuable resources were better positioned to achieve sustained competitive advantage. Human capital, as an intangible resource, was suggested to play a key role in this process. Leaders who invested in their employees' knowledge and skills were shown to be better positioned to leverage these resources for growth.

Penrose's theory also highlighted the importance of internal knowledge, which is often tacit and difficult to transfer. This internal knowledge is essential for firms seeking to grow, as it provides a foundation for decision-making and strategic planning. Leaders who possess firm-specific knowledge are better equipped to navigate complex markets and align the firm's resources with its strategic objectives (Nonaka and Takeuchi, 1995).

2.5 Firm age and size dynamics

Building on Section 2.3's definitions of the performance constructs, this section treats firm age and firm size as contextual conditions that shape managerial discretion, information flows and adjustment costs, linking the life cycle and scaling literatures to the empirical design. This framing motivates their inclusion as contextual controls and the moderation tests used in the empirical models.

The relationship between firm age and firm size has been of interest to academics and researchers for a considerable time. This interest is built on the foundational works by Stinchcombe (1965), in relation to firm age, and Hannan and Freeman (1984), in relation to firm size.

Stinchcombe (1965) argued that firm age is a major factor in determining firm size on the basis that older firms tend to be larger than younger firms due to advantages accumulated over time. These advantages include establishing a reputation, brand recognition, customer loyalty, access to resources and economies of scale. He argued that, purely due to the passage of time, older firms could develop relationships with suppliers, customers and other stakeholders which gives them an advantage over their younger competitors in a market. As a result, older firms generally enjoy greater market share and higher levels of financial resource, which allow them to expand operations and grow.

For new firms Stinchcombe (1965) argued that the liability of young age meant they were faced with challenges which could inhibit their ability to grow and succeed. New firms often encounter financial and resource constraints, whilst limited access to capital, human resources and technology

infrastructure restricts their ability to invest in research and development, marketing and other activities necessary to achieve growth (Davidsson and Wiklund, 2000). They also face challenges due to their uncertain market position because of limited brand recognition, customer loyalty and the lack of track record. In terms of customers, this uncertain market position is reflected in scepticism and a reluctance to switch from trusted, established brands to new and unfamiliar ones, which means new firms can struggle to penetrate markets, or that the speed of penetration into a market is negatively impacted by their newness, and is reflected in lower sales growth (Kumar and Reinartz, 2016). The lack of brand awareness and track record also creates challenges for new firms in terms of building legitimacy and establishing a positive market reputation. The absence of these may lead to to customer, supplier, investor and regulatory body scepticism and acts to limit the ability of new firms to access critical resources and partnerships (Delmar and Shane, 2003). The final liability of a firm's young age revolves around the fact that new firms need to learn and adapt quickly to changing market dynamics, customer preferences and industry needs; however, their lack of experience and knowledge can negatively impact their ability to respond effectively and leads to missed opportunities and competitive disadvantages (Cohen and Levinthal, 1990).

In turn, the liability of firm size, as proposed by Hannan and Freeman (1984), refers to the challenges and constraints large firms face in adapting to changing market condition and which negatively impact their ability to grow. Hannah and Freeman (1984) suggested there are inherent disadvantages in being a large firm which act to limit firm agility, innovation and competitive advantage. Their studies highlighted that large firms tend to suffer from inefficiencies due to having bureaucratic and complex decision-making processes. These inefficiencies accumulate due to the firm expanding and adding additional layers of management and hierarchical structure, which diminish decision-making speed and reduce flexibility. As a result, larger firms find it difficult to respond quickly to change in their markets or to seize new opportunity when it arises. According to Finkelstein and Hambrick (1990), these bureaucratic inefficiencies can lead to a decrease in innovation and increases in costs, which limit a firm's potential to grow. Additionally, the elements that lead to system inefficiencies also tend to lead to organisational rigidity due to the introduction of routines, processes and systems employed by the top management team to maintain control and ensure stability. Whilst the structures that a firm employ can be effective in managing operations, they can also create resistance to change and innovation and, as a result, large firms might find it difficult to adapt to changing markets and customer demands and new technologies. This institutional resistance to change is evidenced by a firm's failure to explore new opportunities and enter new markets which then impacts its ability to grow, or the speed of growth (Hannan and Freeman, 1984). Furthermore, as firm size increases, effective communication and coordination become increasingly more complex. Part of this complexity may be a result of difficulties in sharing information across different departments, divisions and geographies. The opportunities for communication and coordination failures rise significantly with an increasing firm

size, and the ability to align employees' goals and actions with the overall strategic objectives of the firm diminish, in turn affecting initiatives implemented to stimulate growth negatively (Freeman, Carroll and Hannan, 1983). The liability of firm size also suggests that as firms become larger, they are more likely to experience a decline in entrepreneurial spirit and a reduced propensity to innovate. This can be attributed to many factors including increased bureaucracy, risk aversion and the top management team's being focusing on maintaining stability. In comparison, small firms are often characterised by a greater appetite for experimentation, having an entrepreneurial mindset and being more agile, which can arguably contribute to their ability to identify and pursue growth opportunities (Zahra and Covin, 1993). Whereas large firms might encounter competitive disadvantages in certain industries and markets, smaller firms, often referred to as 'nimble competitors', are more able to respond quickly to market change, adapt their strategies to suit and can introduce new products/services to counter threats in their market. Many large firms struggle to match the agility and speed of their smaller competitors, particularly when entering new or niche markets (Barkema and Schijven, 2008).

Whilst Hannan and Freeman (1984) were predominantly focused on the liability of firm size; they also examined the relationship between firm age and firm size with a particular focus on the concept of the 'liability of newness'. Their main argument was that younger firms were disadvantaged, when compared to more established firms, due to their lack of experience and their restricted access to resources. They argued that the liability of newness extended to difficulties in getting credit, attracting customers and in accessing finance. As a result of these liabilities, Hannan and Freemen argued, the young firms are generally smaller than older firms.

Whilst Stinchcombe (1965) emphasised the advantages of increasing firm age, Hannan and Freeman (1984) highlighted the disadvantage of being a younger firm. The results of subsequent empirical research showed mixed findings in terms of these relationships. On the one hand several notable studies support Stinchcombe's argument[3] by finding a positive correlation between firm age and size and show that older firms tend to be larger than younger firms. On the other hand, an equally large number of studies provide support for Hannan and Freeman's perspective that young firms tend to be smaller than their older counterparts. When Geroski, Machin and Walters (2003) analysed a large sample of UK firms they found younger firms tended to have lower profitability and a slower growth rate which, they argued, was an indicator that they were relatively smaller when compared to older firms. Davidsson and Wiklund (2000) examined firm growth and found that younger firms experienced slower growth when compared to older firms, which provided further support to the argument that younger firms tend to be smaller.

When considering the relationship between firm age and firm size it is important to reflect on the influence contextual factors such as industry characteristics, market conditions and technological

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[3] These include Carroll (1985), Geroski (1995), Klepper (2002), Delgardo *et al.* (2014) and Sutton (2015).

advancements might have and which drive different industries to have unique dynamics which affect the relationship between age and size. The relationship between firm age and size and their impact on growth is complex and multifaceted. For Stinchcombe (1965) the liability of firm age posed significant challenges to the growth prospects of new firms. Whereas, for Hannan and Freeman (1984) the liability of firm size was predominantly an issue associated with bureaucracy, decision making inefficiency, organisational rigidity, communication breakdowns, reduced innovation and competitive disadvantages. While older firms may have advantages that contribute to their larger sizes, younger firms face inherent disadvantages that can limit their growth and result in smaller sizes. However, one might posit a third view that whilst large firms possess resources and the ability to leverage economies of scale, they must also actively address the liability associated with their size to remain agile, innovative and competitive in ever-evolving markets. Framing growth as a dynamic, multifactorial process enables a more nuanced exploration of how structural firm characteristics (such as age and size) interact with internal leadership dynamics to shape long-term performance outcomes.

2.6   Founders

2.6.1   Definition of founder

This section situates founder leadership within the literature, explains why founder status is expected to shape outcomes and clarifies the definition of 'founder' used in the thesis. In the management literature, the terms 'entrepreneur' and 'founder' are frequently used interchangeably to describe individuals who create and establish new ventures. While there appears to be minimal distinction between these terms, the definitions are nuanced as an individual can be classified as an 'entrepreneur' without necessarily being a 'founder', particularly when considering the influence of financial motivation (Shane and Venkataraman, 2000). These distinctions are critical in understanding firm growth because they influence how we perceive the roles and contributions of key actors in the establishment and development of firms.

To establish a foundation for the following section, it is essential to define the terms 'entrepreneur' and 'founder'. Entrepreneurs are typically characterised as individuals who possess a distinct set of skills and traits, including innovation, risk-taking propensity and proactiveness which enable them to identify and exploit opportunities for creating new ventures (Shane and Venkataraman, 2000). On the other hand, founders are a specific subset of entrepreneurs, who initiate and formally establish a new firm, often assuming early operational and leadership roles during the venture's formative (Moroz and Hindle, 2012). While all founders are entrepreneurs by nature, not all entrepreneurs go on to found firms; some operate in advisory, investment or innovation roles without direct leadership responsibilities. The interchangeable use of the terms 'entrepreneur' and 'founder' in scholarly and practitioned discourse stems from this overlap, as both are instrumental in the firm

creation. However, this thesis focuses specifically on founder-CEOs, individuals who not only initiate the firm but also retain an ongoing leadership role during its growth and development.

While entrepreneurship encompasses a broad spectrum of motivations ranging from personal fulfilment to social impact, financial motivation has traditionally been viewed as a distinguishing factor between entrepreneurs and founders. Scholars like Shane and Venkataraman (2000) argue that individuals can be classified as entrepreneurs based on their financial drive, even if they did not initiate the venture themselves. For instance, individuals who join existing startups or acquire established businesses with the primary intention of generating financial gains are considered entrepreneurs under this perspective.

However, recent research suggests that this view may be overly simplistic and fails to capture the complexity of entrepreneurial motivations. Stephan *et al*., (2015) offer empirical evidence that entrepreneurial motivations are diverse and multifaceted. They propose that alongside financial incentives, motivations such as the desire for autonomy, personal satisfaction, social change and the opportunity to pursue one's passions play significant roles. Their findings indicate that many entrepreneurs are driven by a blend of factors that include, but extend beyond, financial gains.

This evolving understanding invites a reassessment of how we define and differentiate entrepreneurs from founders. While financial gains remain a key motivator, the richness of entrepreneurial motivation encompasses a variety of non-financial aspirations that contribute to a holistic view of entrepreneurship. This broader perspective acknowledges that the entrepreneurial journey is often as much about personal and societal fulfilment as it is about economic success.

Furthermore, the work by authors like Sarasvathy (2008) on effectuation and the emerging discussions of the entrepreneurial mindset suggest that the decision-making processes and risk management strategies employed by entrepreneurs can also be influenced by their varied motivations. This adds further layer of complexity to the entrepreneurial profile, demonstrating that motivations impact not only the initiation of ventures but also how these ventures are developed and managed.

Defining entrepreneurship is further complicated by considering activities beyond the traditional notion of founding new ventures. This broader view includes acquiring existing businesses as a form of entrepreneurial endeavour, emphasising that entrepreneurship is not confined to the creation of new entities but also involves transformative investment in existing ones (Alvarez and Barney, 2007). Such acquisitions often require identifying opportunities and leveraging financial resources to transform businesses through innovative strategies and initiatives, which are essential aspects of firm growth and evolution.

This expanded definition also supports the argument that financial motivation plays a significant role in categorising individuals as entrepreneurs while highlighting that financial commitment extends beyond mere startup activities. For instance, serial entrepreneurs often engage in multiple ventures over

time, demonstrating an ongoing investment in and commitment to entrepreneurial growth, which contrasts with the more limited role often implied by the term *serial founder*. Therefore, this distinction underscores not just the motivation to initiate firms but also the intent and investment strategies that characterise ongoing entrepreneurial engagement.

2.6.2   Founders and growth

Whilst Penrose (1959) predominantly provides a framework for understanding the factors contributing to growth and firm success, it also emphasises the crucial role played by founders in shaping and driving growth. Penrose argues that founders possess unique entrepreneurial vision, which serves as a crucial driving force for firm growth. Founders often have a deep understanding of market opportunities and possess the ability to identify and exploit them. They formulate a long-term vision for the firm, set strategic objectives, and shape its direction. This vision enables founders to identify untapped resources, emerging technologies and unmet customer needs, thus creating a competitive advantage for the firm (Casson, 2005).

It can also be argued that a founder's entrepreneurial vision plays a significant role in attracting external resources, such as financial capital and talented employees, who share the founder's vision and are motivated to contribute to the firm's growth (Shane and Venkataraman, 2000). Indeed, Penrose emphasises that founders possess unique resource acquisition abilities that enable them to secure essential resources required for firm growth. Founders often have well-established networks and social capital, allowing them to access critical resources, including financial capital, industry expertise and key relationships with suppliers and customers (Uzzi, 1997). These networks and relationships provide founders with a competitive advantage in acquiring and leveraging resources, which is crucial for firm growth.

Furthermore, a founder's personal reputation and track record can significantly influence the firm's ability to attract resources. Founders with a history of successful ventures or notable achievements are more likely to gain trust and support from investors and other stakeholders, facilitating resource acquisition (Stuart and Abetti, 1990). Penrose's theory highlights the importance of internal knowledge, learning and managerial capacity as key determinants of firm growth. While Penrose (1959) did not use the term 'dynamic capabilities', her work has since been interpreted as laying a foundation for understanding how managerial capacity and experiential learning enable firms to evolve. The dynamic capabilities framework, developed later by scholars such as Eisenhardt and Martin (2000), builds on this foundation to explain how firms adapt to high-velocity environments through processes of resource reconfiguration and innovation. Founders possess a unique set of skills and knowledge that allow them to adapt to changing market conditions and exploit new opportunities. They are often highly innovative and possess the ability to recognise and respond to market disruptions, technological advancements and evolving consumer preferences (Eisenhardt and Martin, 2000). Moreover, founders

are instrumental in building and nurturing a culture of innovation within the firm. Their entrepreneurial mindset and risk-taking propensity encourage experimentation and foster a supportive environment for creativity and problem-solving (Lee, Kim and Bae, 2016). This perspective on dynamic capabilities enable firms to adapt, differentiate and seize growth opportunities in a competitive marketplace.

Several empirical studies have provided support for Penrose's arguments regarding the importance of founders in firm growth. For example, research by Gompers *et al*. (2006) found that ventures with experienced founders are more likely to attract funding and achieve higher growth rates. Similarly, a study by Unger *et al*. (2011) revealed that firms led by founders with prior industry experience outperformed their counterparts in terms of innovation and market performance. Furthermore, a longitudinal study by Schildt, Maula and Keil (2005) demonstrated that the presence of a founder was positively associated with firm survival and growth, even after controlling for other factors such as industry conditions and firm size.

More recent contributions have advanced this empirical foundation by exploring the contingencies and mechanisms through which founder leadership affects firm outcomes. For example, Eesley and Roberts (2012) find that FCEOs with diverse prior career paths drive greater innovation outcomes, particularly in dynamic sectors. Zhang and Rajagopalan (2010) examine how the origin of the CEO, whether founder or externally appointed, shapes the degree and success of strategic change, showing that FCEOs often pursue more aggressive reorientation strategies. Collectively, these findings suggest that founder influence is contextually bounded and often mediated by firm-level characteristics such as age, structure and environmental uncertainty.

This thesis builds on these insights by shifting the focus from static comparisons to longitudinal analysis. Specifically, it explores when and why founder influence matters by integrating Penrosean growth theory with the dynamic capabilities and upper echelons perspectives. It further contributes to this literature by testing moderating variables (such as tenure, functional background and firm size) that shape the performance effects of FCEOs versus NFCEOs.

2.6.3   Founders and resource-based view

The importance of founders in shaping and influencing the trajectory of a firm has been a topic of great interest within the field of strategic management. Scholars have recognised that the characteristics and actions of founders can significantly impact firm outcomes, such as growth, innovation and overall performance. Penrose (1959) laid the foundation for understanding the role of founders and set the scene for later development by Barney (1991) of the RBV of the firm. Penrose's (1959) resource-based view posits that the skills, knowledge and experiences of founders represent valuable and unique resources that can contribute to the firm's competitive advantage. Founders bring their personal attributes, such as entrepreneurial orientation, vision and industry expertise, which can shape the strategic direction and resource allocation decisions of the firm (Gimeno *et al*., 1997). In keeping with

the RBV, research by Hitt *et al*. (2001) demonstrates that founders' human capital significantly impacts the initial firm performance and long-term survival rates.

Building upon Penrose's insights, subsequent research has explored the dynamics of founder influence on organisational outcomes. This body of work explores how the characteristics of top executives, including founders, shape strategic decision-making and firm performance. Factors such as age, tenure, education and functional background are critical in shaping their cognitive frames, values and preferences, which in turn influence organisational strategies and success (Carpenter *et al*., 2004). Penrose's work laid the foundation for this exploration by highlighting the significant role of top-level management in utilising resources effectively for firm growth. By recognising that the skills, knowledge and unique capabilities of founders and CEOs can profoundly impact a firm's trajectory, these studies extend Penrose's initial framework, providing a more nuanced understanding of the human elements that drive firm performance.

The concept of human capital plays a crucial role in understanding the unique value that founders bring to the firm. General human capital refers to the transferable skills and knowledge acquired by individuals through education, training and work experience, which can be applied across different industries and firms. Specific human capital, on the other hand, refers to skills and knowledge that are unique to a particular firm and non-transferable (Becker, 1993). Understanding the impact of founders on firm performance requires examining both general and specific human capital. This approach highlights how the diverse backgrounds and experiences of founders contribute to their ability to manage resources effectively, drive innovation and make strategic decisions that foster firm growth.

Research has found that founders' general human capital, such as education and industry experience, positively influences firm performance (Gimeno *et al*., 1997). For example, Colombo and Grilli (2005) identified that founders with higher education levels are more likely to create high-growth ventures. Moreover, specific human capital possessed by founders, such as relationships with key stakeholders or deep industry knowledge, can contribute to competitive advantage and firm success (Kaplan, Sensoy and Strömberg, 2005). Empirical studies have demonstrated that founder characteristics significantly impact firm performance. For instance, research by Carpenter *et al*. (2004) highlighted that founder CEOs' tenure positively influences firm performance, indicating the importance of their accumulated knowledge and experiences in managing the organisation. Additionally, Klotz *et al*. (2013) revealed that founder CEOs' prior industry experience positively affects the adoption of innovative practices, emphasising the role of their specialised human capital in driving firm-level innovation. These findings underscore the importance of considering the diverse backgrounds and capabilities of founders when assessing their influence on firm growth and success.

The relationship between founder characteristics and organisational outcomes suggests that the effectiveness of strategic decision-making is closely linked to the unique qualities of the leadership.

This perspective aligns with Penrose's view by recognising that not just the availability of resources, but the specific capabilities of the individuals managing those resources, play a critical role in shaping firm growth. By understanding how various attributes of founders influence firm performance, we can gain deeper insights into the mechanisms through which leadership impacts organisational success.

An additional perspective on founder influence is offered by Upper Echelons Theory (Hambrick and Mason, 1984), which emphasises how executive backgrounds, experiences and cognitive biases shape strategic choices and performance. This is explored in detail in Section 2.7, where UET is integrated into the broader theoretical framework of this thesis.

The foregoing highlights the importance of founders in the firm and their connection to both the RBV and human capital theory. Founders bring unique resources and capabilities to the firm, acting as key resource holders, while human capital theory sheds light on the diverse ways in which founders' knowledge and experiences impact firm outcomes. Recognising the interplay between these theoretical perspectives provides a more comprehensive understanding of the significant role founders play in shaping firm growth and success.

2.7   Upper echelons

Building on the preceding discussion of founder influence, UET (Hambrick and Mason, 1984) offers a complementary perspective by focusing on how the personal characteristics of top executives shape organisational outcomes. Whereas the RBV emphasises the strategic value of the resources and capabilities that founders bring to the firm, UET shifts attention to how these attributes influence leaders' interpretations of their environment and the strategic choices they make. In this way, UET extends Penrose's (1959) foundational insights by explaining why executives with different backgrounds, values and cognitive frames (even when operating within similar resource contexts) can lead their firms along markedly different trajectories. In essence, Penrose explains the organisational capacity for growth based on available managerial resources, while UET explains the strategic path that growth takes based on who is managing.

Penrose (1959), underscores the pivotal role of top-level management in harnessing a firm's resources to drive growth, laying the foundation for recognising that the unique capabilities, knowledge and skills of founders and CEOs are critical in shaping a firm's strategic direction. Building on this premise, subsequent research has explored in greater depth the impact of managerial influence, identifying various factors that contribute to effective leadership (Hambrick and Mason, 1984; Becker, 1993; Kor and Mahoney, 2000; Hitt *et al*., 2001; Carpenter *et al*., 2004). A key aspect of this research focuses on human capital, both general and specific. General human capital encompasses the broad skills and knowledge acquired through education and diverse work experiences, applicable across different contexts. Specific human capital, however, involves expertise and insights that are unique to an individual's experience within a specific firm. This distinction highlights the complexity of

leadership and its impact on firm performance, suggesting that a deeper understanding of these elements is crucial for comprehending how firms achieve sustainable growth.

Empirical studies have consistently shown that the characteristics of founders and top executives significantly impact organisational outcomes. For example, the accumulated industry experience of founders can drive innovation and strategic decision-making, enhancing firm performance (Klotz *et al*., 2013). Such findings underscore that leadership is not a monolithic construct but shaped by varied personal attributes and experiences that influence how executives perceive and respond to strategic challenges (Carpenter *et al*., 2004; Hambrick, 2007).

While Penrose's framework provides valuable insights into the role of top-level management, it primarily views managers as organisers of resources. This perspective, while foundational, does not fully capture the diversity among managers and the varying ways their individual attributes can influence firm performance. Recognising this shortfall allows us to integrate other theoretical perspectives that offer a more nuanced understanding of leadership's impact on organisational success.

UET (Hambrick and Mason, 1984) serves as a critical extension of Penrose's work, suggesting that organisational outcomes are shaped by the personal characteristics of top executives (including age, tenure, educational background and functional experience). These characteristics shape leaders' cognitive frames, values and preferences, thereby shaping their strategic choices and actions. By considering the heterogeneity of executive attributes, UET provides a framework to understand how diverse leadership profiles can lead to different strategic priorities and organisational approaches.

In the upcoming sections, this thesis will draw UET to deepen the analysis of Penrose's insights examining the interplay between executive characteristics and firm outcomes. This discussion will highlight the strategic importance of leadership diversity and offer a comprehensive view of how the unique qualities of top executives contribute to firm growth and competitive advantage.

2.7.1   UET and growth

This subsection explains why founder imprinting is expected to surface first in growth and how CEO experiences and values shape opportunity search. Penrose (1959) emphasises that the deployment of managerial services constrains and directs firm expansion: leaders with firm-specific experience mobilise resources, frame search, and set the tempo of growth. UET complements this by specifying how executives' backgrounds and value orientations shape interpretations of the environment and strategic choice (Hambrick and Mason, 1984). Read together, these perspectives imply that founder imprinting is most visible initially in top-line outcomes because exploratory search and market development precede the consolidation of routines that deliver efficiency.

Leaders embedded in the firm's history and operations are better able to identify and exploit opportunities that fit its resources and capabilities, drawing on tacit, experiential knowledge to align

actions with what the organisation can actually execute (Penrose, 1959). Entrepreneurial skill further conditions this process: founders and repeat entrepreneurs often possess domain-specific and opportunity-recognition knowledge that accelerates search and experimentation (Ucbasaran, Westhead and Wright, 2001). In combination, firm-specific experience, entrepreneurial cognition, and the capacity to orchestrate managerial services set the upper bound on near-term growth, consistent with Penrose's constraint logic, while efficiency gains follow once new routines are embedded..

With an entrepreneurial mindset, which encompasses both knowledge and attitude, these leaders adopt a proactive approach to innovation. While distinguishing between knowledge and attitude can be challenging in empirical work, conceptually, they represent different aspects of the individual. Knowledge refers to the information and skills acquired through experience or education, whereas attitude involves the mindset or disposition towards entrepreneurial activities (Baron, 2007). By leveraging their comprehensive knowledge and entrepreneurial mindset, these leaders guide the firm towards growth, enabling it to adapt, differentiate, and seize emerging opportunities (Penrose, 1959).

Through their strategic vision and proactive initiatives, leaders with firm-specific and entrepreneurial knowledge effectively navigate the challenges of a dynamic business environment. This ability to combine deep industry insights with a forward-thinking approach positions the firm to achieve sustainable growth and maintain a competitive edge.

A core tenet of Penrose's theory, often referred to as the 'Penrose Effect', is the assertion that leadership capability acts as the primary constraint on firm growth (Penrose, 1959). This perspective is complemented by UET, which emphasises the influence of top leaders' characteristics, values and cognitive processes on firm outcomes. According to UET, leaders' backgrounds, experiences and beliefs significantly shape strategic decision-making and resource allocation, ultimately influencing firm performance and growth (Hambrick and Mason, 1984). Recognising the central role of leadership capability, this integrated perspective underscores the criticality of effective leadership in realising a firm's growth potential (Penrose, 1959; Hambrick and Mason, 1984).

The integration of Penrosean theory and UET provides valuable insights into firm growth from a founder's perspective. Leaders with firm-specific experience possess the knowledge and insights necessary to identify and capitalise on growth opportunities whilst leaders with firm knowledge and entrepreneurial skills shape how firms respond to and pursue these opportunities. Both Penrose (1959) and Hambrick and Mason (1984) agreed that leadership capability acts as the primary constraint on firm growth, hence, utilising an integrated framework here will highlight the significance of leadership in driving sustainable growth.

In their original paper on UET, Hambrick and Mason (1984) defined its central proposition as how the knowledge, experience, values and personalities of executives directly influence the strategic decisions and direction of a firm. UET (Hambrick and Mason, 1984) posits that the characteristics of

leaders are, in part, shaped by both external and internal situations that a firm encounters. External situations include market conditions, competitive pressures and industry trends, while internal situations encompass organisational culture, resources and operational challenges. These situations influence leaders' experiences, perspectives and decision-making processes.

Building on Hambrick and Mason's foundational work, more recent literature has explored the dynamics between executive characteristics, strategic decision-making, and firm outcomes. Hambrick (2007) provides an update to UET, emphasising the importance of executive backgrounds in understanding the cognitive processes that influence strategic decisions. The update also incorporates more recent research on psychological and sociocultural factors that shape how executives interpret and respond to both external and internal stimuli. This view extends the original UET framework to account for how different contextual factors, including the broader cultural environment, can alter leaders' perceptions and actions.

Another key study by Finkelstein, Hambrick and Cannella (2009) provides a comprehensive exploration of executive influence and power. This study furthers our understanding of how leaders' social networks, personal characteristics and power dynamics impact firm behaviour and performance. By incorporating concepts such as executive tenure, personal reputation and relational capital, Finkelstein *et al*. (2009) add new layers to UET, illustrating that leaders' effectiveness is also shaped by their ability to navigate social networks within and outside of the firm.

Ling *et al*. (2008) contribute to UET by examining how CEO characteristics influence firm innovativeness in a dynamic environment. Their findings indicate that CEOs with a transformational leadership style, often characterised by a visionary and motivational approach, can effectively leverage their backgrounds and experiences to foster a culture of innovation. This research highlights how individual leadership styles interact with contextual factors to shape strategic choices and drive firm performance, further elaborating on the implications of the original UET framework.

Similarly, a study by Nielsen (2010) investigates the role of TMT diversity in enhancing organisational outcomes. This research builds on UET by suggesting that diverse teams, in terms of educational and functional backgrounds, are more likely to incorporate a wide range of perspectives, leading to better strategic decision-making processes. Nielsen's findings underscore the significance of TMT diversity as a critical factor that amplifies the positive effects of executive leadership on firm outcomes.

According to UET, the characteristics of top executives, such as their cognitive styles, values and experiences, are critical determinants of strategic choices. For instance, a leader with extensive industry experience may be more inclined to pursue innovative strategies, leveraging their deep understanding of market dynamics to drive firm performance. These strategic choices, shaped by leaders' attributes, directly impact the firm's outcomes. Furthermore, by incorporating more recent insights from Ling *et*

al. (2008) and Nielsen (2010), the framework accounts for the broader impact of leadership styles and team diversity, emphasising the evolving complexity of leadership influence.

Additionally, UET acknowledges that objective situations can drive firm strategic choices even without direct involvement from leaders. For example, regulatory changes or economic shifts may necessitate strategic adjustments that the firm must adopt to remain competitive. Conversely, there are scenarios where leaders' characteristics impact firm performance without their making explicit strategic choices, such as through their influence on organisational culture or employee morale.

The interplay between objective situations and leaders' characteristics can amplify the impact on strategic decisions and firm performance. For instance, a leader's innovative mindset combined with a favourable market condition can lead to more robust and successful strategic initiatives than either factor alone. This synergistic effect underscores the importance of considering both the external/internal environment and the individual attributes of leaders in understanding firm behaviour and performance. Finkelstein *et al.* (2009) further emphasise this point by detailing how leaders' influence is mediated by the power and social networks they build, which ultimately shape their ability to respond effectively to both internal and external pressures.
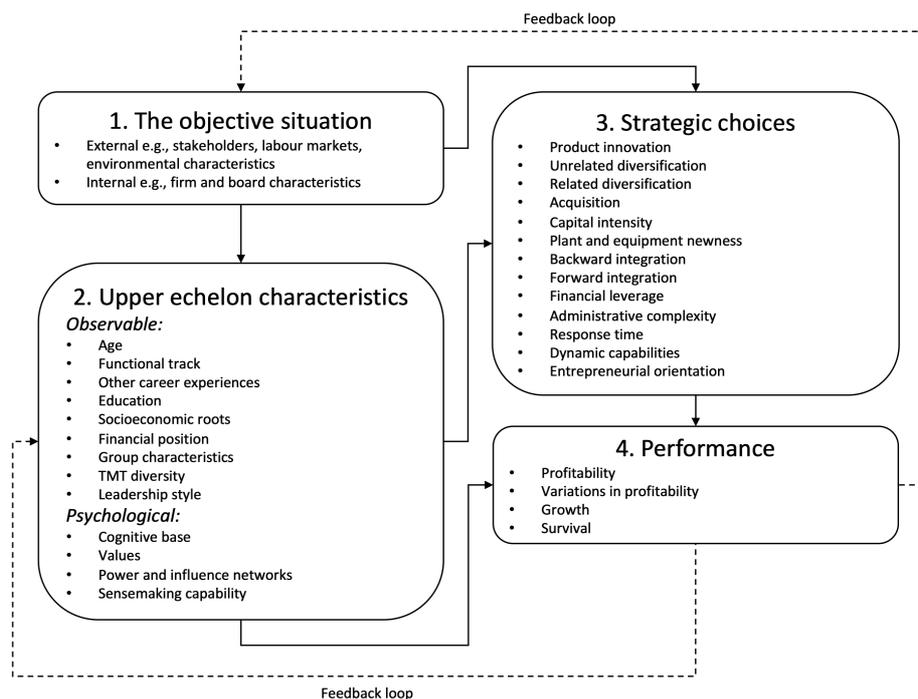
Figure 3 – An upper echelons perspective of firms[5]

Figure 3 illustrates this complex interplay, showing how both objective situations and leaders' characteristics contribute to strategic choices and firm outcomes. By recognising this dynamic relationship, UET provides a comprehensive framework for analysing how top executives influence the

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[5] Adapted from Hambrick and Mason (1984) and enhanced with insights from research by Hambrick (2007), Finkelstein *et al.* (2009), Ling *et al.* (2008) and Nielsen (2010).

trajectory of their organisations. More recent advancements in UET, as discussed in Hambrick (2007), Finkelstein *et al*. (2009), Ling *et al*. (2008) and Nielsen (2010), provide a deeper understanding of the nuanced factors that shape executive behaviour and, consequently, organisational success.

2.7.2   UET and leader characteristics

A foundational aspect of UET is the observable characteristics of leaders and their influence on organisational outcomes. Hambrick and Mason (1984) proposed that the demographic attributes of executives, such as age, education and functional background, shape strategic decision-making processes, ultimately impacting firm performance. These attributes act as proxies for deeper cognitive frameworks and values that influence leaders' decisions and, by extension, their organisations.

2.7.2.1 Observable demographic characteristics

Age, as a demographic characteristic, has been extensively studied in the context of executive decision-making. Younger leaders are often associated with a higher propensity for risk-taking, innovation and exploratory behaviour, which may drive firm growth (Malmendier and Tate, 2005; Yim, 2013). For instance, younger CEOs in technology industries may excel in adopting disruptive innovations, while older executives in traditional sectors often maintain stability by focusing on incremental improvements. However, younger leaders may lack the experience and knowledge of older peers, which can increase the likelihood of suboptimal strategic decisions. Conversely, older executives tend to exhibit conservative risk preferences, as evidenced by Finkelstein and Hambrick (1996), which may limit bold, innovative actions and hinder growth opportunities. These findings highlight the nuanced relationship between age and organisational outcomes, contingent on context and the interplay of other factors such as experience and education.

The functional background and career experiences of leaders are also significant determinants of organisational adaptability and growth potential. Leaders with diverse functional experiences bring broader perspectives, fostering innovation and strategic agility (Finkelstein *et al*., 2009). For example, Vissa and Chacar (2009) found that cross-functional experiences positively correlated with product diversification strategies, thus enhancing growth. Leaders with entrepreneurial experience also exhibit a higher propensity for calculated risk-taking, which supports firm expansion (Melović *et al*., 2022). These dynamics are particularly evident in industries undergoing rapid technological change, where diverse experiences enable leaders to navigate complexity effectively.

Education represents another critical characteristic influencing leadership and firm outcomes. Leaders with advanced education levels demonstrate superior analytical skills and problem-solving abilities, enabling informed decision-making in complex scenarios (Carpenter *et al*., 2004). Urquhart and Zhang (2021) linked advanced degrees with higher firm performance though the relationship varied depending on industry and organisational complexity. For instance, in knowledge-intensive sectors,

such as pharmaceuticals or technology, the educational background of leaders significantly correlated with innovation output and firm growth trajectories.

2.7.2.2 Psychological characteristics and cognitive biases

While Hambrick and Mason (1984) focused on observable characteristics, they also noted the importance of psychological traits such as cognitive biases and values in shaping leadership behaviour. Cognitive biases, including overconfidence and anchoring, significantly influenced decision-making processes, often leading to suboptimal outcomes. For instance, overconfident leaders may underestimate risks, pursuing ventures with limited potential (Hayward and Hambrick, 1997). Conversely, leaders with a growth-oriented mindset are more likely to embrace innovation and pursue expansion opportunities.

At the time, Hambrick and Mason identified significant challenges in studying psychological traits, such as reliance on self-reporting, social desirability bias and a lack of standardised measurement tools. Since then, advances in empirical methodologies, including neuroimaging, behavioural experiments and machine learning, have addressed many of these limitations, enabling more accurate and consistent measurement of cognitive biases (Kahneman and Tversky, 1979; Fisher, Chin and Klitzman, 2015; Jordan and Mitchell, 2015). These advancements have enriched the study of psychological characteristics, complementing observable traits to offer a more comprehensive understanding of executive behaviour. In addition, neuroimaging techniques such as functional Magnetic Resonance Imaging have enabled researchers to observe brain activity associated with decision-making processes, providing objective insights into cognitive biases (Fisher *et al.*, 2015). Machine learning algorithms have also been employed to analyse textual data, such as CEO speeches and earnings calls, to infer psychological traits like optimism, overconfidence or risk aversion (Jordan and Mitchell, 2015). These tools offer deeper insights into the complex interplay between leaders' cognitive traits and their strategic decisions.

2.7.3 UET and founder tenure

UET holds that a firm's top executives backgrounds, values and cognitive characteristics shape strategic choice; in the context of founder tenure this is especially salient because founders often occupy a distinctive position derived from their role in establishing and imprinting the firm (Hambrick and Mason, 1984; Hambrick, 2007). For clarity in what follows, tenure effects are distinguished from embeddedness, and the two constructs are treated separately in the empirical design.

Founder tenure intersects with the key concepts of UET at many levels. Firstly, when a founder's tenure becomes extended this can lead to the development of deeply ingrained mental (cognitive) frameworks which are used to interpret and process information. As founders accumulate experiences and make critical decisions over time, their cognitive frames become more structured and influential and can impact decision-making by reinforcing certain patterns or biases. Whereas shorter tenure might

facilitate more adaptable and innovative decision-making, extended tenure can lead founders to rely on familiar strategies and approaches. In addition, the cognitive frames developed over their period of tenure will, inevitably, shape a founders' perception of risk, opportunity and market dynamics and thereby influence their strategic choices (Hambrick, 2007). Secondly, founder tenure can influence the degree of risk-taking and innovation within a firm. Longer-tenured founders might become risk-averse over time and favour strategies that maintain stability and continuity. Conversely, shorter-tenured founders might be more willing to experiment and implement novel ideas to establish their leadership and make an impact. These dynamics reflect how founders' cognitive orientations evolve over the period of tenure and shape their willingness to engage in innovative ventures (Finkelstein and Hambrick, 1990). Thirdly, the extended founder tenure might impact firm adaptability and inertia due to being more resistant to change because of a founder's attachment to their original vision and ways of operating, which then hinders firm flexibility in responding to external shifts. Conversely, shorter-tenured founders might be more open to changes that align with their vision as they seek to establish their authority, leadership and legitimacy. This interplay between founder tenure and UET underscores how executives' cognitive orientations in general, influenced by their tenure, interact with external and internal pressures to drive or impede firm adaptation (Finkelstein and Boyd, 1998). Finally, the length of a founder's tenure has been suggested to be closely linked to the development of a firm's strategic direction and identity because of the cognitive frames a founder forms, and which are reinforced over their tenure, heavily influencing the core values, mission and purpose of the firm. These longer-tenured founders are likely to embed their personal values deeply into the firms' culture which, in turn, guides in-firm decision-making and behaviour. This argument emphasises the role of founder tenure in shaping a firm's enduring identity and the alignment of strategies with that identity (Hambrick and Fukutomi 1991).

Whilst different studies have identified various types of relationships between founder (and CEO) tenure and firm performance, one of the most prominent was undertaken by Zhang and Rajagopalan (2010), who proposed a reversed-U-shaped relationship between tenure and firm performance, where positive performance facilitates growth. According to their study, founders (and CEOs) with moderate tenure demonstrated the best firm growth as they had acquired sufficient experience to make informed decisions but had not yet succumbed to stagnation or cognitive rigidity. This finding supports the idea that founder and CEO longevity can enhance firm growth through accumulated knowledge and experience. However, it also suggests that there is an optimal tenure length, beyond which the benefits of accumulated experience may be offset by increased resistance to change and decreased cognitive flexibility.

Simsek *et al*. (2009) offer a complementary perspective, examining the relationship between tenure and the implementation of innovative growth strategies. Their study suggested that CEOs with longer tenures are more likely to invest in exploratory and innovative growth strategies due to the

stability and time that longer tenure affords for the effective implementation of long-term, and potentially riskier, initiatives. This capacity for sustained investment in such strategies can significantly and positively impact future firm growth.

These studies, including Zhang and Rajagopalan (2010) and Simsek *et al*. (2009), collectively highlight the nuanced impact of CEO tenure on firm performance. While moderate tenure allows leaders to leverage their experience effectively, extended tenure can facilitate strategic investments in innovative growth strategies. Reconciling these findings, it becomes evident that both the depth of experience and the strategic vision afforded by longer tenures play crucial roles in driving firm growth. However, the benefits of extended tenure must be balanced against the potential for entrenchment and reduced adaptability. In particular, the reversed-U-shaped relationship observed by Zhang and Rajagopalan (2010) suggests that while tenure can provide the stability and accumulated experience needed for strategic success, there is also a risk of diminishing returns as tenure extends beyond an optimal point. This balance of experience and openness to change is crucial for firms aiming to remain competitive and responsive to evolving market dynamics.

2.7.4 Founders and external conditions

In the business world, there is an enduring belief that founders and CEOs exercise sufficient control over their firms to define their direction and ensure their success. However, whilst this might appear to be the case to external observers the reality is that environmental conditions exert pressures that can determine how long these leaders remain in their roles, regardless of their personal ambitions or skills. The most prominent of these environmental conditions is industry dynamism, i.e. the rate at which industries change and evolve (Eisenhardt and Martin, 2000). Dynamic industries are characterised by rapid technological advancements, rapidly changing customer preferences, frequent introduction of new products or services and a rapidly changing regulatory framework. These factors act to destabilise established business models and render previous strategies obsolete (Teece *et al*., 1997). Founders and CEOs operating within such dynamic industries must be agile and adaptive; however, even the most adept leaders can struggle to keep up with the pace of change. For example, the 'dotcom' bubble saw the rapid rise and fall of many tech CEOs due to their inability to pivot their firms when faced with investor pushback and this resulted in their replacement (Finkelstein *et al*., 2009). This last example shows that, regardless of how visionary or competent the leader of a business might be, if this leader cannot match the pace of the industry, then he or she becomes very vulnerable to replacement.

Another important environmental factor which has the potential to dictate the length of a founder or CEOs tenure is external stakeholder pressure, especially that from institutional investors. In recent decades, institutional investors, who hold significant shareholdings in publicly listed firms, have gained substantial influence over corporate governance. While Bratton (2001) highlights the power of institutional investors to demand leadership changes in underperforming firms or those failing to adapt

to industry evolution, subsequent studies have offered a more nuanced perspective. Goergen (2018) systematically discusses the active role of institutional investors, noting that their influence, while significant, is often tempered by internal governance mechanisms and regulatory environments. The pressure that institutional investors exert for short-term returns, even at the expense of long-term strategic goals, remains a persistent challenge for founders and CEOs. However, more recent research underscores that this pressure may not always lead to immediate calls for leadership change, as investor actions often reflect broader market dynamics and governance practices rather than isolated performance metrics. Furthermore, unanticipated global events, such as the 2007/2008 financial crisis and the 2020 COVID-19 pandemic, can play a significant role in determining the duration of a founder or CEOs tenure. Unforeseen events lead to significant market disruptions and create challenges even for the most competent leaders. In such scenarios, the longevity of a founder's or CEO's tenure can become linked to unpredictable external forces rather than their capabilities (Honjo and Kato, 2021).

Regulatory changes also present significant challenges for founders and CEOs as such changes can directly impact the profitability and viability of entire business models. Whilst industries such as healthcare and energy are particularly susceptible to changes in regulatory frameworks (Bansal and Roth, 2000) any industry and, thus any founder or CEO, can be affected. Even if the founder or CEO is adept at navigating a particular regulatory environment, sudden changes can necessitate different skills and this can, potentially, shorten the CEO's tenure. This last particularly serves to highlight the point that to maintain their position within the firm, the founders and CEOs must not only be skilled and visionary but also be exceptionally agile, constantly recalibrating their strategies to navigate the constantly ever-changing environment.

2.7.5   Founder transitions and tenure

This section considers two related mechanisms through which leadership history shapes outcomes, namely transitions from founder to professional CEOs and the effects of tenure in the CEO role. It then integrates these strands to clarify their joint implications for adaptation and performance.

2.7.5.1 Founder-to-professional CEO transitions

The transition from a FCEO-led firm to one overseen by a professional CEO, or NFCEO, is a complex and nuanced process, fraught with both challenges and opportunities. Berle and Means (1932) laid the foundational groundwork for discussions of ownership and incentives, emphasising the alignment of financial and managerial interests in corporate governance. This foundation, later developed in Ownership and Agency Theory, complements the understanding of how such transitions influence firm dynamics. Finkelstein and Hambrick (1996) expanded on this by highlighting that the immediate aftermath of a founder's departure often results in a dip in firm performance. Founders, as cultural linchpins and visionaries, play unique roles in shaping company culture (Schein, 2017), and their exit

may lead to clashes between ingrained philosophies and new leadership paradigms, potentially causing temporary disarray (Jayaraman *et al*., 2000).

Tacit knowledge, as discussed by Polanyi (2009), represents a deeply personal and specialised understanding of a firm's operations and objectives, which founders possess uniquely. The transition from FCEO to NFCEO often disrupts this reservoir of knowledge, creating a learning curve that can impact performance. Lane and Lubatkin (1998) argue that leadership changes can temporarily reduce a firm's absorptive capacity, hindering its ability to assimilate and apply new knowledge effectively.

While these transitions pose risks, they also open the door for revitalisation and long-term growth. Founders may lack the administrative and strategic capabilities needed to manage a scaling organisation (Nelson, 2003a). Boeker and Wiltbank (2005) contend that professional CEOs bring specialised managerial expertise, broad industry networks and strategic acumen that can be invaluable for the firm's evolution. Furthermore, these CEOs are often more adept at navigating complex organisational structures and stakeholder relations (Bigley and Wiersema, 2002). Zenger (1992) adds that NFCEOs often align rewards with strategic goals, enhancing overall performance. Despite potential short-term setbacks, these transitions can reorient the firm strategically, making it more responsive to market shifts and innovation cycles (Wright *et al*., 2006). However, Haleblian *et al*. (2009) caution that firm-specific variables, such as age, size and competitive environment, heavily influence the success of such transitions. Established firms with institutionalised processes may ease this shift, whereas younger firms, reliant on the founder's vision, face greater challenges (Baron *et al*., 1999).

2.7.5.2 CEO tenure and organisational dynamics

The dynamics of CEO tenure provide another critical lens for understanding leadership's influence on organisational outcomes. As Miller (1991) and Hambrick and Fukutomi (1991) propose, CEO tenure follows a life cycle that begins with openness to diverse information sources and culminates in reduced adaptability as tenure extends. Initially, short-tenured CEOs engage with internal and external sources to fill knowledge gaps, fostering innovation and customer orientation (Wu, Levitas and Priem, 2005; Zhang and Rajagopalan, 2010). Over time, however, prolonged tenure may lead to overconfidence and reduced receptiveness to new perspectives, weakening the firm's responsiveness to market changes and reducing innovation (Miller, 1991). The study by Luo, Kanuri and Andrews (2013) identifies a median CEO tenure of 4.8 years among top U.S. firms, suggesting that this period allows leaders to build firm-specific knowledge and foster innovation. However, their bimodal findings, CEOs either 'fail fast' or 'succeed and stay*'*, highlight the complexity of tenure dynamics. CEOs unable to adapt may exit quickly, while successful leaders often extend their tenures, accumulating tacit knowledge but risking entrenchment (Hambrick and Fukutomi, 1991).

Debates surrounding optimal CEO tenure often draw cultural analogies, such as the U.S. President's eight-year term limit, reflecting societal norms around leadership duration. However, as

Kaplan, Klebanov and Sorensen (2012) argue, adaptability and continuous learning are more critical indicators of CEO effectiveness than tenure length alone. While longer tenures may benefit sectors requiring extensive project timelines, such as infrastructure, rapid product cycles in technology demand dynamic leadership.

The contrasting impacts of tenure highlight the importance of leadership adaptability and responsiveness. Hambrick, Geletkanycz and Fredrickson (1993) caution that prolonged tenure risks entrenchment, thereby limiting innovation. Simultaneously, Quigley and Hambrick (2014) find that industries reliant on tacit knowledge benefit from extended tenures. These insights underscore the necessity of balancing continuity and adaptability in leadership.

2.7.5.3 Integrating founder transitions and tenure

Integrating the discussion of FCEO-to-NFCEO transitions with CEO tenure dynamics underscores the multifaceted nature of leadership's impact on firm performance. UET (Hambrick and Mason, 1984) provides a valuable lens for examining these dynamics, particularly in understanding how leaders' values, experiences and cognitive frames shape organisational outcomes. While transitions from FCEO-led to NFCEO-led firms present unique challenges, they also create opportunities for strategic renewal and long-term growth. Similarly, CEO tenure has a dual impact, offering the benefits of accumulated knowledge and stability, while highlighting the risks of entrenchment and reduced adaptability. These factors collectively underscore the importance of balancing leadership continuity with responsiveness to change in achieving sustained organisational success.

2.7.6   Ideal CEO tenure

This section reviews the literature on optimal CEO tenure and clarifies how tenure in office differs from in-firm time in this thesis. It sets the expectation that any relation between tenure and performance is contingent on firm age, size and founder status, which motivates the tests implemented in Chapter 5.

Whether driven by the interests of the firm, its stakeholders, or broader market dynamics, the debate on CEO tenure is both multifaceted and profoundly consequential. As firms navigate the complex interplay of internal and external factors, the quest for the ideal CEO tenure remains a pivotal, yet unresolved, question, underscoring the pressing need for further in-depth research on this topic.

What the preceding discussion highlights is that the data on CEO tenure can be construed in many ways. It might be suggested that some CEOs are holding positions for durations which are not in the interests of the firms they represent, including its shareholders, employees, and customers. For shareholders, perspectives on tenure can vary significantly based on ownership structure, with institutional investors often favouring stability and long-term growth, while activist shareholders may prioritise immediate returns (Goergen, 2018). However, it could also be argued that industry dynamics and market forces dictate length of tenure and that some industries do better with shorter-tenured CEOs

whilst others perform better with leaders on longer tenures. These conflicting views on CEO tenure and whether there is a generalised optimal duration where firm performance is maximised highlights a gap in the literature and presents an intriguing opportunity for further scholarly inquiry.

The notion of optimal tenure draws on conflicting empirical and theoretical foundations. One view of research on CEO tenure outlines that new or short-tenured CEOs are more likely to seek information from diverse sources, driving innovation and customer satisfaction (Miller, 1991; Wu *et al.*, 2005). In a contrary view, longer-tenured CEOs may become overconfident and less receptive to external inputs, leading to a potential disconnection from market dynamics and ultimately, underperformance (Hambrick and Fukutomi, 1991). However, such a straightforward dichotomy may be too simplistic, given that it does not account for firm-specific factors, industry dynamics or broader market conditions. According to the Contingency Theory of Leadership, the effectiveness of management practices and processes, including CEO tenure, may be dependent on situational variables (Donaldson, 2001). In other words, industry volatility, technological changes, market complexity and competitive intensity may influence the ideal duration of CEO tenure. Furthermore, the very definition of optimal tenure can be complicated by the differing interests of the firm's stakeholders. Stakeholder Theory, as articulated by Freeman (1984), offers a lens to understand the competing priorities of diverse stakeholders, including shareholders, employees, customers and suppliers. While some shareholders, particularly activist investors, may focus on short-term profits, others, such as institutional investors, often prioritise NPV and long-term sustainability. Employees may prefer job stability, while customers value long-term relationship building. This perspective highlights how the evaluation of CEO tenure must balance these often-conflicting interests to optimise outcomes for all. The assessment of the impact of CEO tenure also depends on the performance metrics used. Financial performance indicators like ROI and stock price could point towards a different optimal tenure compared to non-financial metrics such as employee satisfaction, customer loyalty or innovation rate. For example, cross-sectional research may show that firms in rapidly changing industries like technology might benefit from shorter-tenured CEOs equipped to adapt quickly (Nadkarni and Herrmann, 2010). In contrast, industries that value relational contracts and trust-building may see an advantage in longer CEO tenures (Graffin *et al.*, 2008).

The implication is that a one-size-fits-all approach to CEO tenure may be ineffective or even detrimental, underlining the importance of nuanced, context-dependent academic investigation. Hence, what is required is a more robust conceptual framework that considers multiple contingencies, including industry characteristics, stakeholder interests and performance metrics, to better understand the conditions under which different CEO tenures are most effective is required.

2.8   Human capital

The landscape of CEO human capital is multifaceted, comprising two forms: general and specific human capital. Penrose (1959) provides a useful frame for understanding how these capabilities, as internal managerial services, enable firms to mobilise resources and exploit external opportunities. In this context, distinguishing between general and specific human capital, clarifies what founders bring into the venture and how those attributes may relate to growth and performance. The types of human capital, their performance value and their antecedents are discussed in the follow section.

General human capital refers to transferable skills and knowledge acquired through education, training and diverse work experience. This form is not firm-specific and can be applied across industries and roles. CEOs with advanced degrees or broad cross-industry experience exemplify general human capital that can be leveraged to improve performance. Evidence links general human capital to firm outcomes via enhanced cognitive capacity, problem-solving and adaptability (Crook *et al*., 2011); greater opportunity identification and strategic flexibility (Estrin, Mickiewicz and Stephan, 2016); and versatility under competitive and uncertain conditions (Arenius and Minniti, 2005; Block, Thurik and Zhou, 2013; Parker, 2009, 2011). General human capital can also widen strategic vision and responsiveness to global market dynamics (Barney and Felin, 2013), expanding the scope for growth.

Specific human capital, however, consists of skills and knowledge that are unique to a particular firm or industry. This type of human capital is developed through hands-on experience within the firm, including familiarity with its processes, culture and unique challenges. CEOs with specific human capital are deeply attuned to their firm's operations and can leverage this intimate knowledge to make informed strategic decisions that align with the firm's long-term goals. Penrose's emphasis on internal resources aligns with the concept of specific human capital, as she underscores the importance of leveraging firm-specific knowledge to achieve competitive advantage. Specific human capital is instrumental in building and sustaining firm capabilities that are difficult for competitors to replicate (Minniti, Bygrave and Autio, 2005). Nyberg *et al*. (2014) further argue that specific human capital enhances a leader's ability to optimise firm operations, as they possess a unique understanding of the firm's internal dynamics, employee capabilities and operational intricacies. This kind of capital is particularly beneficial in industries where deep technical knowledge and relationships are critical to success.

The interplay between general and specific human capital is pivotal in shaping a firm's strategic direction and performance. Li and Patel (2018) argue that CEOs with a blend of generalist and specialist experience, referred to as 'jack of all, master of all', are particularly effective in driving firm success. These leaders can draw on their broad knowledge base to introduce innovative growth strategies while utilising their firm-specific insights to implement these strategies effectively. The balance between these two forms of human capital is critical for optimal firm performance. CEOs with predominantly

general human capital may excel in navigating diverse environments and driving strategic change, but might lack the deep organisational knowledge needed for fine-tuning internal processes. Conversely, those with primarily specific human capital may be highly effective in optimising firm operations but might struggle with broader strategic shifts or innovation.

Furthermore, Coff and Kryscynski (2011) emphasise the importance of understanding the dynamic nature of human capital. They suggest that the value of both general and specific human capital can change over time based on the firm's strategic needs and the external environment. For instance, during periods of rapid industry change, the adaptability provided by general human capital may be more valuable, whereas during stable periods, the operational efficiency driven by specific human capital may be more advantageous. This dynamic perspective highlights the need for firms to align their leadership's human capital profile with their evolving strategic objectives. Research by Ployhart and Moliterno (2011) also suggests that human capital should be viewed as a collective asset rather than just an individual attribute. These authors introduce the concept of human capital resources, which refers to the synergistic value created when the skills and knowledge of multiple individuals within an organisation are effectively integrated. This perspective is particularly relevant when considering the roles of CEOs, as their ability to cultivate and harness the collective human capital of their teams can significantly impact firm performance. By fostering an environment that encourages knowledge sharing and collaboration, leaders can amplify the value of both general and specific human capital, driving innovation and competitive advantage.

UET posits that the characteristics of top executives significantly influence organisational outcomes. While education and experience help to explain leadership capabilities, UET links these attributes directly to strategic choice by emphasising how executives' cognitive frames and values shape decision-making (Hambrick and Mason, 1984). Framed this way, the educational and experiential backgrounds of leaders underpin heterogeneity in strategic decisions. Hambrick (2007) further argues that leaders with more diverse backgrounds are more likely to engage in comprehensive strategic analysis, considering a wider array of factors and potential outcomes; this broad perspective can yield more informed decisions and improve the likelihood of long-term success.

In addition to distinguishing general and specific human capital, it is useful to note their antecedents. Education, prior work experience and industry exposure shape general human capital by building foundational knowledge and cognitive skills and by developing problem-solving ability and adaptability (Becker, 1993). Specific human capital is largely formed though time within a particular firm or industry: longer exposure deepens familiarity with capabilities, culture and operational constraints, enabling decisions that align with long-term objectives. The interaction between general and specific human capital has implications for strategic flexibility and resilience. Leaders who possess both are better equipped to navigate complex strategic challenges: breadth helps them recognise and evaluate new opportunities, while depth enables them to leverage existing resources effectively (Hatch

and Dyer, 2004). This combination is particularly valuable in dynamic environments and where firms must balance innovation with the efficient use of established assets.

To gain a deeper understanding of how human capital shapes organisational outcomes, it is essential to explore both general and specific human capital, their performance value and antecedents. The discussion in the next sections will elucidate how these two forms of human capital influence strategic decision-making and firm performance, providing a nuanced view of the interplay between leadership characteristics and organisational success. By integrating insights from both Penrose's resource-based view and UET we can develop a more comprehensive understanding of the factors that contribute to effective leadership and firm growth.

2.8.1   Performance implications of general and specific human capital

Building on the theoretical distinctions introduced above, this subsection explores how general and specific human capital influence strategic decision-making, leadership adaptability and firm performance. The aim is to move beyond definitional clarity and examine how these forms of capital manifest in practical and performance-related outcomes for FCEOs.

General human capital equips individuals with a breadth of skills, such as analytical thinking, leadership and communication, acquired primarily through formal education and diverse work experiences (Becker, 1964; Lazear, 2009). Founders with strong general human capital are typically better able to adapt to changing environments, recognise new opportunities and foster a culture of innovation within their firms (Davidsson and Honig, 2003). However, this breadth may come at the cost of depth in industry-specific knowledge, which can affect decision-making precision in more specialised contexts (Unger *et al*., 2011; Hambrick and Mason, 1984). In contrast, specific human capital reflects the knowledge and capabilities developed through prolonged immersion in a particular firm, function or industry (Acemoglu and Pischke, 1998; Becker, 1964). Founders with deep specific human capital bring valuable operational insight and a nuanced understanding of the firm's routines, culture and strategic levers. Such expertise can enhance the precision of strategic choices and improve execution. However, it may also lead to over-reliance on established routines and reduce the likelihood of recognising opportunities beyond the existing domain, a phenomenon sometimes referred to as strategic myopia (Politis, 2005; Sirmon and Hitt, 2003).

The performance implications of these two forms of capital are context dependent. In dynamic, uncertain environments, general human capital enhances a CEO's ability to pivot, explore emerging markets and adopt new technologies. In contrast, in stable or highly regulated environments, specific human capital supports internal efficiency and consistency in execution. This trade-off highlights the need for an appropriate alignment between human capital profiles and the external and internal conditions faced by the firm (Ployhart and Moliterno, 2011). Moreover, the optimal scenario may be one in which founders possess a blend of both general and specific human capital. Li and Patel (2018)

describe such individuals as 'jack of all, master of all' i.e. leaders capable of broad strategic vision while remaining grounded in firm-specific realities. This dual capability enables firms to remain agile while maintaining operational coherence.

While general and specific human capital are typically examined as distinct forms of CEO capability, their interaction may be particularly consequential in founder-led firms. FCEOs who can cultivate both the breadth afforded by general human capital and the depth rooted in firm-specific experience may be uniquely positioned to lead across different stages of the firm lifecycle. This dual orientation allows them to introduce strategic innovations while ensuring these are grounded in a realistic understanding of the firm's internal constraints and capabilities. In this sense, the effectiveness of FCEOs is not solely a function of their initial knowledge base but also of their capacity to develop and balance different forms of human capital over time, aligning with the firm's evolving strategic needs.

2.8.2   Determinants (or antecedents) of human capital

Education is a foundational determinant of CEO human capital, influencing both general and specific skills. On the one hand, general human capital, developed through broad-based education such as MBAs or PhDs, equips CEOs with versatile knowledge and critical thinking skills applicable across various industries (Estrin *et al*., 2016). This form of education not only enhances cognitive awareness, enabling CEOs to grasp complex issues, but also fosters socialisation, shaping behaviours and motivations that contribute to effective leadership (Schwartz, 1999). Educational experiences further refine social and cognitive skills through interactions with peers and mentors, enhancing decision-making abilities and organisational growth (Estrin *et al*., 2016). Specific human capital, on the other hand, benefits from specialised degrees tailored to particular industries. For instance, a CEO with a background in biotechnology, engineering or law gains in-depth technical knowledge and skills directly applicable to those fields. This expertise allows them to better understand the nuances and complexities of their industry, enhancing their effectiveness in leading firms within specific sectors (Parker, 2009; Li and Patel, 2018). While education significantly contributes to human capital, the relationship between educational attainment and career choice can be complex. The high opportunity costs associated with advanced education may deter some individuals from entrepreneurial paths, favouring stable, well-compensated roles in established firms where they can leverage their skills with lower personal and financial risk (Parker and Belghitar, 2006; Estrin *et al*., 2016). In managerial roles that provide decision-making autonomy, these individuals find a balance between security and the opportunity to influence and innovate within an organisational framework.

Experience is another vital determinant of specific human capital, particularly valuable for CEOs. Unlike general skills developed through education, specific human capital accrues through direct engagement within a firm or industry, encompassing a deep understanding of the firm's culture, market

dynamics and competitive landscape. CEOs with extensive experience in a particular sector develop tacit knowledge, i.e. experiential insights that are difficult to acquire through formal education alone. This knowledge enables them to make informed, nuanced decisions and adapt strategies to the unique needs of their organisation (Polanyi, 2009; Becker, 1993). The experiential learning process also helps CEOs build relational networks, which are valuable assets for information exchange, collaboration and resource acquisition. These networks, cultivated through tenure and industry experience, strengthen the CEO's ability to align strategies with long-term goals and respond effectively to market demands (Adner and Helfat, 2003). Additionally, the learning curve effect, where skills and knowledge improve with experience, reinforces the importance of stability in leadership roles. This cumulative knowledge enables CEOs to leverage internal resources effectively, driving firm performance and competitive advantage (Argote, 1999).

In summary, education and experience together shape the human capital of CEOs, enabling them to navigate diverse business environments and industry-specific challenges. Through general education, CEOs gain adaptable skills, while specialised education and experience provide the depth of knowledge needed for specific industries. This combination fosters effective leadership, empowering CEOs to address complex organisational needs and capitalise on unique opportunities for growth (Estrin *et al*., 2016; Parker, 2011; Crook *et al*., 2011).

2.8.3   Human capital, performance and contingencies

Firm and industry contexts serve as critical factors shaping CEO human capital. These contexts wield influence over individual returns and opportunity costs, underscoring the importance of alignment between CEO human capital and specific industry conditions (Estrin *et al*., 2016). The size and age of a firm further complicate this relationship, with smaller, younger firms requiring CEOs with specific human capital tailored to their unique challenges and larger established firms benefiting from CEOs with broader general human capital (Hambrick and Mason, 1984). The relationship between CEO human capital and firm performance is multifaceted and context dependent. Empirical evidence suggests that the alignment between a CEO's human capital and the firm's strategic needs is crucial for optimising firm performance. Crook *et al*. (2011) conducted a meta-analysis demonstrating that human capital significantly impacts firm performance. Their findings highlight that both general and specific human capital contribute to firm success, but the extent of their impact varies depending on the firm's context and industry conditions.

Specific human capital, characterised by deep industry knowledge and firm-specific expertise, is particularly valuable in smaller, younger firms where the challenges are unique and rapidly evolving. CEOs with specific human capital can leverage their intimate understanding of the firm's operations and market dynamics to implement tailored strategies that drive growth and competitive advantage (Harris and Helfat, 1997). In contrast, larger, more established firms benefit from CEOs with general

human capital, as their broad-based skills and experiences enable them to navigate diverse challenges and innovate across different contexts (Li and Patel, 2018). The complexities introduced by the level of education, rising opportunity costs and firm and industry contexts necessitate further empirical research to unveil the nuances of this relationship. The interplay of these two types of human capital aligns closely with Penrosean theory. Penrose argues that a firm's unique internal resources, particularly its managerial team, contribute to its capacity to grow by leveraging and developing these resources over time. Founders with specific human capital constitute unique, non-substitutable resources, offering strategic advantages that are difficult for competitors to replicate (Barney, 1991). Meanwhile, founders with general human capital contribute to the firm's adaptive capacity, aligning with Penrose's view that companies need to continually evolve and expand their resource base for sustained growth (Teece, 2007).

The concept of absorptive capacity, as discussed by Cohen and Levinthal (1990), further illustrates the importance of aligning human capital with firm needs. Absorptive capacity refers to a firm's ability to recognise, assimilate and apply new knowledge. CEOs with specific human capital enhance the firm's absorptive capacity by bringing deep industry insights and fostering a culture of continuous learning and innovation. Conversely, CEOs with general human capital contribute to absorptive capacity by integrating diverse perspectives and knowledge, facilitating cross-functional collaboration and strategic flexibility. Research by Hitt *et al*. (2001) supports this view, showing that firms led by CEOs with a balance of general and specific human capital tend to perform better. These leaders can draw on their broad knowledge base to introduce innovative growth strategies while utilising their firm-specific insights to implement these strategies effectively. This combination enables firms to adapt to changing market conditions and sustain competitive advantage over time.

Moreover, the dynamic capabilities framework proposed by Teece (2007) underscores the need for CEOs to possess both types of human capital. Dynamic capabilities refer to a firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments. CEOs with general human capital provide the strategic vision and flexibility needed to identify and pursue new opportunities, while those with specific human capital ensure the effective execution of these strategies through their deep operational expertise. The contribution of a founder's human capital to firm growth and performance is thus complex and multi-dimensional, incorporating elements of both general and specific human capital. Each type offers distinct advantages and limitations, but when effectively combined, they can synergistically contribute to the firm's ability to grow through both internal optimisation and adaptive capacity. This nuanced understanding opens avenues for further exploration, particularly in comparing the roles and impacts of founders with those of professional CEOs in organisational development and performance.

2.9   Gaps in the literature

The current literature on the role of founders and their human capital in firm growth and performance presents a complex and often incongruous narrative, reflecting several important gaps that warrant further scholarly inquiry. One prominent example is the inconsistency in reported effects of founders serving as FCEOs on firm performance. Some research suggests that FCEOs are well-equipped to lead firms towards favourable outcomes, owing to their intimate understanding of the business and its founding vision (Wasserman, 2003). Conversely, other studies propose that as firms evolve and reach higher levels of complexity, the capabilities of NFCEOs, become more advantageous (Nelson, 2003b; Boeker and Wiltbank, 2005). Rather than signalling a conceptual flaw, this lack of consensus reflects the multifaceted nature of the founder-CEO phenomenon and underscores the importance of a more nuanced, context-sensitive approach. It also presents a clear opportunity for empirical contributions, such as this study, to explore how variables including industry sector, firm age, governance models and CEO tenure interact with human capital in shaping performance outcomes. A closely related yet underexplored issue is the influence of FCEO tenure on firm performance. While existing studies indicate that tenure can significantly affect outcomes (Gimeno *et al*., 1997), the interaction between tenure and human capital remains poorly understood. For instance, it is still unclear whether firms led by long-tenured FCEOs with specific human capital outperform those led by FCEOs with generalist profiles. While some evidence suggests that tenure is positively correlated with the accumulation of firm-specific knowledge (Kor, 2003), more comprehensive empirical work is needed to assess the long-term implications of tenure-human capital combinations for sustained firm performance.

Moreover, there is a noticeable gap in understanding how contextual variables might influence the efficacy of different types of human capital, particularly pertaining to CEOs and their firms. While some research suggests that specific human capital's advantages may be more pronounced in highly specialised or regulated industries (Sirmon and Hitt, 2003), the role of broader contextual factors like market volatility, geographical location and the rate of technological change is not well-investigated (Zahra, 2007). Given that firms operate in increasingly complex and dynamic environments, understanding how different human capital types perform under various conditions could offer valuable insights (Mayer, 2006).

Specific human capital, with its deep industry knowledge and firm-specific expertise, may be particularly beneficial in stable, specialised or highly regulated industries where detailed operational knowledge and compliance with industry standards are crucial. In such contexts, CEOs who possess extensive experience and understanding of industry-specific regulations, technical requirements and market idiosyncrasies can effectively navigate challenges and capitalise on niche opportunities. This nuanced understanding can lead to more efficient operations, compliance with regulatory standards and strategic advantage in competitive markets (Sirmon and Hitt, 2003). Conversely, in volatile markets

characterised by rapid technological change and dynamic competitive landscapes, general human capital might be more advantageous. CEOs with broad-based skills and diverse industry experience are better equipped to adapt to unforeseen challenges, pivot strategies quickly and innovate in response to new opportunities. The ability to draw on a wide range of experiences and knowledge allows these leaders to be more flexible and responsive, which is critical in environments where agility and innovation drive success (Zahra, 2007).

Geographical location also plays a significant role in determining the effectiveness of different types of human capital. For instance, CEOs leading firms in emerging markets may face unique challenges such as less developed infrastructure, political instability and different consumer behaviour patterns. In these settings, specific human capital that includes local market knowledge and experience in navigating regional regulatory environments can be particularly valuable. On the other hand, in more developed markets with well-established institutions and infrastructures, general human capital may provide the versatility needed to exploit a broader array of strategic opportunities (Mayer, 2006).

The rate of technological change is another critical contextual factor. In industries undergoing rapid technological advancements, such as information technology or biotechnology, CEOs with a combination of general and specific human capital might be most effective. They need the broad strategic vision provided by general human capital to understand and integrate new technologies across different domains, while also relying on specific human capital to manage the technical intricacies and operational implementation within their firm (Teece, 2007).

Understanding these contextual variables is essential for developing a more nuanced perspective on how human capital impacts firm performance. It also underscores the importance of aligning CEO human capital with the specific needs and strategic goals of the firm, considering the broader environmental conditions. This expanded focus on contextual variables highlights the complexity and multidimensionality of CEO human capital. By examining how market volatility, geographical location and technological change impact the efficacy of general and specific human capital, we can better understand the conditions under which different types of human capital are most beneficial. This understanding is crucial for both theoretical development and practical applications in strategic management and leadership.

Additionally, the role of potential moderating variables remains underexplored. Several factors could serve as significant moderators, including firm size, the industry's life cycle stage, economic conditions and geographical location (Nelson, 2003b; Kaplan *et al*., 2012; Zahra, 2007). These variables could moderate the relationship between the type of CEO, their human capital and firm performance and offer a more nuanced understanding. For example, the influence of an FCEO could vary depending on the economic climate; during economic downturns, a founder's specialised knowledge could be

more beneficial for navigating challenges, while in economic upturns, a professional CEO's general managerial skills may be more valuable (Kaplan *et al*., 2012).

This review establishes Penrose's account of firm growth as the primary conceptual anchor. UET is used to explain how observable CEO attributes shape strategic choices and outcomes. The RBV is used to clarify when founder-related capabilities create advantage and how that advantage may erode as firms age and scale. This integration motivates the empirical focus on FCEOs, the comparative baseline of NFCEOs and the moderating roles of human capital, in-firm time and tenure. The next chapter translates these arguments into testable hypotheses and a conceptual framework that guides the analysis (Penrose, 1959; Hambrick and Mason, 1984; Barney, 1991).

Chapter 3

Hypothesis development

This chapter outlines the study's hypotheses based on the theoretical foundations presented in the previous chapter, utilising concepts from Penrosean theory, the RBV and UET. It develops hypotheses linking FCEOs' characteristics (such as education, industry experience and tenure) to firm growth, exploring how these attributes moderate the relationship between leadership and performance. The chapter also highlights the role of firm-specific and general human capital in shaping leadership effectiveness, providing a clear rationale for the study's focus on FCEOs. This theoretical foundation sets the stage for the subsequent methodology and analysis.

3.1 Theoretical foundations

This study investigates the impact of FCEOs on firm growth, comparing them to NFCEOs. FCEOs, as original creators of their businesses, often embody entrepreneurial motivations, a long-term vision and deep firm-specific knowledge that can uniquely drive growth. By contrast, NFCEOs bring diverse professional experiences from various organisational contexts, which may lend advantages in managing and scaling firms with more established structures. This comparison provides insights into how leadership origin shapes strategic direction and performance.

Grounded in Penrosean theory (Penrose, 1959), which emphasises managerial resources and services as the engine of expansion, the framework treats growth as the outcome of capability development within the firm. FCEOs shape the direction and intensity of opportunity search through their experiences, ownership and authority, which can widen the set of feasible initiatives and accelerate market development. In this account, growth effects are expected to precede efficiency gains as routines and coordination mechanisms are built. Differences between FCEOs and NFCEOs are therefore read through their access to and deployment of firm specific knowledge, with FCEOs drawing on deep familiarity with the venture and NFCEOs relying more on diverse external experiences. UET provides the CEO level channel and the RBV explains the resource conditions under which such effects arise (Hambrick and Mason, 1984; Barney, 1991).

Central to this framework are the human capital characteristics of CEOs, which serve as key moderators in the relationship between leadership origin and firm performance. General human capital, comprising transferable skills and knowledge from education and diverse professional experiences, is argued to enable strategic flexibility and innovation. Conversely, specific human capital, reflecting accumulated knowledge of a firm's culture, processes and operations, enhances the ability to optimise firm resources effectively. The interplay between these forms of human capital underscores the theoretical argument that FCEOs possess a unique advantage in driving growth when these attributes are well-developed.

Tenure serves as another critical moderator in this study. Drawing on Penrosean insights into the learning curve effect and the deepening of managerial capabilities over time, this study posits that extended tenure allows FCEOs to align growth initiatives with the firm's evolving goals. However, UET also highlights the risks of entrenchment and strategic rigidity associated with prolonged tenure, necessitating a balance between the benefits of accumulated experience and the need for ongoing adaptability.

In summary, the theoretical foundations of this study are deeply rooted in the integration of Penrosean theory and UET, providing a robust framework for understanding the complex interplay of CEO characteristics, moderating factors and firm performance. By exploring these dynamics, this research seeks to uncover the nuanced conditions under which FCEOs and NFCEOs contribute to firm growth.

3.2   Hypothesis development

3.2.1   Growth outcomes for FCEOs versus NFCEOs

Hypothesis 1 posits that firms led by FCEOs will experience higher growth rates than those led by NFCEOs. In this study, growth refers to the change in sales revenue, used as a proxy for firm size and expansion. This operationalisation captures the extent to which a firm increases its market reach and production capacity over time. Unless otherwise specified, subsequent references to growth in later hypotheses adopt the same definition.

FCEOs' deep connection to the firm's origins often equips them with a unique, intrinsic motivation and an intimate knowledge of the firm's resources and capabilities. These factors may enhance their ability to navigate firm-specific challenges, leading to a strategic advantage that translates into higher growth rates (Wasserman, 2003; Nelson, 2003a; Boeker and Wiltbank, 2005).

In contrast, NFCEOs, with their broader range of managerial experiences across different firms and contexts, may approach growth with a more standardised or industry-agnostic perspective. While this can offer advantages in operational efficiency, FCEOs' strong alignment with firm-specific goals and their commitment to long-term success could provide a more substantial impact on growth. This hypothesis aligns with the Penrosean view that firms benefit when managers leverage unique, non-replicable resources embedded within the organisation.

Hypothesis 1: The rate of growth in firms with FCEOs will be higher than in those with NFCEOs.

3.2.2   Moderating effects of human capital

Hypotheses 2a to 2d propose that specific human capital attributes (education, functional knowledge, industry experience and in-firm time) moderate the relationship between founder leadership and firm

growth. These attributes are expected to influence the strength or direction of the founder effect on growth, helping to explain variation in performance among founder-led firms. Each facet contributes differently to a founder's capability set and, in principle, may enhance or attenuate the effectiveness with which founders translate strategy into growth.

3.2.2.1 Education level

Higher education levels provide CEOs with broad-based knowledge, analytical skills and critical thinking abilities, which can be instrumental in guiding firms through complex strategic decisions and growth challenges. Education enhances general human capital by fostering cognitive awareness and socialisation, equipping CEOs with the adaptability and insight needed to respond to dynamic market conditions (Estrin *et al*., 2016; Crook *et al*., 2011).

However, the prevalence of lower formal educational attainment among FCEOs may reflect the distinct motivational drivers that characterise entrepreneurial endeavours. Founders are frequently propelled by an intrinsic calling or a profound passion to create and innovate, effectively a drive that overshadows the pursuit of formal education. Cardon *et al*. (2009) discuss the nature and experience of entrepreneurial passion, emphasising that such fervour often becomes the focal point of founders' careers. This passion, deeply embedded in their identity and sense of purpose, may lead them to eschew extended academic pursuits in favour of immediate entrepreneurial action.

Furthermore, Nicolaou and Shane (2009) explore the genetic factors that may predispose individuals to engage in entrepreneurial activities, suggesting that the decision to launch a venture is influenced by inherent traits as much as, if not more than, formal education. This perspective introduces the idea that the educational aspirations of FCEOs might be shaped by a blend of innate predispositions and personal passions that steer them toward entrepreneurship at the expense of traditional educational trajectories.

These insights collectively suggest that the educational background of FCEOs, as compared to NFCEOs, reflects a broader trend where entrepreneurial ambition and a calling to innovate take precedence over academic qualifications. Rather than undermining their leadership potential, this divergence challenges traditional assumptions that formal education is the principal pathway to economic success. It highlights how the entrepreneurial drive, often shaped by intrinsic motivation and a readiness to act, can redefine the characteristics of effective business leadership.

For FCEOs, advanced education may nonetheless bolster their decision-making by providing a structured framework for strategic thinking, allowing them to supplement their firm-specific knowledge with broader management perspectives. This integration of general and specific human capital could amplify a FCEOs capacity to drive growth more effectively than their less-educated counterparts. By combining their entrepreneurial passion with the analytical and strategic benefits conferred by higher education, FCEOs may enhance their ability to navigate complex business environments and capitalise

on growth opportunities. Therefore, we hypothesise that the impact of education on firm growth rates will be greater for FCEOs compared to NFCEOs.

Hypothesis 2a: The impact of level of education on firm growth rate will be higher for FCEOs compared to NFCEOs.

3.2.2.2 Functional knowledge

Functional knowledge, which stems from specific roles and responsibilities within the firm, represents a specialised form of human capital that enhances a CEO's ability to handle operational challenges and drive strategic initiatives. For clarity, in this thesis functional knowledge is defined as the CEO's possession of a relevant qualification and/or prior professional experience aligned with the firm's dominant operational function (e.g. finance, engineering, operations, marketing). This construct draws on definitions from the strategic human capital literature and is operationalised using biographical and professional history data. The empirical operationalisation and coding of this construct are set out in Section 4.10.3.

This knowledge is particularly critical in environments where industry-specific expertise is essential for navigating complex strategic decisions and achieving growth. Evidence suggests that the presence of industry-specific education and experience, regardless of duration, is a critical determinant of effective leadership, especially in such environments (Wasserman, 2003; Hsu, 2007).

For FCEOs, functional knowledge enables the translation of entrepreneurial vision into practical, actionable plans, allowing them to bridge the gap between vision and execution. An FCEO with high functional knowledge is likely to be adept at optimising resources, managing teams effectively and addressing internal inefficiencies, all of which are crucial for scaling operations and enhancing performance (Gimeno *et al*., 1997). Furthermore, the educational trends observed among FCEOs highlight the importance of business-related and generic educational backgrounds, which reflect the multifaceted nature of their roles, and the diverse competencies required for entrepreneurial leadership. While FCEOs may lack extensive tenure in specific roles or industries, their ability to acquire and leverage functional knowledge through education and professional qualifications compensates for this and positions them as effective leaders within their organisations.

The impact of functional knowledge on firm growth is expected to be greater for FCEOs compared to NFCEOs, as they rely on it to bridge the gap between entrepreneurial vision and operational execution.

Hypothesis 2b: The impact of functional knowledge on firm growth rate will be higher for FCEOs compared to NFCEOs.

3.2.2.3 Industry experience

Industry experience provides CEOs with a deep understanding of the competitive landscape, customer preferences and regulatory environment, which are essential for identifying and capitalising on growth opportunities. This depth of knowledge equips CEOs with the ability to navigate the unique challenges of their sector by identifying strategic opportunities, mitigating risks and implementing effective solutions tailored to their industry's context. Such expertise is critical for driving firm performance and achieving sustainable growth (Finkelstein *et al*., 2009).

For FCEOs, industry experience serves as a form of specific human capital that complements their firm-specific insights. This dual expertise allows them to leverage their unique position within the industry, fostering innovation and competitive differentiation (Sirmon and Hitt, 2003). CEOs with significant industry-specific experience are better positioned to develop a nuanced perspective on competitive dynamics, customer needs and technological advancements. These insights inform strategic decision-making processes that align with the firm's long-term goals and market positioning (Hambrick, 2007). For FCEOs, this combination of industry knowledge and entrepreneurial vision enhances their ability to implement innovative, growth-oriented strategies.

Additionally, industry experience contributes to a CEO's ability to build and maintain relationships within the industry. These networks provide access to critical resources, partnerships and market intelligence, which support the firm's competitive advantage. For FCEOs, these relationships are often complemented by their entrepreneurial drive, allowing them to maximise the benefits of their industry expertise for sustained growth (Hsu, 2007).

The analysis of CEO industry experience highlights its significance as a determinant of effective leadership and firm performance. Data suggests that FCEOs are more likely to possess industry-specific experience compared to their counterparts in the broader CEO population. This advantage provides them with the insights and skills needed to navigate the complexities of their industry and drive strategic success. The impact of industry experience on firm growth is expected to be greater for FCEOs compared to NFCEOs, as they leverage it alongside their entrepreneurial vision to drive strategic success.

Hypothesis 2c: The impact of industry experience on firm growth rate will be higher for FCEOs compared to NFCEOs.

3.2.2.4 In-firm time

In-firm time, or the length of a CEO's tenure within their organisation, contributes significantly to the development of firm-specific knowledge and insights that are critical for long-term strategic planning. Extensive in-firm time allows CEOs to gain a thorough understanding of the firm's internal dynamics, including its culture, processes and strategic priorities. This deep familiarity enhances their ability to

make decisions that align with the firm's long-term objectives and operational realities (Finkelstein *et al.*, 2009).

For FCEOs, extended tenure within the firm offers a distinct advantage by enabling them to accumulate tacit knowledge that is both experiential and context specific. This knowledge equips FCEOs to identify strategic opportunities, address challenges unique to the firm and align growth strategies with the organisation's core capabilities and values (Kor, 2003; Polanyi, 2009). By leveraging this deep understanding of the firm's unique characteristics, FCEOs can drive growth more effectively than their counterparts who lack comparable firm-specific experience.

In addition to firm-specific knowledge, in-firm time contributes to building strong relational networks within the organisation. Long-tenured CEOs are likely to have established trust and rapport with key stakeholders, including employees, board members and external partners. These relationships foster a collaborative environment, enabling the CEO to implement strategic initiatives more effectively and maintain a cohesive organisational culture (Hambrick, 2007). For FCEOs, these relationships, when combined with their entrepreneurial vision, further enhance their capacity to implement innovative and growth-oriented strategies (Hsu, 2007).

The combination of extensive in-firm time and an entrepreneurial background provide FCEOs with a unique advantage in leadership. Their ability to integrate firm-specific knowledge with their entrepreneurial drive allows them to implement strategies that support sustained growth and competitive advantage. This dual perspective not only enhances their strategic agility but also ensures that growth initiatives are deeply embedded in the firm's operational and cultural context.

The impact of in-firm time on firm growth is expected to be greater for FCEOs compared to NFCEOs, as they leverage their firm-specific knowledge and networks to implement sustained growth strategies.

Hypothesis 2d: The impact of in-firm time on firm growth rate will be higher for FCEOs compared to NFCEOs.

3.2.3   Moderating effects of tenure

The impact of CEO tenure on firm performance is multifaceted, reflecting both the benefits of accumulated experience and the potential risks of strategic rigidity. On one hand, longer tenures allow CEOs to develop valuable firm-specific knowledge and deepen their understanding of the firm's strategic environment. These attributes enhance a CEO's ability to make informed decisions and align organisational resources with long-term growth objectives. This perspective aligns with Penrose's (1959) work, which emphasises the importance of managerial capabilities in fostering firm expansion and resilience.

For FCEOs, the advantages of extended tenure are particularly significant. Founders bring an entrepreneurial perspective that prioritises innovation and strategic risk-taking. Over time, these qualities are amplified by the knowledge and relational networks developed through tenure. Longer tenure allows FCEOs to refine their resource management strategies, optimise the deployment of firm-specific human capital and implement initiatives that drive sustained growth. Kor (2003) and Finkelstein *et al*. (2009) note that the learning curve effect associated with longer tenure enhances CEOs' ability to navigate market complexities and foster organisational resilience.

However, extended tenure also carries inherent risks. Miller (1991) describes the 'stale in the saddle' phenomenon, wherein long-tenured CEOs may become resistant to change and innovation, leading to strategic inertia. Hambrick and Fukutomi (1991) similarly warn that entrenched leaders may struggle to adapt to dynamic market conditions, ultimately hindering a firm's competitiveness. For FCEOs, balancing their entrepreneurial instincts with the challenges of prolonged leadership is critical. Without this balance, the benefits of tenure may be undermined by a diminished willingness to explore unconventional opportunities or revise established strategies.

The alignment between a CEO's tenure and the firm's culture can also have both positive and negative implications. Long-tenured CEOs often exhibit strong alignment with organisational norms and strategic direction, fostering stability and continuity (Hambrick, 2007). While this alignment can support consistent execution, it may also inhibit innovation and responsiveness to evolving market conditions. For FCEOs, whose leadership style often relies on agility and a growth-oriented mindset, managing this tension is essential to sustaining firm performance over time.

Despite these risks, the unique position of FCEOs suggests that the benefits of extended tenure outweigh its challenges. Longer-tenured FCEOs are well-positioned to leverage their accumulated experience and relational networks, strengthening the firm's strategic adaptability and resilience. By combining their entrepreneurial drive with the insights gained through tenure, FCEOs can implement growth strategies that effectively address both immediate opportunities and long-term goals.

In summary, CEO tenure plays a pivotal role in shaping leadership effectiveness and firm performance. The impact of tenure on firm growth is expected to be greater for FCEOs compared to NFCEOs, as they combine their entrepreneurial vision with accumulated firm-specific knowledge to sustain performance over time.

Hypothesis 3: The impact of tenure on firm growth rate will he higher for FCEOs compared to NFCEOs.

3.3   Conceptual model and variables

The study of organisational performance and the factors influencing it has long been of interest within the field of strategic management. Central to this investigation is the role of the CEO, whose decisions,

characteristics and tenure are often seen as critical determinants of a firm's success. Within this context, the contrast between FCEOs and NFCEOs presents a distinctive opportunity to examine how leadership shapes outcomes. The conceptual framework developed for this research draws on Penrose's insights, UET and the RBV. Together these lenses propose that the characteristics and experiences of top executives influence organisational outcomes, and that such attributes can constitute resources whose value depends on fit with the firm's architecture. The framework delineates the relationships between CEO type, moderating variables and the performance metrics used in this study.

3.3.1 Conceptual framework

The conceptual framework organises the study and sets out how founder identity relates to firm performance. FCEO is the focal predictor. The framework is grounded in Penrose's account of growth through the deployment of managerial services and the mobilisation of firm resources and in upper echelons reasoning about how executives shape outcomes. Human capital provides the basis for heterogeneity in the founder effect through education, functional knowledge, industry experience and in-firm time and from tenure in the CEO role. Firm age and firm size are treated as context controls and are included in all models to improve comparability. The framework guides the hypotheses and the specification choices that follow rather than serving as a causal mediation model. See the methods section for definitions and measurement choices that implement the framework (Penrose, 1959; Hambrick and Mason, 1984; Becker, 1964). Throughout the thesis growth is defined as the change in sales revenue (ΔSR), whilst profitability (ROA) is analysed as a secondary performance outcome without a directional prior.

The figure implies three testable elements. First, H1 states a direct association between founder leadership and growth (ΔSR). Second, H2a to H2d state that education, functional knowledge, industry experience and in-firm time moderate the founder effect. Third, H3 states that tenure provides an additional moderator. Firm age and firm size are included as controls and are not themselves subject to hypotheses. Any mechanisms such as opportunity search and resource mobilisation are discussed in the theory and are not estimated directly. The hypotheses and the model forms in Chapter 5 follow this mapping to ensure that tests align with the framework (Penrose, 1959; Hambrick and Mason, 1984; Becker, 1964).
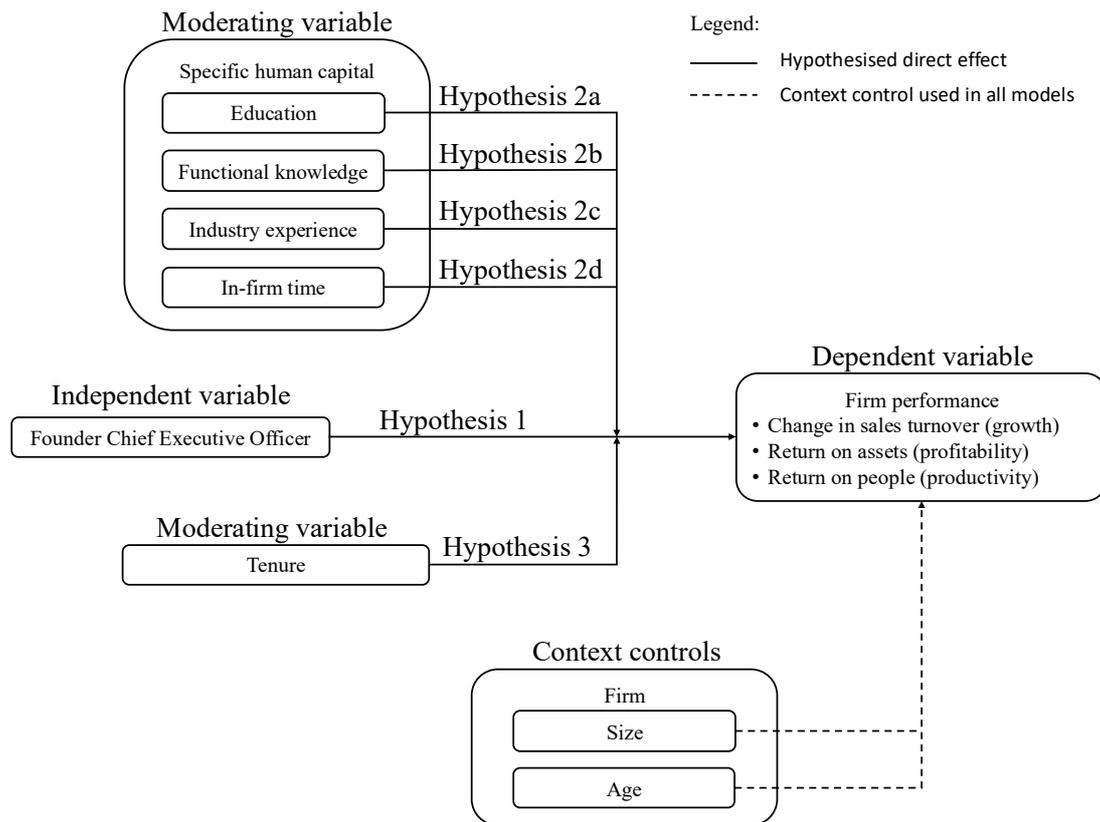
Figure 4 – Conceptual framework

3.3.2 Dependent variable: Firm performance

Firm performance is treated as a multidimensional construct and is operationalised on three dimensions. Growth is measured by the change in sales revenue (ΔSR) and is the focal outcome for hypothesis testing (H1). Profitability is captured by return on assets (ROA) and is analysed as a secondary outcome to assess the scope of any founder effect beyond growth. These distinctions align the empirical tests with the framework and preserve interpretability of the estimates.

3.3.3 Independent variable: CEO type

The independent variable in this study distinguishes between FCEOs and NFCEOs based on their relationships with the firm. FCEOs, defined as individuals who founded the firm and hold the CEO position, are characterised by entrepreneurial spirit, deep organisational knowledge and long-term commitment to the firm. Conversely, NFCEOs are hired or appointed to the CEO position without founding ties to the firm. They bring diverse external experiences and professional management practices. This binary classification underpins Hypothesis 1, positing that firms led by FCEOs will exhibit higher growth rates than those led by NFCEOs, driven by their entrepreneurial drive and intimate firm knowledge.

3.3.4 Moderating variables

The model includes two key moderating variables: specific human capital and tenure. Specific human capital attributes, which include education, functional knowledge, industry experience and in-firm time, are theorised to moderate the relationship between CEO type and firm performance. Higher education levels equip CEOs with advanced analytical skills and broader networks. Functional knowledge and industry experience, developed through diverse professional roles, enhance CEOs' ability to address market demands. In-firm time reflects the accumulation of tacit knowledge and an understanding of the firm's unique culture and capabilities. These attributes are critical in influencing strategic decisions and fostering growth. Tenure is a proxy for firm-specific human capital, encompassing experience and commitment. For FCEOs, extended tenure enhances their ability to align growth initiatives with the firm's evolving goals, leveraging accumulated knowledge and relational networks. However, prolonged tenure also introduces risks, such as entrenchment and strategic rigidity. These dynamics highlight the dual nature of tenure's influence, necessitating careful management to maximise its positive effects.

3.3.5 Operationalisation and integration of model with hypotheses

This study operationalises its variables using measurable firm performance metrics (ΔSR and ROA) to ensure clarity and consistency in the analysis. CEO type is categorised as either FCEOs or NFCEOs based on founding ties and leadership roles. Moderating variables, including specific human capital attributes (such as education and functional knowledge) and tenure, are defined and measured systematically to capture their influence on firm performance.

The conceptual model provides a structured approach to explore the complex relationships between CEO type, firm performance and moderating variables. It posits that firms led by FCEOs will exhibit higher growth rates than those led by NFCEOs, reflecting the entrepreneurial orientation and strategic risk-taking commonly associated with founders. The impact of specific human capital attributes, such as education and functional knowledge, on firm growth is expected to be more pronounced for FCEOs than NFCEOs, as founders are more likely to leverage their specialised knowledge and market insight. Similarly, the effect of CEO tenure on firm growth is anticipated to be higher for FCEOs, as longer in-firm time may enhance strategic decision-making but also introduce the risk of entrenchment. This integrated model reflects the dynamic interaction between leadership style, organisational resources and strategic outcomes.

Beyond academic contributions, this model offers practical insights for boards and practitioners involved in CEO selection and succession planning. Understanding the nuanced effects of CEO characteristics and tenure enables organisations to make informed leadership decisions, fostering long-term success. This conceptual model provides a detailed map of the pathways through which CEO characteristics and contextual factors influence firm performance. By incorporating moderators, it captures the multifaceted nature of CEO influence and establishes a robust basis for empirical testing.

This approach ensures that the interplay between leadership attributes and firm outcomes is comprehensively analysed, paving the way for meaningful contributions to both theory and practice.

Chapter 4

Data and methods

This chapter details the data sources, sample selection and methodology employed in the study. The dataset includes firms led by FCEOs and NFCEOs, with variables capturing firm performance metrics such as growth, profitability and productivity. The chapter explains the operationalisation of key independent variables, including CEO characteristics (e.g., education, tenure and industry experience), as well as control variables such as firm size and age. The analytical methods, including regression modelling, are described, emphasising the use of transformations and statistical tests to address skewness and ensure robustness. This chapter establishes the empirical foundation for testing the study's hypotheses.

4.1   Research approach

This research utilises publicly available secondary data that is verifiable and objectively factual and is built around a quantitative research approach. In addition, this data is interpreted within a qualitative framework to enhance and add depth to the research.

In contextualising the data and analysis, it is assumed that a single reality exists; we can unambiguously hypothesise, for example, that firms led by FCEOs will exhibit higher growth rates than those led by NFCEOs, as defined by Hypothesis 1. This approach represents a realist ontological position (Lee and Lings, 2008; Bryman, 2016).
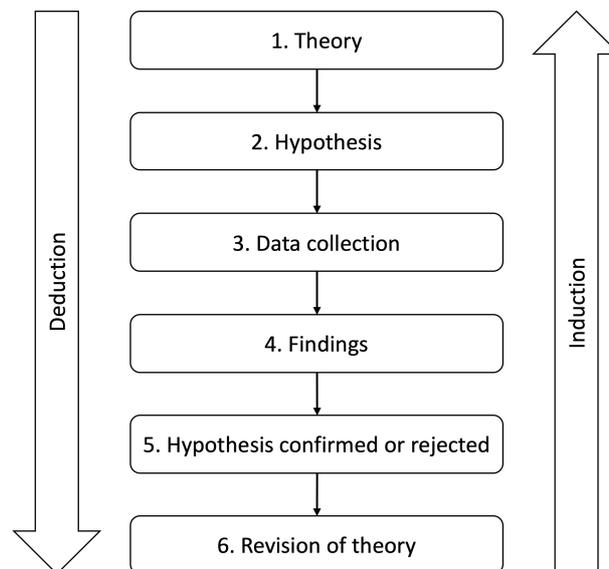
Figure 5 – The process of deduction (Bryman, 2016)

The epistemological position relies on a positivist deductive approach for the research, as shown in Figure 5 (Bryman, 2016). Utilising deduction was a logical approach because a conceptual

framework was constructed, then secondary data was used to formulate findings which confirmed or rejected the hypotheses and, if necessary, would lead to the revision of the conceptual framework.

The research employs a longitudinal approach rather than a cross-sectional one. While the dataset has a single cut-off point (31 December 2018) for both the CEOs and the firms they lead, it also incorporates historical data to track changes over time. This design allows the examination of relationships between variables across an extended period, providing insights into trends and developments that a purely cross-sectional study could not offer (Saunders, Lewis and Thornhill, 2015; Bryman, 2016). The cut-off date was selected because it coincided with the end of a calendar year and, at the outset of data collection, represented the latest listing of firms available from the London Stock Exchange (LSE).

Using deductive research processes with real data to understand how CEOs impact firm performance, before trying to reason (Lee and Lings, 2008), defines an empiricist approach to knowledge accumulation. This is a tried and tested approach with an established pedigree. Indeed, one of the first written references to it was in John Locke's *Essay Concerning Human Understanding* (1689), where he suggested that for us to reason about the world we must first observe and understand the context.

As the research involves the collection and interpretation of quantitative data, this leads to the view that scientific methods will be applied. However, to be considered truly scientific, research must not only be generalisable in the widest possible context (Lee and Lings, 2008) but also meet the criterion of falsifiability, as proposed by Popper (2002), that is, hypotheses must be capable of being tested and potentially disproven. This principle underpins the logic of hypothesis testing, where no hypothesis can ever be absolutely proven, only its null alternative rejected based on statistical evidence. This perspective is debated among scholars. For instance, sectoral research is widely recognised and valued for its contributions to understanding specific contexts (Bryman, 2016). Theoretical frameworks should indeed aim for generality but can and often should be applied to specific sets to test their validity in varied contexts.

Generalising might not be the most appropriate term in this context. Typically, theory is tested and retested with different datasets. If confirmed, this process suggests that the theory has more general validity, but these confirmations occur through multiple studies rather than within a single study (Saunders *et al*., 2015). This iterative process of testing and refinement is fundamental to the scientific method and helps to build robust, generalisable theories over time.

The approach for this research has been developed with full understanding of these constraints and with the view that subsequent studies will continue to test and refine the findings to enhance generalisability. This ongoing research process involves conducting further studies in different contexts and with different datasets to see if the results hold true across various conditions. This iterative

approach is crucial for building a comprehensive understanding of how CEO characteristics impact firm performance (Eisenhardt, 1989; Yin, 2018).

4.2   Research methods

The population for this research is the CEOs of firms. This would have been an extremely wide sample frame if we considered all firms in the world, which some data agencies believe to be around 200 million (Datapo.com, 2019). This sample would have covered a broad range of organisations from micro (< 9 employees) to large enterprises (>250 employees) in both developed and developing economies. Collecting such data would be very desirable and likely to result in highly generalisable findings. However, the scale and complexity of collecting data on the firms and their CEOs, particularly micro-enterprises and those in developing economies, would have been an issue as they are not subject to the same requirements for statutory reporting as larger organisations and those in developed economies.

Restricting the sample to publicly listed firms in the world reduces the number to 43,248 (World Bank Open Data, 2022) but does not resolve other issues around data complexity and volume. On this basis, it was clear that, while being able to generalise at a global level might be desirable, processing and analysing data from such large and diverse sample frames was unrealistic in terms of the time and cost. An interesting question to consider would be whether the Anglo-Saxon system of governance, prevalent in the United Kingdom, United States of America and other English-speaking countries, impacts outcomes differently to other forms of governance, as this could narrow the population even further and provide a more homogeneous sample for analysis. The Anglo-Saxon model emphasises shareholder value and may influence the dynamics between FCEOs and NFCEOs differently compared to other governance systems (Aguilera and Jackson, 2003). While not considered in this study, that aspect might offer an interesting avenue for future scholarly enquiry.
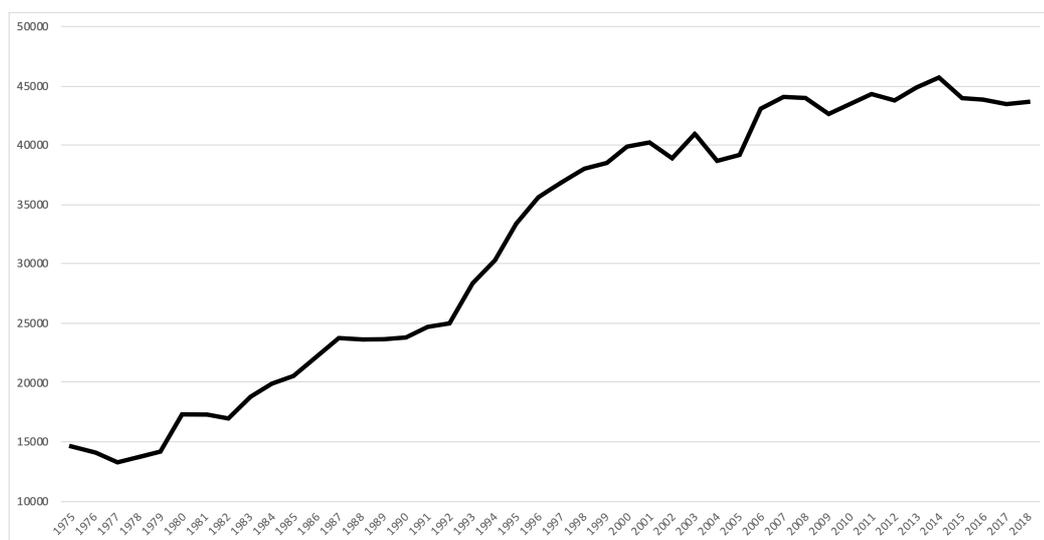
Figure 6 – Publicly listed companies in the world (derived from World Bank Open Data, 2022)

Limiting the data set specifically to firms listed on the LSE was a deliberate methodological choice. First, the UK represents a single, well-regulated institutional context with consistent disclosure and corporate governance requirements, which enhances the comparability of firms and reduces confounding variation due to institutional heterogeneity. Second, the UK operates under the Anglo-Saxon system of governance, where shareholder primacy shapes managerial incentives and board oversight in ways that are particularly relevant to evaluating leadership impacts. Third, focusing on UK-listed firms ensures that the study leverages high-quality, standardised and independently audited financial and governance data, enabling rigorous longitudinal analysis. Finally, CEO succession events, including transitions between FCEOs and NFCEOs, are more transparent and systematically documented in listed firms, providing a robust empirical foundation for the hypotheses tested.

Description	Businesses (thousands)	Employment (thousands)	Turnover (£ billions)	Businesses (%)	Employment (%)	Turnover (%)
No employees *	4,278	4,643	275	75.5%	17.2%	7.1%
Micro (< 9 employees)	1,137	4,159	533	20.1%	15.4%	13.8%
Small (10-49 employees)	210	4,083	590	3.7%	15.1%	15.3%
Medium (50-249 employees)	35	3,399	595	0.6%	12.6%	15.4%
Total SMEs (0-249 employees)	**5,660**	**16,284**	**1,994**	**99.9%**	**60.3%**	**51.6%**
Large (> 250 employees)	8	10,743	1,868	0.1%	39.7%	48.4%
Total all businesses	**5,668**	**27,027**	**3,862**	**100.0%**	**100.0%**	**100.0%**

Notes:
* Includes sole proprietorships and partnerships with only the self-employed owner-manager(s) and companies with a single employee, who are assumed to be directors

Table 1 – Private sector businesses in the UK 2018 (Rhodes, 2018)

Table 1 illustrates the composition of UK private sector businesses in 2018, highlighting that while large firms represent only 0.1% of all business, they account for almost 40.0% of total employment and nearly half of total turnover (Rhodes, 2018). In contrast, micro and smaller enterprises make up most firms by number but contribute a smaller proportion of total employment and turnover. Excluding micro and smaller enterprises from the sample would, therefore, eliminate 95.6% of firms, along with 32.6% of total employment and 20.9% of turnover. These proportions underscore that narrowing the population to large firms substantially reduces the sample size while still capturing a significant share of the UK's economic activity. This reinforces the rationale for focusing on UK-listed firms, where high-quality, consistent and publicly available data facilitate robust longitudinal analysis.

The sample frame and data gathering described in Section 4.3 reflect the need to overcome some of the barriers to collecting reliable data relevant to a CEO population. This approach ensures that the data collected is both manageable and robust, allowing for meaningful analysis and valid conclusions.

The aim is to identify regularities represented by the hypotheses within a defined set of firms where reliable data can be consistently obtained and analysed.

4.3   Sampling strategy

This research examines UK-incorporated, non-Financial Services firms listed on the LSE Main Index as of 31 December 2018, and their CEOs. Following the application of systematic inclusion and exclusion criteria, the final dataset comprised 443 unique firms and 1,161 individual CEOs. The firms in the sample were all listed on the LSE Main Index and still trading on 31 December 2018. Companies listed on the Alternative Investment Market, the Professional Services Market, or as Admission to Trading Only were excluded, as were firms classified under the ICB Industry Financials and Super-Sector Financial Services. The latter exclusion follows established strategic management literature (McGahan and Porter, 1997; Mackey, 2008; Hambrick and Quigley, 2013), reflecting the distinctive characteristics of financial organisations, which include the absence of clarity over what constitutes their primary transactions and profits, their higher leverage, greater susceptibility to regulatory intervention, heightened macro-economic sensitivity, and a shorter 'market memory' relative to non-financial firms (Fama and French, 1992)[6]. Additional exclusions were made for firms incorporated outside the United Kingdom, those in liquidation prior to 31 December 2018[7], investment trusts with no executive management, those lacking sufficient financial data, duplicate listings and shell companies. A full explanation of the derivation of this list is provided in Appendix A.

The decision to focus on this specific population was both deliberate and methodologically driven. From a statistical perspective, and in line with the recommendations of Tabachnick and Fidell (2013), the sample size exceeds the minimum threshold (N>200) required to ensure the stability and usability of the data while remaining manageable for processing, analysis, and interpretation. From a methodological perspective, concentrating on a single, well-regulated institutional setting (such as that which operates in the UK under the Anglo-Saxon system of governance) enhances internal validity by reducing confounding variation due to institutional heterogeneity. This governance context is particularly relevant to the present study's focus on the impact of founder and non-founder CEOs, as it creates a consistent institutional framework for comparison.

Moreover, the LSE's regulatory environment ensures that high-quality, standardised and audited financial and governance data are available. This facilitates accurate longitudinal analysis and circumvents the limitations associated with self-reported data from privately held companies, where CEOs or owners may, intentionally or unintentionally, present a more favourable view of the firm's

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[6] Fama and French (1992) in their research on expected stock returns excluded financial firms as high leverage is normal for these types of firms and is unlikely to have the same meaning as for firms in other sectors, where it is more likely to reflect a firm in distress.

[7] Relates to firms that entered liquidation, were dissolved, or became insolvent prior to 31 December 2018 but, due to limited time between the event and the list being prepared, had not been removed by the LSE.

performance. The stringent reporting requirements for publicly listed companies, including the preparation of audited financial statements and strategic reports in accordance with established accounting standards, minimise the risk of such bias by holding firms accountable to shareholders and regulatory bodies alike.

Data for the period 31 December 1990 to 31 December 2018 was extracted from the Bloomberg Professional Services system as downloadable Microsoft Excel reports. For firms admitted to the LSE after 31 December 1990, data was collected from the date of admission, as earlier records were substantially incomplete or unavailable. CEO biographical data was primarily sourced from Bloomberg; however, where information was incomplete, secondary and contextual sources were consulted, including FT.com, Bureau van Dijk's Orbis and internet searches. No CEO data was collected prior to 31 December 1990 or the firm's LSE admission date, whichever was later. A summary of CEO distribution by firm is provided in Appendix B.

In summary, the sampling strategy balances the requirement for a robust, representative dataset with the practicalities of data collection and analysis. It ensures the findings are derived from a transparent, well-defined and methodologically rigorous sample frame. This approach enhances the reliability and comparability of the results, whilst also acknowledging that the focus on UK-listed firms constrains generalisability of the conclusions to similar governance and institutional contexts.

4.4   Data handling

Individual firm-level financial information downloaded from the Bloomberg system was inserted into firm-specific Microsoft Excel workbooks/spreadsheets. These were grouped alphabetically using LSE equity symbols, with each firm given a unique number identifier. The finance collection process was automated in terms of downloading formatted Bloomberg data. However, Bloomberg's database for some of the years between 1990 and 2018 was incomplete, necessitating manual checks and adjustments to ensure correct assignment and consistency across firms.

Biographic information on all CEOs between 1990 and 2018 was added to the firm-level financial information in the workbooks/spreadsheets manually, as this process could not be automated. Bloomberg served as the primary data source, but inconsistencies and gaps required further validation and supplementation. The gathering of this information proved time-consuming, particularly for firms like Ashley (Laura) Holdings PLC (equity code ALY), which had up to ten CEOs in the period, requiring data collection on each one.

A summary of the data collected at the firm, CEO and financial levels is provided in Appendix C, together with definitions/descriptions of how the information was operationalised for use in the research. Once all data had been collected into the workbooks/spreadsheets, StataCorp LLC's statistics and data analysis software, Stata 16.1, was utilised to convert all individual firm '.xlsx' files to '.dta'

format. These files were then appended into a single document containing 12,847 rows of observations. Despite efforts to ensure completeness, certain gaps remained in the dataset. Bloomberg financial data, while extensive, contained missing values for specific firms and years. These gaps were addressed through a structured approach, ensuring reliability through cross-validation with multiple sources, including annual reports. Where financial data was unavailable for a given year, it was treated as missing rather than imputed, in line with econometric best practices. Missing dependent variable values led to listwise deletion in regression models, while missing independent variables were managed through an unbalanced panel approach, ensuring that firms with partial data could still contribute to the analysis. There were no duplications in the financial data obtained from Bloomberg, as bulk downloads were structured to prevent redundant entries. However, CEO data contained some duplication, particularly in cases where multiple executives held the CEO role within the same firm in a given year. As noted earlier, the decision was made to retain the first CEO in post at the start of each year to maintain a consistent panel data structure. The accuracy of Bloomberg financial data was generally high, but discrepancies arose when firms changed their financial year-end due to mergers, acquisitions, restructuring or shifts in regulatory reporting standards. These changes sometimes resulted in a missing year in the Bloomberg dataset. In such cases, financial data was manually validated against annual reports and, where necessary, adjusted accordingly. CEO data from Bloomberg was less reliable, requiring extensive cross-checking and correction. While Bloomberg provided an initial reference point, widespread manual validation was necessary to correct errors in tenure, educational background and prior experience.

One of the major issues with the data at this stage was overlapping tenures of CEOs within single years or, as in the case of Ashley (Laura) Holdings PLC mentioned above, several CEOs in a single year. To run panel regression, it was necessary to have only a single CEO in a firm each year. Resolving these types of issues often depends on logical thought processes of the individual researcher. In this instance, consideration was given to utilising the data from the last CEO in any year, from the CEO who served the longest in any year and from the CEO who was in post at the start of the year. The 'last CEO' option was ruled out as they were unlikely to have been in post long enough to fundamentally alter the outcome for the year in question. The 'longest CEO' option was also ruled out because if they were not the CEO at either the start or end of the year, it was unlikely their time in post would have been sufficiently long to implement a new strategy. On this basis, the decision was made to utilise data from the 'start' CEO as they would have been implementing a strategy formulated before the start of the year and had, in most instances, been in post for some time.

The summary statistics for the panel data are presented in Tables 2 and 3. These dictate that the base level for factor variables used in this analysis is white CEOs aged between 50 and 59 years with a degree qualification, training predominantly in a business-related subject, i.e. ISCED-F 2013 detailed field codes 0400 to 0499, and in a firm less than 10 years old. The summary statistics are presented for

the full CEO population within the data set and then for a series of subsamples for the CEO population, FCEOs and NFCEOs all with a restriction on firm age less than or equal to 41 years. This constraint was imposed as the data showed the oldest firm with an FCEO was 41 years old and adoption of the restriction allowed direct comparison between FCEOs and NFCEOs. It should be noted that the data shown in Table 3 is derived from the CEO population (firm age ≤41 years) presented in Table 2.

All data analysis was performed using Stata 16.1 software, as discussed previously, with 'xtreg' commands used for regression estimations. As panel data was used, a Hausman Test was conducted to determine whether fixed or random effects estimators were appropriate. Since the p-value for the test was less than 0.05, the null hypothesis could be rejected, and a fixed effects model was judged to be consistent and was applied in this case. Robust standard errors were employed to account for potential heteroscedasticity.

The regression models incorporated control variables to account for factors that could independently influence firm performance and to enhance the robustness of the analysis. These controls included firm size, measured by the number of employees, reflecting its established relevance to organisational complexity and resource availability (Penrose, 1959; Kor, 2003; Child, 1972). Firm age was also included, acknowledging its potential influence on performance, as older firms often benefit from accumulated market experience and established reputations (Huselid, 1995; Coad, Segarra and Teruel, 2013). Industry type was controlled for, recognising that variations in industry characteristics, such as capital intensity or technological demands, significantly impact firm performance metrics (Becker and Huselid, 1998; Porter, 1980). Additionally, CEO characteristics, such as tenure and educational background, were included, drawing on UET, which emphasises the role of executive traits in shaping organisational outcomes (Hambrick and Mason, 1984; Finkelstein and Hambrick, 1990; Bertrand and Schoar, 2003; Hambrick, 2007).

The models were estimated systematically to test the hypotheses in a structured manner. First, a base model with only control variables was estimated to establish a foundation for the analysis. This was followed by models that incorporated CEO-specific variables to evaluate their incremental contribution to firm performance, consistent with previous studies on the interaction between human capital and organisational outcomes (Becker and Huselid, 1998; Estrin *et al*., 2016). This stepwise approach ensured that the explanatory power of CEO-specific characteristics could be assessed relative to the broader contextual factors captured by the control variables. To ensure the robustness of the analysis statistical tests, including *F*-statistics, were employed to evaluate the joint significance of variables added at each step. The detailed results and their implications are presented in the results section, where the incremental explanatory power of CEO-specific characteristics is systematically discussed.

Variable	CEO population					CEO population (firm age ≤41 years)				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
CEO age	5,956	52.709	7.149	27	82	4,683	52.453	7.183	27	78
CEO age range:										
<40	5,956	0.031	0.172	0	1	4,683	0.035	0.183	0	1
40-49	5,956	0.294	0.456	0	1	4,683	0.306	0.461	0	1
50-59	5,956	0.521	0.500	0	1	4,683	0.511	0.500	0	1
60-69	5,956	0.137	0.344	0	1	4,683	0.133	0.339	0	1
70>	5,956	0.017	0.130	0	1	4,683	0.016	0.126	0	1
Female CEO	5,956	0.034	0.181	0	1	4,683	0.038	0.191	0	1
CEO nationality:										
United Kingdom[1]	5,956	0.815	0.388	0	1	4,683	0.815	0.388	0	1
Anglosphere[2]	5,956	0.920	0.272	0	1	4,683	0.915	0.280	0	1
Commonwealth[3]	5,956	0.859	0.348	0	1	4,683	0.858	0.349	0	1
CEO ethnic background:										
White[4]	5,956	0.942	0.234	0	1	4,683	0.939	0.240	0	1
Non-white[5]	5,956	0.058	0.234	0	1	4,683	0.061	0.240	0	1
Level of CEO education:										
Pre-degree	5,956	0.189	0.391	0	1	4,683	0.204	0.403	0	1
Degree	5,956	0.456	0.498	0	1	4,683	0.438	0.496	0	1
Post-graduate	5,956	0.356	0.479	0	1	4,683	0.358	0.479	0	1
CEO professional qualification	5,956	0.353	0.478	0	1	4,683	0.340	0.474	0	1
CEO education/training background:										
Generic	5,646	0.104	0.305	0	1	4,482	0.116	0.320	0	1
Education	5,646	0.000	0.013	0	1	4,482	0.000	0.015	0	1
Arts	5,646	0.045	0.207	0	1	4,482	0.043	0.202	0	1
Social science	5,646	0.084	0.277	0	1	4,482	0.087	0.282	0	1
Business	5,646	0.512	0.500	0	1	4,482	0.501	0.500	0	1
Natural science	5,646	0.063	0.242	0	1	4,482	0.067	0.250	0	1
Information & communication technology	5,646	0.010	0.097	0	1	4,482	0.012	0.109	0	1
Engineering	5,646	0.171	0.376	0	1	4,482	0.164	0.370	0	1
Agriculture	5,646	0.004	0.064	0	1	4,482	0.004	0.063	0	1
Health	5,646	0.007	0.086	0	1	4,482	0.006	0.080	0	1
Services	5,646	0.001	0.030	0	1	4,482	0.001	0.026	0	1
CEO previous firm SIC same as current firm	5,943	0.408	0.492	0	1	4,670	0.430	0.495	0	1
CEO is internal appointment	5,956	0.553	0.497	0	1	4,683	0.528	0.499	0	1
Months before becoming CEO	5,951	80.110	104.739	0	461.0	4,678	76.669	104.422	0	461.0
Founder CEO	5,956	0.117	0.321	0	1	4,683	0.148	0.355	0	1
Firm age	5,956	23.423	19.702	0	86	4,683	14.841	11.217	0	41
Firm age range:										
<10	5,956	0.312	0.463	0	1	4,683	0.397	0.489	0	1
10-19	5,956	0.226	0.418	0	1	4,683	0.287	0.453	0	1
20-29	5,956	0.142	0.349	0	1	4,683	0.181	0.385	0	1
30-39	5,956	0.088	0.284	0	1	4,683	0.113	0.316	0	1
40-49	5,956	0.092	0.289	0	1	4,683	0.023	0.149	0	1
50-59	5,956	0.072	0.259	0	1					
60-69	5,956	0.052	0.222	0	1					
70-79	5,956	0.014	0.117	0	1					
80>	5,956	0.002	0.041	0	1					
Number of employees	5,719	20,452	54,285	1	648,254	4,472	18,987	53,014	1	648,254
Sales turnover	5,814	4,446	16,968	-30,204	294,787	4,565	3,831	14,913	-30,204	294,787
Return on assets	5,804	0.012	1.641	-110	3	4,564	0.003	1.850	-110	3
Return on people	5,717	0.374	1.352	-4	76	4,470	0.351	0.962	-4	28

Notes:

[1] UK nationals only

[2] Australia, Canada, Ireland, New Zealand, UK and USA nationals

[3] Australia, Canada, India, Malaysia, New Zealand, Singapore, South Africa and UK nationals

[4] Office of National Statistics ethnic groups 1 to 4

[5] Office of National Statistics ethnic groups 5 to 18

Table 2 – Summary statistics - All CEOs and all CEOs (firm age ≤41 years)

Variable	FCEO (firm age ≤41 years)					NFCEO (firm age ≤41 years)				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
CEO age	694	54.013	8.975	31	78	3,989	52.181	6.789	27	78
CEO age range:										
<40	694	0.053	0.225	0	1	3,989	0.032	0.175	0	1
40-49	694	0.259	0.439	0	1	3,989	0.314	0.464	0	1
50-59	694	0.428	0.495	0	1	3,989	0.525	0.499	0	1
60-69	694	0.205	0.404	0	1	3,989	0.120	0.325	0	1
70>	694	0.055	0.228	0	1	3,989	0.009	0.096	0	1
Female CEO	694	0.006	0.076	0	1	3,989	0.044	0.204	0	1
CEO nationality:										
United Kingdom[1]	694	0.798	0.402	0	1	3,989	0.818	0.386	0	1
Anglosphere[2]	694	0.941	0.236	0	1	3,989	0.910	0.286	0	1
Commonwealth[3]	694	0.831	0.375	0	1	3,989	0.862	0.345	0	1
CEO ethnic background:										
White[4]	694	0.880	0.325	0	1	3,989	0.949	0.221	0	1
Non-white[5]	694	0.120	0.325	0	1	3,989	0.051	0.221	0	1
Level of CEO education:										
Pre-degree	694	0.369	0.483	0	1	3,989	0.175	0.380	0	1
Degree	694	0.401	0.490	0	1	3,989	0.445	0.497	0	1
Post-graduate	694	0.231	0.421	0	1	3,989	0.380	0.486	0	1
CEO professional qualification	694	0.275	0.447	0	1	3,989	0.351	0.477	0	1
CEO education/training background:										
Generic	686	0.299	0.458	0	1	3,796	0.083	0.275	0	1
Education						3,796	0.000	0.016	0	1
Arts	686	0.039	0.195	0	1	3,796	0.043	0.203	0	1
Social science	686	0.137	0.344	0	1	3,796	0.078	0.269	0	1
Business	686	0.327	0.469	0	1	3,796	0.532	0.499	0	1
Natural science	686	0.042	0.201	0	1	3,796	0.071	0.257	0	1
Information & communication technology	686	0.025	0.156	0	1	3,796	0.010	0.098	0	1
Engineering	686	0.117	0.321	0	1	3,796	0.172	0.377	0	1
Agriculture						3,796	0.005	0.069	0	1
Health	686	0.015	0.120	0	1	3,796	0.005	0.071	0	1
Services						3,796	0.001	0.028	0	1
CEO previous firm SIC same as current firm	694	0.625	0.484	0	1	3,976	0.396	0.489	0	1
CEO is internal appointment	694	0.128	0.335	0	1	3,989	0.598	0.490	0	1
Months before becoming CEO	689	31.954	81.240	0	430.5	3,989	84.393	106.038	0	461.0
Founder CEO	694	1.000	0.000	1	1	3,989	0.000	0.000	0	0
Firm age	694	9.408	8.619	0	41	3,989	15.786	11.348	0	41
Firm age range:										
<10	694	0.602	0.490	0	1	3,989	0.361	0.480	0	1
10-19	694	0.271	0.445	0	1	3,989	0.290	0.454	0	1
20-29	694	0.084	0.277	0	1	3,989	0.198	0.398	0	1
30-39	694	0.040	0.197	0	1					
40-49	694	0.003	0.054	0	1	3,989	0.125	0.331	0	1
50-59						3,989	0.026	0.159	0	1
60-69										
70-79										
80>										
Number of employees	648	3,098	5,697	5	35,506	3,824	21,680	56,844	1	648,254
Sales turnover	682	364	500	0	3,702	3,883	4,439	16,092	-30,204	294,787
Return on assets	681	-0.105	4.205	-110	2	3,883	0.022	0.961	-48	3
Return on people	647	0.509	1.805	0	28	3,823	0.324	0.725	-4	19

Notes:

[1] UK nationals only

[2] Australia, Canada, Ireland, New Zealand, UK and USA nationals

[3] Australia, Canada, India, Malaysia, New Zealand, Singapore, South Africa and UK nationals

[4] Office of National Statistics ethnic groups 1 to 4

[5] Office of National Statistics ethnic groups 5 to 18

Table 3 - Summary statistics - FCEOs and NFCEOs (firm age ≤41 years)

Pairwise Pearson correlations are reported in Appendix D, Table D1. Founder leadership is negatively correlated with firm size and age and positively correlated with CEO tenure, education and training are moderately correlated. No pairwise correlation exceeds 0.5, which is informative for interpretation and does not indicate problematic bivariate collinearity for the models.

For the subsample of FCEOs, variables unique to founder-led firms were included selectively to reflect the distinct dynamics of FCEOs. For example, firm-specific knowledge and entrepreneurial

investment, variables frequently associated with FCEOs, were analysed only in models focused on founder-led firms, as these factors are less relevant for NFCEOs (Kor, 2003). Similarly, the inclusion of CEO tenure within the firm aimed to capture the depth of experiential knowledge that FCEOs often develop over time, which has been shown to influence firm outcomes (Polanyi, 2009). By carefully tailoring the inclusion of these variables to the context of FCEOs, the analysis ensured that the results were reflective of the unique contributions of FCEO leadership. This approach also mitigated potential biases arising from comparing FCEO-specific variables against the NFCEO population, thereby enhancing the robustness and interpretability of the findings.

4.5   Outlier handling

To ensure the robustness of the analysis, outliers in the primary dependent variables (ΔSR and ROA) were examined and addressed systematically. Outlier detection was performed in Stata 16.1 by inspecting histograms for each variable to assess skewness and the presence of extreme values. Procedures applied to ROP are reported with the robustness checks in Section 5.7, where the same diagnostic approach was followed.

Rather than applying traditional winsorisation, which symmetrically trims extreme values to predefined percentiles, this study employed LV decomposition as an adaptive, distribution-sensitive alternative for summarising distributions and handling skewed data. The LV method dynamically adapts to the shape of the distribution and accounts for skewness, making it more suitable than winsorisation for handling firm performance metrics, which often exhibit heavy-tailed distributions. The LV decomposition approach established outer fence values as the cut-off points for defining outliers. Any observations beyond these cut-off points were excluded from the regression models to prevent extreme values from distorting the results. This method ensures that naturally occurring variations in firm performance remain intact while mitigating the influence of extreme distortions. Unlike winsorisation, which replaces extreme values with fixed percentiles, LV decomposition identifies cut-off points based on the data structure, preserving meaningful extreme values. Traditional winsorisation assumes symmetrical distributions, which may not be appropriate for financial variables that are inherently skewed. In contrast, LV decomposition accommodates asymmetry in firm performance measures, making it a more flexible and accurate technique for identifying true outliers. By setting dynamic thresholds, LV decomposition prevents extreme values from unduly influencing regression coefficients, leading to more reliable estimates.

4.6   Model specification, robustness checks and multicollinearity

The initial regression models were estimated using fixed effects (FE) to account for unobserved heterogeneity across firms. The models also employed clustered standard errors at the firm level (by LSE equity symbol) to address issues of heteroskedasticity and within-group correlation in the panel

data. Fixed effects models assume that firm-specific characteristics remain constant over time and eliminate time-invariant heterogeneity, making them well-suited for analysing the impact of CEO characteristics on firm performance. The use of clustered standard errors enhances model reliability by correcting for within-firm correlation and violations of homoscedasticity assumptions, thereby reducing bias in coefficient estimates.

Sub-sample analysis was not conducted in this study, as the focus remained on evaluating the full panel dataset. The decision to retain the entire dataset rather than split it into subgroups ensures that statistical power is maximised and findings remain generalisable across the sampled firms. Multicollinearity was assessed using standard regression diagnostics in Stata 16.1. Although a formal Variance Inflation Factor (VIF) test was not conducted, Stata's built-in estimation routines automatically detect and adjust for multicollinearity concerns. Given that the independent variables were selected based on theoretical justifications and prior empirical research, the risk of severe multicollinearity was deemed minimal. Additionally, exploratory checks on pairwise correlations indicated that no variables exhibited excessively high correlation coefficients that would necessitate further corrective action.

We mitigate selection concerns in two complementary ways. Fixed effects estimation absorbs time invariant unobserved heterogeneity at the firm level. Section 5.6 summarises a propensity score matching design that aligns founder led and non-founder firm years on observed characteristics and Appendix E provides the full specification and diagnostics. This combination addresses selection on observables and time invariant unobservables. Remaining risks from time varying shocks and reverse causality are discussed in Section 6.7 and the conclusions are consistent across designs.

4.7   Sampling strategy and industry distribution

The sampling strategy for this study focused on publicly listed UK firms, ensuring consistency in reporting standards and data availability. Firms that were delisted due to liquidation, dissolution or insolvency were excluded from the analysis to avoid survivorship bias. Additionally, financial services firms, shell companies, firms owned by other listed firms and those not incorporated in the UK were removed to maintain a homogeneous sample. Interim CEOs and those with tenure of less than one year were not excluded from the dataset. If a CEO was the first in post for a given year, they were retained in the analysis, ensuring that leadership transitions were appropriately captured within the panel structure.

Industry representation was assessed using Standard Industrial Classification (SIC) codes. The dataset included firms from a broad range of industries, with no single sector comprising more than 30% of the sample (see Table 4). This diverse representation enhances the generalisability of the findings, ensuring that results are not unduly driven by a specific industry segment.

Firm SIC	Frequency	Percentage
Agriculture	40	0.67%
Mining	520	8.73%
Manufacturing	1,525	25.60%
Utilities	160	2.69%
Construction	408	6.85%
Motor trade	113	1.90%
Retail	557	9.35%
Transport	277	4.65%
Accommodation	170	2.85%
Communication	625	10.49%
Finance	470	7.89%
Real Estate	396	6.65%
Professional	255	4.26%
Business Administration	314	5.27%
Health	19	0.32%
Art	68	1.14%
Other	39	0.65%
Total	**5,956**	**100.00%**

Table 4 – Data set industry distribution

4.8 Laplace distribution and interpretation of results

The Laplace distribution was found to characterise firm growth patterns within the dataset, suggesting that extreme values in firm performance measures occur more frequently than would be expected under a normal distribution. This has implications for regression analysis, particularly in terms of interpreting coefficient estimates. However, the impact of extreme values was mitigated through LV decomposition, which excluded values beyond the outer fence, ensuring that outlier effects did not distort regression results.

The presence of a Laplace distribution does not necessarily require non-linear models or quantile regression, as the applied fixed effects model with robust standard errors remains appropriate for estimating relationships between CEO characteristics and firm performance. Given that LV decomposition effectively removes extreme distortions, the primary concern of excess kurtosis in firm performance measures was already addressed before running the regressions. Thus, the use of standard linear regression models remains valid within this research context. The methodological approach taken ensures that firm growth dynamics influenced by the Laplace distribution are incorporated into the analytical framework while maintaining consistency in model specification. This allows for meaningful interpretation of results without introducing unnecessary complexity into the regression estimation process.

4.9 Dependent variable

According to Venkatraman and Ramanujam (1986), firm performance, which corresponds to the dependent variables in this research, can be interpreted as the degree to which a firm is economically successful. Historically, there has been considerable debate around the definition of economic success

and how to measure it at the firm level. Early work on UET suggested it was related to the strategic actions of the CEO and TMT (Hambrick and Mason, 1984). Further clarity around the definition was provided later with the suggestion that pursuing potentially profitable opportunities (Simsek, 2007) and implementing proactive strategies, i.e. embracing risk-taking and change (Nadkarni and Herrmann, 2010), facilitate higher levels of positive firm performance. Additionally, evidence indicates that CEOs, TMTs and firms that fail to adapt their strategy, diversify into new markets and react to change perform worse than those that do (Miller, 1991; Simsek, 2007).

However, a significant challenge in much of this previous research is the lack of consensus regarding the best measure of firm performance (Carton and Hofer, 2010). Following the approach by Carton and Hofer (2010) this study operationalises two annualised financial performance dimensions for the core analysis, growth (ΔSR) and profitability (ROA), which prior work shows distinguish effectively between higher- and lower- performing firms (Carton and Hofer, 2010). Labour productivity (ROP) is examined separately as a robustness outcome to delineate the scope of any effects.

ΔSR was calculated based on the absolute difference between the prior year ($t-1$) and the year under consideration (t). While percentage change is commonly used as a growth metric, this study adopts the absolute change method to focus on the financial scale of growth. Absolute change captures the direct monetary impact of CEO leadership on firm performance, aligning with the study's objectives to assess revenue growth in tangible terms.

We recognise that percentage change can also be influenced by the initial level of sales revenue, similar to absolute change. To address this potential limitation, the initial sales revenue was included as a covariate in the regression models. This approach controls for differences in starting revenue levels, ensuring that the observed growth effects are not disproportionately influenced by the firm's baseline revenue position. Including initial revenue as a control variable allows for a more robust analysis of the relationship between CEO leadership and changes in sales revenue. This method ensures the results are both interpretable in financial terms and reflective of the unique dynamics of firm growth under different leadership conditions. While percentage change offers insights into proportional growth, the decision to use absolute change was guided by the study's emphasis on assessing the direct financial outcomes of leadership on organisational performance.

Profitability was measured using ROA, calculated as net income divided by total assets (Penman, 2013). ROA reflects the firm's efficiency in generating earnings from its asset base and is a standard indicator of operational performance in financial research.

For robustness, labour productivity (ROP) is defined as revenue per employee and is analysed using the natural logarithm of revenue divided by headcount. The log transformation mitigates skew, reduces the influence of extreme values and improves variance stability in ratio data, consistent with

established practice (Tabachnick and Fidell, 2013; Osborne, 2010; Hair *et al*., 2010; Cohen *et al*., 2003; Wooldridge, 2019; Baltagi, 2008). Further detail and diagnostics are reported in Section 5.7.

F-tests were used to evaluate the joint significance of multiple predictors in the models, providing a robust mechanism to assess whether groups of explanatory variables significantly contribute to firm performance outcomes. These tests are particularly relevant for ensuring that the results account for the collective impact of demographic, educational and firm-specific characteristics. By integrating *F*-tests into the methodology, this research strengthens its ability to draw conclusions that are both statistically valid and contextually relevant.

All financial performance data, including ∆SR and ROA and, for robustness analyses, ROP, were sourced from the Bloomberg system via firm-level Excel downloads. This ensured consistency, transparency and reliability in measurement for the empirical analyses that follow.

4.10   Key explanatory variables

The explanatory variables descriptive statistics will be discussed for the full CEO population (Table 2), next for the CEO population where firm age is constrained to less than or equal to 41 years (Table 2) and then by bifurcating this constrained sample across FCEOs and NFCEOs (Table 3) to provide necessary depth to, and understanding of, the data set.

4.10.1 Founder CEO

For the purposes of this study, a FCEO was defined as an individual who had been directly involved in the incorporation of the firm, either as the sole founder or as part of a group of co-founders, regardless of whether they initially held the CEO role. Co-founders who joined at incorporation but later assumed the CEO position after occupying other senior roles (e.g., COO, CFO, CTO) were also classified as FCEOs. Individuals who joined the firm after its formal incorporation were not considered founders. Founder status was first identified using Bloomberg data, however, because this source contained gaps and occasional inconsistencies (likely due to staggered data entry and limited verification), all entries were validated using multiple additional sources, including company annual reports, FT.com, Bureau van Dijk's Orbis database and targeted internet searches. Where contradictions arose, founder status was confirmed through cross-referencing across these sources until agreement was reached. Missing data for this variable was coded as missing and excluded from the dataset; in practice, no cases lacked sufficient evidence to determine founder status. This rigorous multi-source verification process ensures both the accuracy and replicability of the coding, providing a reliable basis for using FCEO status as a key explanatory variable in the analysis.

CEO status was operationalised as a binary variable, where '1' indicates that the CEO was also the firm's founder and '0' indicates that the CEO was not a founder. This information was primarily obtained from the Bloomberg system, supplemented where necessary by additional sources. This

variable serves as the key explanatory variable in the analysis, directly testing the hypothesis that FCEOs exhibit a distinctive impact on firm growth compared to NFCEOs.

Upon initial inspection of the summary data, as presented in Tables 2 and 3 there appeared to be some inconsistency between internal appointment and founder variables in the FCEO data. As this population was limited to founders only, the 'Founder CEO' minimum and maximum response we expected to see was '1', i.e. a 'yes' response, which is the case. The concern arose from why we did not see both minimum and maximum values of '0', i.e. a 'no' response for internal appointment. The reason for this discrepancy was that some founders were not initially appointed as CEO but assumed the role later, after other founders, who initially held the position, had stepped down.

There were 15 CEOs where a '1', i.e., a 'yes' response, was recorded for both questions, equating to 89 observations (12.8% of the 694 observations). Referring to the variable 'Months before becoming CEO' shows a maximum value of 461.0 months for NFCEOs and 430.5 months for FCEOs. This supports the understanding of the data related to internal appointment because it indicates that it is not only NFCEOs who might work within a firm for an extended period prior to assuming the CEO role and this can also apply to FCEOs. This scenario is common in entrepreneurial settings where founders may initially occupy other significant roles such as Chief Operating Officer (COO) or Chief Technical Officer (CTO) before transitioning to the CEO position. Such transitions can occur due to various reasons including the need for different leadership skills at different stages of the firm's development, changes in the founders' strategic vision or the resignation of the initial CEO-founder. This explains the presence of *yes* responses for both the founder and internal appointment variables and justifies their inclusion in the explanatory framework.

In addition, the inclusion of variable 'Months before becoming CEO' provides extra context. It reflects the accumulation of firm-specific knowledge and experience, which are important factors in understanding the dynamics of founder-led firms (Hsu, 2007; Wasserman, 2003). Furthermore, this measure allows for robust testing of the relationship between tenure and firm performance using interaction terms to explore potential moderating effects.

4.10.2 CEO education level

The level of education achieved by the CEO population was operationalised by three levels of binary variables (pre-degree, degree and post-graduate) to enable a clear comparison of educational attainment across FCEOs and NFCEOs, as shown in Table 5.

Education description	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
Pre-degree	18.85%	20.35%	36.89%	17.47%
Degree	45.57%	43.84%	40.06%	44.50%
Post-graduate	35.58%	35.81%	23.05%	38.03%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 5 – Distribution of CEO education

In analysing the educational background of CEOs within the dataset, 82.53% of NFCEOs possessed at least a degree-level education, compared to 63.11% for FCEOs. This disparity highlights different pathways to leadership, with pre-degree education notably more prevalent among FCEOs (36.89%) than NFCEOs (17.47%). This finding aligns with the notion that founders often possess an entrepreneurial propensity that is not solely predicated on academic achievements. Lazear (2005) posits that entrepreneurs are typically more versatile in their skill sets, which may not necessarily correlate with traditional educational paths, suggesting that the rich tapestry of entrepreneurial skills can be acquired through diverse experiences beyond the realm of formal education. This variation in education levels between FCEOs and NFCEOs could have implications for how each group approaches leadership and firm strategy. The findings are further explored in Chapter 5 to assess whether these differences significantly impact firm performance across growth, profitability and productivity metrics.

4.10.3 CEO functional knowledge

The functional knowledge of CEOs is a pivotal attribute that significantly impacts their capacity to lead and make strategic decisions. Evidence suggests that industry-specific education and experience are critical determinants of effective leadership, particularly in complex environments where specific knowledge is key to strategic decision-making (Wasserman, 2003; Hsu, 2007). This study operationalises functional knowledge using two binary indicators: the alignment between the CEO's educational or training background and the industry in which their current firm operates, and the presence of relevant professional qualifications. Industry-specific knowledge enhances a CEO's ability to navigate sector-specific challenges and opportunities, which, in turn, can influence the strategic trajectory and performance of the firm (Cannella, Park and Lee, 2008).

Educational background alignment was operationalised by categorising the CEO's highest level of education and field of study. The fields of study were matched against the primary industry of the firm based on SIC code. This was assessed as a binary score of '1' if there was a match between the CEO's educational background and the firm's industry, and '0' if there was no match. For example, a CEO with a Master's degree in chemical engineering leading a chemical manufacturing firm would receive a score of '1', indicating alignment.

By analysing the relevance of the CEOs' educational background to their current industry and identifying any professional qualifications they hold, we can infer the level of specialisation and industry-specific expertise. CEOs with a strong educational foundation in their industry are presumed

to have a deep understanding of the unique challenges and competitive dynamics of their field, which can be instrumental in strategic planning and execution. Additionally, professional qualifications suggest mastery of certain skills or knowledge areas directly relevant to the CEOs' roles and responsibilities within the firm (Carter and Hodgson, 2006). These observations are consistent with entrepreneurial profiles described by Ucbasaran, Westhead and Wright (2007), who highlight that broad skills and experiential learning often complement specialised academic credentials.

Broad categories were created for education and training based on the UNESCO Institute of Statistics *International Standard Classification of Education Fields of Education and Training 2013 (ISCED-F 2013) - Detailed Field Descriptions* (UNESCO, 2015). Table 6 provides a breakdown of CEO training distribution across different classifications, highlighting trends in educational alignment with firm industries.

Classification[1]	Broad description	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
0000 to 0099	Generic	10.40%	11.58%	29.88%	8.27%
0100 to 0199	Education	0.02%	0.02%	0.00%	0.03%
0200 to 0299	Arts	4.48%	4.26%	3.94%	4.32%
0300 to 0399	Social Science	8.38%	8.72%	13.70%	7.82%
0400 to 0499	Business	51.19%	50.07%	32.65%	53.21%
0500 to 0599	Natural Science	6.25%	6.67%	4.23%	7.11%
0600 to 0699	ICT	0.96%	1.20%	2.48%	0.97%
0700 to 0799	Engineering	17.09%	16.35%	11.66%	17.20%
0800 to 0899	Agriculture	0.41%	0.40%	0.00%	0.47%
0900 to 0999	Health	0.74%	0.65%	1.46%	0.50%
1000 to 1099	Services	0.09%	0.07%	0.00%	0.08%
Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Notes:
1. Devived from UNESCO (2015)

Table 6 – Distribution of CEO training

In the dataset, an examination of educational backgrounds reveals that the highest percentage of CEOs, both FCEOs and NFCEOs, have undergone training in business-related disciplines as categorised by *ISCED-F 2013* codes 0400 to 0499, with 32.65% of the FCEO population and 53.21% of NFCEOs being educated in such fields. This feature underscores the importance of business acumen for individuals in top executive roles, where formal business education provides a foundational understanding of management principles, economic theory, and organisational behaviour, essential for strategic decision-making and leadership (Blickle *et al.*, 2009). Additionally, the data indicates that the prevalence of FCEOs with a generic education, i.e. that which is considered non-specialised and typically offered up to A-Level (college-level education), is considerably higher at 29.88% when compared to NFCEOs, which returned a value of 8.27%. This observation is consistent with the entrepreneurial profile of FCEOs who may prioritise practical experience over specialised academic credentials. The *Global Entrepreneurship Monitor* reports similar patterns, noting that a substantial

portion of entrepreneurs globally often commence their entrepreneurial journeys with limited formal education (Bosma and Levie, 2010).

The preference for a generic education among FCEOs could also reflect the diverse nature of challenges they face, which often require a broad skill set rather than deep specialisation. This educational background allows FCEOs to wear multiple hats and be agile in their strategic approach, as they are responsible for a wider range of tasks in the nascent stages of their firms (Ucbasaran *et al*., 2007).

The second dimension of CEO functional knowledge was examined by considering the presence of professional qualifications, recognising that such credentials are indicative of focused specialisation and a substantive understanding of a particular domain. Professional qualifications, often acquired through rigorous certification processes, are indicative of a CEO's in-depth knowledge and expertise. These qualifications are not merely symbols of competence; they correlate with more informed strategic choices and an enhanced ability to drive organisational success. Research by Minichilli, Zattoni and Zona (2009) and Barker and Mueller (2002) highlights how CEOs' characteristics, including their professional credentials, affect critical areas of decision-making. Furthermore, Finkelstein and Hambrick (1996) articulate how top executives' professional qualifications contribute to their strategic leadership capacity. Whether a CEO held a professional qualification from a recognised professional institution relevant to the firm they are leading was measured on a binary scale, scored as '1' if the CEO held a relevant professional qualification and '0' if not.

Professional qualification	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
No	64.71%	66.03%	72.48%	64.90%
Yes	35.29%	33.97%	27.52%	35.10%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 7 – Distribution of CEO professional qualifications

The level of professional qualification in FCEOs was found to be lower than that in the NFCEO population, 27.52% versus 35.10%. A significantly higher proportion of FCEOs might have indicated they compensated for their lower education levels by on-the-job-training, including study at college, which then led to the taking of professional examinations and membership of a relevant institution or other governing/regulating body. This aligns with Lazear's (2005) assertion that entrepreneurial skills often emerge from diverse, non-traditional learning pathways. However, there is no indication in this data that FCEOs use this route to gain higher level qualifications.

By combining the binary indicators of educational background and professional qualification, a composite metric was created to represent the overall functional knowledge of the CEO. This composite metric was then used in the analysis to examine its impact on firm performance. The binary nature of the metric ensures clarity and simplicity in measurement while capturing the essential elements of

functional knowledge. For instance, using the examples from earlier, a CEO with a Master's degree in chemical engineering and a professional qualification as a Chartered Chemical Engineer leading a chemical manufacturing firm would receive a high composite score of '2'. Conversely, a CEO with a Master's degree in chemical engineering and no professional qualification leading a technology firm would receive a low composite score of '0'. The composite metric represents an ordinal measure of functional knowledge, where higher scores reflect greater levels of CEO expertise. However, while it is ordinal, the assumption of cardinality was made in the analysis to reflect the additive relationship between training and professional qualifications in contributing to functional knowledge. While this assumption aligns with prior literature emphasising the cumulative effects of education and qualifications on human capital and managerial competencies (Becker and Huselid, 1998; Crook *et al*., 2011), it is recognised that this assumption needs to be empirically tested. This testing is performed in the results section using post-estimation techniques to determine whether the relationship between functional knowledge and firm performance is indeed linear. Specifically, an *F*-test is used to compare the current cardinal approach to alternative models employing dummy variables for each level of the composite metric. These tests evaluate whether the coefficients for different levels of functional knowledge indicate a non-linear relationship. By taking this approach, the analysis balances the need for simplicity and interpretability with a commitment to rigorously validating the assumptions underpinning the operationalisation of functional knowledge. The findings from these tests are reported in the results section, providing a robust basis for the conclusions drawn about the impact of functional knowledge on firm performance.

Functional knowledge	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
No related training or professional qualification	60.44%	61.52%	68.73%	60.27%
Related training or professional qualification	35.78%	34.29%	25.07%	35.90%
Related training and professional qualification	3.78%	4.19%	6.20%	3.84%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 8 – Distribution of CEO functional knowledge

4.10.4 CEO industry experience

The industry experience of CEOs is a critical factor that significantly influences their ability to lead and make strategic decisions. This aspect of human capital is particularly important as it encompasses the practical knowledge and insights gained from working within a specific industry. Industry-specific knowledge allows CEOs to understand sector dynamics, including customer behaviour, supplier relationships, regulatory frameworks and innovation opportunities. To measure this dimension, a binary approach was used to assess whether the CEO had prior experience in the same industry as their current firm. This operationalisation reflects the theory that deep familiarity with industry-specific nuances can shape more effective leadership and strategic alignment (Hambrick and Mason, 1984; Kor and Sundaramurthy, 2008).

Industry experience was operationalised by determining if the CEO had previously worked in a firm with the same or a similar SIC code as their current firm. This was measured as a binary score of '1' if the CEO had related industry experience and '0' if they did not. For example, a CEO who had previously worked in various roles within firms classified under the same SIC code as their current chemical manufacturing firm would receive a score of '1'. Conversely, a CEO who had previously led finance businesses but was now leading a technology firm would receive a score of '0'. This operationalisation ensures a clear and straightforward measurement of industry experience while capturing its essential impact on leadership effectiveness. An examination of the dataset reveals a notable distribution of industry experience among the CEO population. The table below summarises the operationalisation of CEO industry experience.

Industry experience	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
No related experience	59.16%	57.00%	37.46%	60.41%
Related experience	40.84%	43.00%	62.54%	39.59%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 9 – Distribution of CEO industry experience

From this data, it is evident that a higher percentage of FCEOs possess related industry experience compared to NFCEOs. Specifically, 62.54% of FCEOs have relevant industry experience, whereas only 39.59% of NFCEOs have such experience. This finding underscores the potential advantage FCEOs derive from their intimate familiarity with the industry they operate in, often gained through their involvement in the firm's founding and early development stages (Wasserman, 2003). This dynamic supports prior research indicating that FCEOs' hands-on experience is closely tied to their ability to identify and exploit unique growth opportunities (Shane, 2003).

The emphasis on industry-specific experience as a critical determinant of strategic effectiveness aligns with UET (Hambrick and Mason, 1984), which posits that CEOs' backgrounds, including their industry experience, shape their strategic choices and firm outcomes. This theory is particularly relevant for FCEOs, who often leverage their industry insights to navigate the challenges and opportunities unique to their sectors. The higher proportion of related experience among FCEOs suggests that their leadership effectiveness may, in part, be attributable to their deep industry knowledge.

4.10.5 CEO in-firm time

The percentage of a CEO's career spent within their firm, known as in-firm time, is a significant factor that impacts their leadership effectiveness and strategic decision-making abilities. In-firm time captures the accumulation of firm-specific knowledge, familiarity with organisational culture and understanding of the internal and external environment of the firm. This dimension aligns with Hambrick and Mason's (1984) UET, which highlights how experience within the firm shapes executives' cognitive frames and decision-making styles.

The operationalisation of in-firm time was achieved by calculating the percentage of a CEO's career spent within the firm. This metric is based on the CEO's tenure relative to their total career length, as inferred from their education and professional background. Career length was estimated by determining the year the CEO would have started working, based on their level of education and deducting this from the year under consideration. For example, a CEO who started their career in 1982 and has been with their current firm since 2000 would have spent 50% of their career within the firm by 2018. This metric provides a straightforward and accurate measure of in-firm time, highlighting its influence on leadership effectiveness. In-firm time is particularly relevant for FCEOs, as their extended tenure often reflects a deep commitment to the firm and its vision. By contrast, NFCEOs may exhibit shorter in-firm times due to their typically external recruitment and role transitions across firms. This distinction underscores the unique dynamics of leadership styles between these two CEO categories.

Percentage of career spent in firm	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
0 to 10%	15.68%	15.58%	5.19%	17.40%
10 to 20%	15.46%	15.99%	8.79%	17.25%
20 to 30%	14.14%	14.47%	12.82%	14.75%
30 to 40%	9.56%	9.60%	10.37%	9.47%
40 to 50%	7.02%	6.41%	10.52%	5.69%
50 to 60%	8.33%	8.02%	13.98%	6.97%
60 to 70%	9.45%	10.30%	15.71%	9.04%
70 to 80%	6.92%	6.97%	11.10%	6.24%
80 to 90%	8.94%	8.81%	6.92%	9.14%
90 to 100%	4.50%	4.14%	4.61%	4.05%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 10 – Distribution of CEO in-firm time

An analysis of the dataset reveals the distribution of in-firm time among the CEO population. Table 10 provides a summary of the operationalisation of CEO in-firm time. The data shows that FCEOs have spent a larger share of their careers within their firms than NFCEOs, with 38.34% of FCEOs versus 28.74% of NFCEOs spending more than 60% of their careers in- firm. This indicates that FCEOs are more likely to have extensive in-firm experience, reflecting their deep involvement in the firm's development and operations (Wasserman, 2003). This extensive in-firm tenure among FCEOs also aligns with the entrepreneurial commitment observed in FCEO-led firms, where the leadership is often intertwined with the firm's strategic trajectory and cultural evolution (Kor and Sundaramurthy, 2009). By contrast, NFCEOs may rely on external perspectives and industry-wide insights gained from shorter tenures within individual firms. These contrasting patterns underscore the interplay between in-firm experience and leadership styles in shaping organisational outcomes. *F*-tests recorded in the Chapter 5 evaluate whether the relationship between in-firm time and firm performance exhibits a linear or non-linear dynamic, ensuring robustness in the interpretation of these findings.

4.10.6 CEO tenure

CEO tenure, defined as the length of time an individual has served as the CEO of their current firm, is a critical factor that influences their leadership effectiveness and strategic decision-making. This dimension of human capital captures the accumulated experience and knowledge a CEO gains over their tenure, which can impact the firm's performance and strategic direction. To measure this dimension, the number of years spent as CEO was categorised into several ranges. This approach reflects the importance of tenure in shaping a CEO's ability to lead and make informed strategic decisions (Hambrick and Mason, 1984).

CEO tenure was operationalised by categorising the number of years a CEO had held their current position. This metric provides a clear and precise measure of tenure, highlighting its influence on leadership effectiveness. For example, a CEO who has been in their role for 15 years falls into the 10 to 20 years category. This operationalisation ensures a straightforward and accurate measurement of tenure. An analysis of the dataset reveals the distribution of CEO tenure among the CEO population. The table below provides a summary of the operationalisation of CEO tenure for the CEO population, the constrained subsample and the bifurcation of this subsample to provide FCEO and NFCEO data.

Tenure (years)	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
0 to 1	3.68%	3.85%	1.74%	4.21%
1 to 3	21.58%	21.70%	8.13%	24.04%
3 to 10	46.88%	46.30%	24.53%	50.06%
10 to 20	19.44%	19.03%	31.35%	16.90%
20 to 30	6.00%	6.37%	20.75%	3.89%
30 to 40	1.71%	1.86%	8.71%	0.68%
40 to 50	0.66%	0.83%	4.35%	0.23%
50 to 60	0.05%	0.06%	0.44%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 11 – Distribution of CEO tenure

Table 11 illustrates the distribution of CEO tenure across the full CEO population, constrained subsample, and bifurcated FCEO/NFCEO subsamples. The data highlights that FCEOs exhibit significantly longer tenures compared to NFCEOs. Notably, 65.60% of FCEOs have served for more than 10 years, whereas only 21.70% of NFCEOs have done so. This pattern suggests that FCEOs tend to remain in leadership positions longer, reinforcing their deep commitment and long-term involvement with their firms (Wasserman, 2003). However, extended tenure may also introduce risks of strategic rigidity and entrenchment, as discussed in the literature (Miller, 1991; Hambrick and Fukutomi, 1991).

F-tests reported in Chapter 5 provide an evaluation of whether the relationship between CEO tenure and firm performance is linear or exhibits a non-linear dynamic. These tests assess the impact of tenure across its categorical ranges, providing statistical robustness to the analysis and ensuring a nuanced understanding of how tenure influences organisational outcomes.

4.11 Other variables

4.11.1 CEO age

The data on CEO age reveals interesting patterns and differences between FCEOs and NFFCEOs. Firstly, the mean age of FCEOs is slightly higher than that of NFCEOs, with FCEOs averaging 54.0 years compared to 52.2 years for NFCEOs. This indicates that FCEOs tend to be older, which might be attributed to the additional time required for founders to establish and grow their companies before transitioning into the CEO role (Wasserman, 2003). Older age among FCEOs could reflect a longer period of involvement with the firm, allowing them to accumulate more firm-specific knowledge and experience.

Age statistic	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
Mean age	52.7	52.5	54.0	52.2
Minimum age	27	27	31	27
Maximum age	82	78	78	78

Table 12 – Summary of CEO age statistics

The age data reveals notable differences and similarities between FCEOs and NFCEOs, shedding light on the dynamics of their respective career paths. The minimum age for NFCEOs is 27, compared to 31 for FCEOs, indicating that younger individuals are more likely to ascend to the CEO position through professional or organisational career routes. This highlights the structured and hierarchical nature of professional pathways, where qualifications and demonstrated competencies can accelerate progression to leadership roles at a relatively younger age. In contrast, the older minimum age for FCEOs suggests that becoming a FCEO typically requires more years of experience, reflecting the time needed to acquire entrepreneurial maturity. This includes building industry expertise, networks and resources necessary to launch and lead a firm effectively (Coad *et al*., 2013).

Interestingly, the maximum age for both FCEOs and NFCEOs is identical at 78, suggesting that firms across the spectrum value the longevity and experience of older leaders. This shared upper age limit may reflect societal norms around retirement age or the recognition of accumulated knowledge and leadership capabilities that remain valuable well into late careers. For FCEOs, this longevity highlights their sustained connection and commitment to their ventures, while for NFCEOs, it underscores the enduring relevance of seasoned professionals in driving firm performance. Overall, the age trends suggest that while younger individuals may reach CEO positions faster through professional routes, the leadership effectiveness of both FCEOs and NFCEOs is not constrained by age, with firms appreciating the strategic insights and stability provided by long-tenured leaders.

Age (years)	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
<40	3.06%	3.48%	5.33%	3.16%
40 to 50	29.42%	30.60%	25.94%	31.41%
50 to 60	52.07%	51.06%	42.80%	52.49%
60 to 70	13.73%	13.26%	20.46%	12.01%
70>	1.73%	1.60%	5.48%	0.93%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 13 – Distribution of CEO age

The distribution of CEO ages also highlights notable differences. In the NFCEO population, the majority (52.49%) are aged between 50 and 60 years. This age group represents a period where CEOs likely possess a blend of extensive experience and the vigour necessary for effective leadership (Hambrick and Mason, 1984). In comparison, a smaller proportion of FCEOs (42.80%) falls within this age range, indicating a wider spread of ages among founder-led firms. The analysis of CEO age distribution provides notable insights into the differing demographic characteristics of FCEOs and NFCEOs. Interestingly, a higher proportion of FCEOs (5.33%) are under 40 years of age compared to NFCEOs (3.16%). This disparity may reflect the entrepreneurial drive often associated with younger founders, who assume leadership roles early in their careers to maintain the firm's vision and agility. This is particularly evident in dynamic and rapidly growing startups, where founders are central to navigating initial challenges and fostering innovation (Fahlenbrach, 2009).

To further explore these differences, a difference-in-means test was conducted to evaluate the statistical significance of the age variations between FCEOs and NFCEOs. The results indicate that FCEOs are, on average, older than NFCEOs, with a mean age of 54.0 years compared to 52.5 years for NFCEOs. This difference is statistically significant (t=-5.12, p<0.001), confirming that the observed age patterns are unlikely to be random.

Group	Mean age	Standard deviation	Difference	t	p
NFCEOs	52.5	6.85			
FCEOs	54.0	8.98	-1.48	-5.12	0.0000

Table 14 – Difference-in-means test for CEO age

The analysis also reveals that a significantly larger proportion of FCEOs (25.94%) are over 60 years old compared to NFCEOs (12.94%). This pattern suggests that FCEOs are more likely to retain their leadership roles into later stages of their careers, potentially due to their deep-rooted connection and commitment to the firms they founded. Founders' personal and emotional investment in their ventures often motivates them to continue leading well beyond typical retirement age, contributing to firm stability and strategic continuity (Wasserman, 2003; Fahlenbrach, 2009). These age-related trends highlight distinct implications for firm performance and strategic leadership. Older FCEOs may bring a wealth of experience and long-term strategic vision, fostering stability and sustained growth (Hambrick and Fukutomi, 1991). Conversely, the presence of younger FCEOs underscores the

innovative and agile nature of founder-led firms, which can provide a competitive edge in rapidly changing industries (Hsu, 2007).

To complement this analysis, *F*-tests were carried out to assess whether the observed relationships between CEO age and firm performance exhibit linear or non-linear trends and the results are presented in Chapter 5. These tests examine the incremental effects of CEO age categories, offering a detailed understanding of its role in shaping firm outcomes.

In conclusion, the age distribution of FCEOs and NFCEOs reflects their unique career trajectories and leadership dynamics. The broader age range and older average age of FCEOs underline their sustained commitment to their firms and the critical role they play in shaping firm strategies over time. These demographic distinctions likely influence the strategic priorities, management styles and performance outcomes of FCEO-led versus NFCEO-managed companies.

4.11.2 Other CEO demographics

The other demographic data on CEOs highlights significant patterns and differences between FCEOs and NFCEOs. By examining gender, nationality and ethnicity, we can gain insights into the demographic characteristics that distinguish FCEOs from NFCEOs.

Gender	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
Male	96.63%	96.20%	99.42%	95.64%
Female	3.37%	3.80%	0.58%	4.36%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 15 – Distribution of CEO gender

The data shows a pronounced gender disparity among CEOs, with males dominating the role across both groups. In the NFCEO population, 95.64% are male, while only 4.36% are female. This disparity is even more pronounced among FCEOs, where 99.42% are male and just 0.58% are female, which might indicate the potential for higher barriers to female entrepreneurship and leadership in new ventures (Brush *et al*., 2006).

Nationality	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
UK:				
No	18.49%	18.49%	20.17%	18.20%
Yes	81.51%	81.51%	79.83%	81.80%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Anglosphere:				
No	8.03%	8.54%	5.91%	9.00%
Yes	91.97%	91.46%	94.09%	91.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Commonwealth				
No	14.07%	14.22%	16.86%	13.76%
Yes	85.93%	85.78%	83.14%	86.24%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 16 – Distribution of CEO nationality

The analysis of CEO nationality reveals significant differences between FCEOs and NFCEOs. For UK nationality, 81.80% of NFCEOs are UK nationals compared to 79.83% of FCEOs. Although the proportion is slightly higher among NFCEOs, a two-sample t-test shows that the difference-in-means is not statistically significant (t=1.2182, p=0.2232). This suggests that both FCEO and NFCEO-led firms are predominantly led by UK nationals, with only marginal variation between the groups.

Nationality	CEO type	Mean	Standard error	Standard deviation	t	p
UK	NFCEO	81.80%	0.53	38.64	1.2182	0.2232
	FCEO	79.83%	1.52	40.16		
Anglosphere	NFCEO	91.00%	0.38	27.60	-2.1852	0.0289
	FCEO	94.09%	0.89	23.59		
Commonwealth	NFCEO	86.30%	0.47	34.39	2.2486	0.0246
	FCEO	83.14%	1.42	37.47		

Table 17 – Difference-in-means for CEO nationality by CEO type

In contrast, when examining CEOs from the Anglosphere (UK, USA, Canada, Australia and New Zealand), the data indicates a higher representation among FCEOs (94.09%) compared to NFCEOs (91.00%). The difference-in-means is statistically significant (t=−2.1852, p=0.0289), suggesting that FCEOs are more likely to originate from culturally similar backgrounds within the Anglosphere. This trend aligns with prior research, which highlights the influence of shared cultural and business practices on leadership styles and decision-making (Burt, 2004). A similar pattern is observed for Commonwealth nationality. Among NFCEOs, 86.24% are from Commonwealth countries, compared to 83.14% of FCEOs. The difference-in-means is statistically significant (t=2.2486, p=0.0246), indicating that NFCEOs have a slightly higher representation from Commonwealth nations. This may reflect differences in recruitment practices or networks among NFCEOs. These findings highlight the subtle yet meaningful distinctions in the demographic composition of FCEOs versus NFCEOs, particularly concerning their geographic and cultural origins. While both groups exhibit a strong representation from the UK and the Anglosphere, the higher proportion of FCEOs from Anglosphere countries underscores the potential influence of cultural alignment on entrepreneurial leadership. Conversely, the slightly higher representation of NFCEOs from Commonwealth nations may reflect broader international recruitment trends in professional managerial roles.

The ethnicity data reveals a higher proportion of white CEOs across all groups. In the NFCEO population, 94.86% are white, whereas among FCEOs, the percentage is lower at 88.04%, indicating a higher level of ethnic diversity among founders compared to non-founders. This suggests that founder-led firms may have more diverse leadership, which can contribute to varied perspectives and potentially innovative business practices (Robinson and Dechant, 1997). The higher representation of non-white CEOs among FCEOs (11.96%) compared to NFCEOs (5.14%) highlights the potential for enhanced creativity and problem-solving within founder-led firms, leveraging a broader range of experiences and perspectives (Carter, Simkins and Simpson, 2003).

Ethnicity	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
White	94.19%	93.85%	88.04%	94.86%
Non-white	5.81%	6.15%	11.96%	5.14%
Total	**100.00%**	**100%**	**100.00%**	**100.00%**

Table 18 – Distribution of CEO ethnicity

In conclusion, the demographic analysis of CEOs highlights significant differences between FCEOs and NFCEOs. FCEOs tend to be predominantly male and slightly older, with a marginally higher ethnic diversity compared to the NFCEO population. These differences underscore the unique demographic characteristics of founder-led firms, which may influence their strategic direction and performance. The data also suggests a strong preference for UK nationals and individuals from the Anglosphere and Commonwealth countries among both the FCEO and NFCEO population, reflecting cultural and business practice similarities. These insights are crucial for understanding the demographic dynamics that shape leadership in firms and their potential impact on firm performance. However, it also needs to be recognised that limited diversity within the data set, in terms of nationality and ethnicity, might reflect the selection process as only firms on the LSE Main Index on 31 December 2018 and incorporated in the UK were included in the data set. Firms incorporated in countries other than the UK were excluded from data collection and, therefore, data could be argued to favour UK nationals who are classified as ethnically white over other nationalities.

While the analysis of nationality and ethnicity reveals meaningful demographic distinctions between FCEOs and NFCEOs, these variables were not included in the regression models due to their limited statistical contribution to the robustness of the models. Preliminary F-tests conducted on these variables demonstrated that neither nationality nor ethnicity significantly enhanced the explanatory power of the regression models when other control variables were included. Therefore, to maintain parsimony and prevent over-specification, these variables were excluded. Gender, however, remains a key demographic variable in the models due to its documented influence on leadership styles and strategic decision-making. This approach ensures that the analysis focuses on the variables with the most substantive and measurable impact on firm performance while acknowledging the broader demographic differences highlighted in the descriptive statistics.

4.11.3 Firm age

Firm age is a critical variable in the context of this research as it provides a framework for understanding the temporal dimension of firm development and growth. The age of a firm can significantly influence its strategic priorities, resource allocation and overall performance. Additionally, firm age serves as a crucial control variable in regression analyses, helping to contextualise the relationship between CEO characteristics and firm performance (Penrose, 1959).

Firm age statistic	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
Mean	23.4	14.8	9.4	15.8
Minimum	0	0	0	0
Maximum	86	41	41	41

Table 19 – Summary of firm age statistics

Table 19 summarises firm age statistics across the full sample, as well as bifurcated subsamples for FCEOs and NFCEOs. The data indicates that firms led by FCEOs are significantly younger on average (9.4 years) compared to those led by NFCEOs (15.8 years). Firms with FCEOs also tend to be younger in distribution, with 60.23% being less than 10 years old, compared to 36.10% in the NFCEO population (Table 20). This reflects the entrepreneurial nature of FCEOs, who often establish and grow new ventures, resulting in a younger firm age profile (Wasserman, 2003). As firms mature, there is a noticeable shift toward NFCEO leadership, reflecting a transition to more structured governance and management processes. The findings support lifecycle perspectives on firm development, suggesting that governance mechanisms evolve as firms scale and the presence of an FCEO becomes less common (Boeker and Karichalil, 2002; Adams, Almeida and Ferreira, 2009).

It is, perhaps, not surprising that younger firms are more likely to have FCEOs than older ones. However, it is also apparent (from Table 20) that a high proportion of FCEO tenure (60.23%) does not extend beyond 10 years. This raises the question of whether this large exodus reflects that FCEOs are, or are perceived to be, poorly equipped to run the firms they create (Kelly *et al*., 2000; Nelson, 2003b; Ling *et al*., 2007; Mathias *et al*., 2015) beyond 10 years. It also leads to the question of whether this then reflects the ability of those in control of the firm at the time (boards, shareholders, other stakeholders etc.) to take action to mitigate the negative impacts, i.e. decline in firm performance etc. of FCEOs by replacing them with professional (NFCEO) management (Drucker, 1993; Clifford and Cavanagh, 1985; Willard *et al*., 1992; Begley, 1995; Jayaraman *et al*., 2000; Boeker and Karichalil, 2002; Wasserman, 2003; Bamford, Bruton and Hinson, 2006; Adams *et al*., 2009; Fahlenbrach, 2009; He, 2008).

Firm age plays a significant role in shaping the strategic behaviour and resource allocation of companies. Younger firms are typically more agile and innovative, driven by the entrepreneurial vision of their founders. They often focus on growth and market expansion, leveraging their flexibility to adapt quickly to changing market conditions. In contrast, older firms may have more established processes and a greater emphasis on stability and incremental improvements (Penrose, 1959).

Firm age (years)	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
<10	31.20%	39.68%	60.23%	36.10%
10 to 20	22.60%	28.74%	27.09%	29.03%
20 to 30	14.20%	18.07%	8.36%	19.75%
30 to 40	8.85%	11.25%	4.03%	12.51%
40 to 50	9.22%	2.26%	0.29%	2.61%
50 to 60	7.20%	0.00%	0.00%	0.00%
60 to 70	5.19%	0.00%	0.00%	0.00%
70 to 80	1.38%	0.00%	0.00%	0.00%
80 to 90	0.17%	0.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 20 – Distribution of firm age

Penrosean theory provides a valuable theoretical framework for understanding how firm age influences organisational development. According to Penrose (1959), firms grow through the accumulation and effective utilisation of resources, particularly managerial resources. As firms age, they accumulate experience and knowledge, which can enhance their ability to exploit new opportunities and sustain competitive advantage. However, the growth trajectory of older firms may be constrained by bureaucratic inertia and the challenges of managing an increasingly complex organisation.

The relationship between firm age and performance is nuanced. Younger firms, while often more dynamic and innovative, may face greater risks and resource constraints. They rely heavily on the entrepreneurial drive of their founders to navigate early-stage challenges and achieve growth. In contrast, older firms benefit from accumulated resources and established market positions, but they may also encounter difficulties in adapting to disruptive changes and maintaining entrepreneurial vigour (Hambrick and Fukutomi, 1991).

When running regression estimations, firm age is utilised as a control variable to account for potential confounding effects on CEO characteristics and firm performance. At a firm level, age is proxied as the number of years since joining the LSE, i.e. firms with greater time between year under consideration and date admitted to the LSE were deemed to be older than those with a shorter elapsed time. Post-estimation tests, such as F-tests, have then been employed to evaluate whether firm age interacts significantly with other explanatory variables. These tests allow for a nuanced analysis of whether firm age amplifies, diminishes, or remains neutral in moderating the observed relationships. This methodological approach ensures that firm age, while critical to understanding organisational dynamics, does not overshadow the specific effects of CEO attributes in the regression models.

In conclusion, firm age is a vital factor in understanding the dynamics of firm performance and growth. It provides a temporal framework that shapes the strategic behaviour and resource allocation of firms. By incorporating firm age as a control variable, this study aims to provide a more nuanced

analysis of the relationship between CEO characteristics and firm performance, contributing to the broader literature on strategic leadership and organisational development.

4.11.4 Number of employees

The number of employees is an essential control variable in this research, serving as a proxy for firm size. For firms with FCEOs, the number of employees varied between 5 and 35,506, with a mean of 3,098 and for firms with NFCEOs number of employees varied between 1 and 648,254, with a mean of 21,680.

Number of employees statistic	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
Mean	20,452	18,987	3,098	21,680
Minimum	1	1	5	1
Maximum	648,254	648,254	35,506	648,254

Table 21 – Summary of number of employees

The distribution of the number of employees is heavily skewed, with most firms having fewer than 50,000 employees, which accounts for 89.34% of firms generally, 88.20% of firms led by NFCEOs and 100% of firms led by FCEOs. This skewness prompted the decision to use a natural logarithmic transformation of the number of employees in the regression models to normalise the variable. The transformation helps achieve more accurate parameter estimates by addressing extreme outliers, which are particularly prevalent among larger firms (Tabachnick and Fidell, 2013).

Number of employees	All CEOs	All CEOs (firm age ≤41 years)	FCEO (firm age ≤41 years)	NFCEO (firm age ≤41 years)
0 to 100	6.70%	5.48%	12.50%	4.26%
100 to 1,000	20.91%	22.74%	36.42%	20.42%
1,000 to 5,000	29.55%	31.75%	35.19%	31.17%
5,000 to 10.000	12.00%	11.14%	9.57%	11.40%
10,000 to 50,000	20.18%	18.83%	6.33%	20.95%
50,000 to 100,000	6.26%	6.08%	0.00%	7.11%
100,000 to 200,000	2.90%	2.77%	0.00%	3.24%
200,000 to 300,000	0.58%	0.40%	0.00%	0.47%
300,000 to 400,000	0.40%	0.22%	0.00%	0.26%
400,000 to 500,000	0.17%	0.13%	0.00%	0.16%
500,000 to 600,000	0.24%	0.31%	0.00%	0.37%
600,000 to 700,000	0.10%	0.13%	0.00%	0.16%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 22 – Distribution of number of employees

Using the natural logarithm of the number of employees provides several advantages. Firstly, it normalises the data, which is essential for dealing with skewed distributions and ensuring the stability of variance across the dataset. Secondly, this transformation also reduces the influence of outliers by scaling down larger values more than smaller ones, leading to a more accurate estimation of central tendencies and variability (Cohen et al., 2003; Osborne, 2010). Moreover, the transformation improves homoscedasticity, an assumption of equal variances for different levels of predictors within regression

models, which is crucial for financial data that often exhibit variance proportional to firm size (Hair et al., 2010).

Although the use of a log-transformed variable addresses issues of skewness, additional post-estimation diagnostics, including F-tests, are used to assess whether the number of employees moderates or inters with other key variables. These tests help determine potential non-linear or interaction effects of firm size on performance. Results are presented in the Results chapter. Coefficients in this log-level specification are interpreted as semi-elasticies following Wooldridge's (2019), ensuring analytical rigor and practical relevance.

As discussed previously, the number of employees serves as a proxy for firm size, a critical control due to its influence on economies of scale, market power and resource availability (Penrose, 1959; Chandler, 1990). It is important to distinguish this size measure from performance dimensions , such as profitability or productivity, which are captured by other variables in this study. Although alternative size measures (e.g., total assets or revenue), are widely used, headcount was selected for this its availability and consistency across the dataset (Brynjolfsson and Hitt, 1996; Delmar *et al*., 2003).

In conclusion, the use of a log-transformed independent variable in a log-level model allows for robust and interpretable analyses while maintaining a focus on absolute changes in firm performance. This approach ensures the study's findings are actionable for practitioners and stakeholders, providing insights into the tangible outcomes of CEO leadership and firm dynamics.

Chapter 5

Results

This chapter reports the empirical results from the firm fixed-effects regressions. It begins with descriptive comparisons of performance patterns by CEO type and key attributes, then presents the tests of H1–H3, focusing on founder status and the moderating roles of education, functional knowledge, industry experience, in-firm time and tenure. The primary outcome is growth (ΔSR), with profitability (ROA) analysed as a secondary outcome to assess whether any founder effect extends beyond top-line expansion. Subsequent sections consider the contextual influence of firm age and firm size and assess the joint contribution of variable groups using F-tests. Robustness checks, including propensity score matching and supplementary models, are reported at the end of the chapter; productivity (ROP) is confined to these robustness analyses rather than treated as a core outcome

5.1   General

This chapter presents the empirical findings derived from the regression analyses conducted to test the hypotheses outlined earlier in the study. The results are organised to foreground hypothesis testing while drawing selectively on diagnostic and descriptive evidence. The empirical tests focus on growth measured as Δ SR, in line with H1. Profitability (ROA) is analysed as a secondary outcome to assess whether any founder effect extends beyond top-line performance. Productivity (ROP) is examined only as a robustness outcome in Section 5.7. Descriptive statistics are reported in Section 5.3 and the pairwise correlation matrix is provided in Appendix D (Table D1).

The chapter proceeds by first assessing model robustness and the joint contribution of key covariate groups using F-tests, then evaluating the effects of founder status and CEO attributes (education, functional knowledge, industry experience, in-firm time and tenure) on ΔSR and ROA, conditional on firm size, firm age and other controls. The findings are interpreted with reference to the theoretical frameworks developed in Chapters 2 and 3.

The results are presented in three stages. First, Section 5.3 reports exploratory (bivariate) analyses, using descriptive statistics and graphical evidence to document patterns in growth and profitability by CEO type, CEO attributes and firm context. Second, Sections 5.4 and 5.5 present the multivariate fixed-effects models that form the core hypothesis tests, including founder status, human capital moderators and contextual factors, with joint significance assessed via F-tests. Third, Sections 5.6 and 5.7 report robustness checks: propensity score matching to address selection and reverse-causality concerns and supplementary models using labour productivity (ROP) as an alternative outcome. Together, these stages provide a coherent inferential sequence from descriptive patterns to formally identified effects, aligning with the overall objectives of the thesis.

5.2 Preliminary model evaluation

The preliminary evaluation of the regression models serves to establish their robustness and reliability as a foundation for hypothesis testing. This section begins by examining the results of the F-tests, which assess the joint significance of groups of variables, including demographic factors, CEO characteristics and firm-level moderators. These tests are critical for ensuring that the included variables contribute meaningfully to the explanation of firm performance metrics such as growth, profitability, and productivity.

5.2.1 Overview of regression models

The regression models were designed to evaluate the impact of FCEOs compared to NFCEOs on firm performance metrics. Table 23 provides a summary of the models, the moderating variables and the hypotheses tested reflecting the comparative influence of these factors rather than strict moderation effects. Each model incorporates control variables, such as firm size and firm age, which have been demonstrated to exhibit consistent effects across the dataset. This approach ensures a comprehensive evaluation of CEO characteristics and firm-level moderators on the dependent variables.

Model	Moderating variable	Hypothesis tested
1	Baseline	1
2	Length of tenure as CEO	3
3	Firm age	n/a
3a	Firm age	n/a
3b	Firm age	n/a
4	Firm size (based on number of employees)	n/a
5	Impact of education on firm growth	2a
6	Impact of functional knowledge on firm growth	2b
7	Impact of industry experience on firm growth	2c
8	Impact of in-firm time on firm growth	2d

Table 23 – Model, moderating variable and hypothesis tested

5.2.2 *F*-test results

To evaluate the collective explanatory power of related groups of variables, joint F-tests were conducted for the ΔSR and ROA models and are reported alongside the corresponding regression estimates (Tables 24 to 26). These tests examine the null hypothesis that the specified sets of coefficients are jointly equal to zero and provide a basis for assessing the incremental contribution of founder status, human capital terms and contextual controls.

For the ΔSR models (Table 24), the joint test for all variables in Model 1 yielded $F=20.436$ ($p<0.01$), confirming the overall robustness of the specification. The joint test for firm characteristics was also highly significant ($F=51.501$, $p<0.01$), indicating their substantial explanatory power. By contrast, the joint test for CEO demographic characteristics approached, but did not reach, conventional levels of statistical significance (F=2.603, $p=0.052$). Interaction terms were also tested jointly; for example, the tenure interaction in Model 2 produced $F=2.308$ ($p=0.101$), suggesting that, while the

direction of effects is consistent with the theoretical expectations, the moderating effect is not statistically significant at the 5% level.

A similar pattern holds for the ROA models (Table 25). The joint test for all variables in Model 1 was significant (F=6.600, p<0.001), and firm characteristics again exhibited strong joint explanatory power (F=24.355, p<0.001). CEO demographic characteristics were not jointly significant (F=1.748, p=0.157). The tenure interaction in Model 2 was also not significant (F=1.662, p=0.191).

5.2.3 Control variables

The control variables display stable statistically significant associations with the performance. Firm size, operationalised as the natural logarithm of employees, is negatively related to growth and positively related to profitability (both p<0.01). Firm age is negatively associated with growth (p<0.01) and positively associated with profitability (both p<0.01). These patterns are consistent with established accounts of scale and organisational maturity, which emphasise trade-offs between resource breadth and agility (Penrose, 1959).

To assess potential non-linearity, the baseline models for ΔSR and ROA were augmented with quadratic terms for firm size and firm age, and joint Wald F-tests were used to evaluate the curvature blocks (Haans, Pieters and He, 2016; Lind and Mehlum, 2010). For ΔSR, the curvature blocks are statistically significant (age: $F_{(2,327)}$[10]=46.49, p<0.001; size: $F_{(2,327)}$=18.61, p<0.001), but the implied turning points lie outside the empirical support (age≈100 years; size extremum below the feasible size range), indicating an effectively monotonic relation within the observed data. For ROA, the age block is significant ($F_{(2,336)}$=5.96, p=0.0029), with an implied turning point around 55 years that lies above the observed age range (0 to 41 years) and is imprecisely estimated (95% CI≈1 to 109). The size block is also significant ($F_{(2,336)}$=25.10, p<0.001), but the estimated maximum occurs at the extreme lower tail (ln employees ≈1.12, ≈3 employees) and is imprecisely located. For ROP, no curvature is detected for age ($F_{(2,339)}$=0.01, p=0.99) and is likewise poorly located. Taken together, these non-linearity diagnostics indicate that, within the support of the sample, the effects of firm size and firm age are well approximated as monotonic and consistent with the signs reported in the main specifications.

5.2.4 Methodological consideration

The use of robust standard errors clustered at the firm level ensures that the regression results are resilient to potential heteroscedasticity and within-firm error correlation. Additionally, the Hausman Test confirmed the appropriateness of the fixed-effects (FE) estimator, which accounts for time-invariant unobserved heterogeneity across firms and enables consistent within-firm causal inference.

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[10] Joint F-tests utilised in Section 5.2.3 are cluster-robust Wald tests. Degrees of freedom are (q,G-1), where q is the number of linear restrictions and G is the number of firm clusters.

Given the panel structure of the data, the FE approach is methodologically preferable to random-effects (RE), which assumes independence between unobserved firm-level effects and the included regressors (Hausman, 1978)[11]. While the main analysis does not incorporate a between-effects (BE) specification, which estimates cross-sectional variation using firm-level means, this alternative is acknowledged as a complementary lens and is noted in the Future Research section as a potential avenue for deeper exploration of inter-firm heterogeneity. These methodological choices enhance the credibility of the analysis and provide a reliable basis for interpreting the results.

In summary, the preliminary evaluation establishes the robustness of the regression models and confirms the relevance of the included variables. These findings provide a solid foundation for the subsequent sections, which will focus on the detailed testing of the hypotheses.

5.3   Exploratory data analysis

5.3.1   Overview of exploratory approach

Prior to estimating the multivariate regression models, an exploratory data analysis (EDA) was undertaken to provide initial insights into the structure and distribution of key variables, as well as to identify potential patterns and relationships between CEO characteristics and firm performance outcomes. This step aligns with standard econometric practice in panel data studies (Wooldridge, 2010) and helps contextualise the modelling strategy by offering descriptive evidence on bivariate differences. The EDA focuses particularly on mean differences and distributional comparisons between firms led by FCEOs and NFCEOs, across key performance indicators and CEO-level attributes. These initial comparisons are presented without control variables, providing an intuitive baseline before progressing to multivariate models in subsequent sections.

5.3.2   Firm performance differentials by CEO type (Hypothesis 1)

This subsection initiates the empirical exploration of Hypothesis 1, which is evaluated on growth measured as ΔSR and posits that FCEO-led firms grow faster than those led by non-founders. We report unadjusted comparisons for ΔSR by CEO type (means, distributions and grouped-mean plots) as a baseline prior to multivariate modelling. In addition, parallel descriptive plots for ROA are presented to indicate whether any observed growth differences are accompanied by contemporaneous differences in profitability, recognising ROA as a secondary outcome.

The bar chart (Figure 7) indicates that the average ΔSR is higher for firms led by FCEOs compared to those led by NFCEOs. This descriptive pattern is consistent with accounts that emphasise founder-led resource mobilisation and growth orientation (Penrose, 1959; Hambrick and Mason, 1984;

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[11] A between-effects model, which relies on variation between rather than within firms, was considered but is not reported in the main results as it lies outside the primary methodological approach adopted. Its relevance is acknowledged for future work focusing on long-term structural differences across firms.

Wasserman, 2003; 2008) and with the positive founder differential reported later in the regression results.
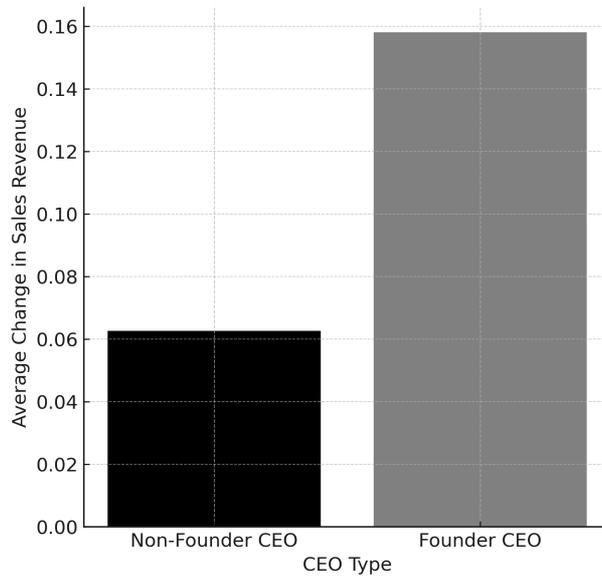
Figure 7 - Average ΔSR by CEO type

The time-series analysis (Figure 8) examines ΔSR over the observation window. FCEO-led firms tend to exhibit higher mean growth alongside greater fluctuations. Such variability is consistent with founder-led strategic experimentation and risk-taking (Wasserman, 2003; 2008), as well as with the interaction of leadership and market conditions that can amplify or dampen expansion in particular periods.
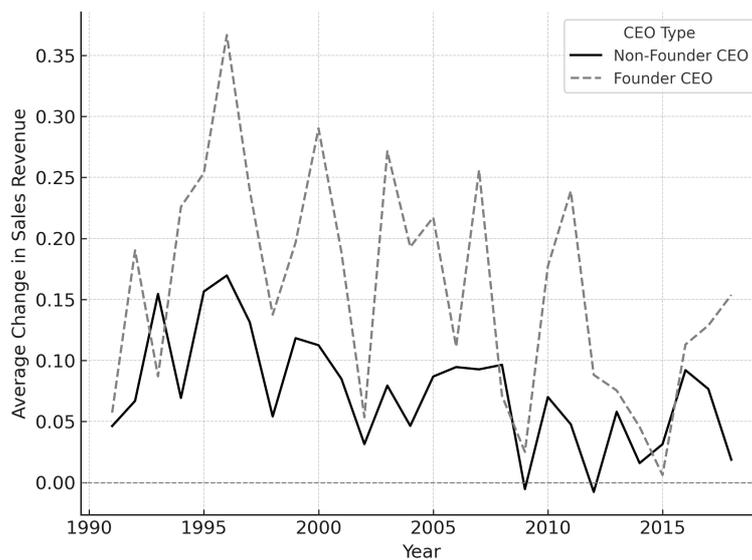
Figure 8 - ΔSR over time by CEO type

The box plot (Figure 9) shows the distribution of ΔSR by CEO type. The median is higher for FCEOs and the dispersion is wider, suggesting greater heterogeneity in growth outcomes among

founder-led firms, again consistent with an entrepreneurial posture that can yield both exceptional expansions and more frequent downside realisations in some periods (Wasserman, 2003; 2008).
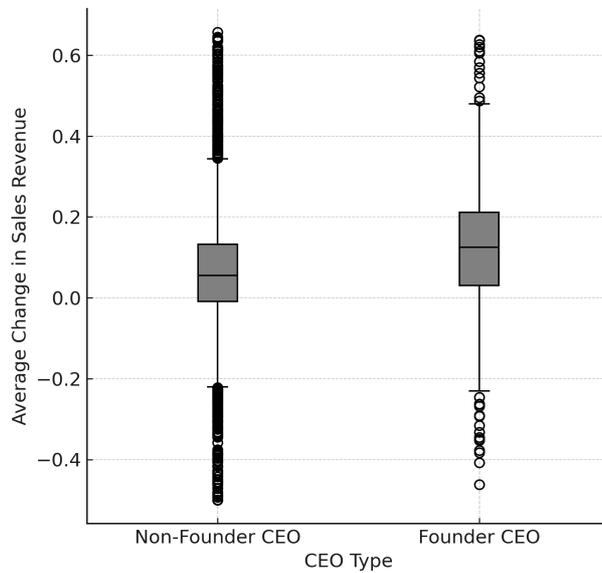
Figure 9 - Distribution of ΔSR by CEO type

Turning to profitability, the bar chart (Figure 10) shows only a modest difference in mean ROA between FCEO- and NFCEO-led firms at this descriptive stage. This accords with the idea that aggressive growth strategies may involve reinvestment or market-share acquisition that does not translate contemporaneously into higher accounting returns (Adams *et al*., 2009; Boeker and Wiltbank, 2005; Wasserman, 2003).
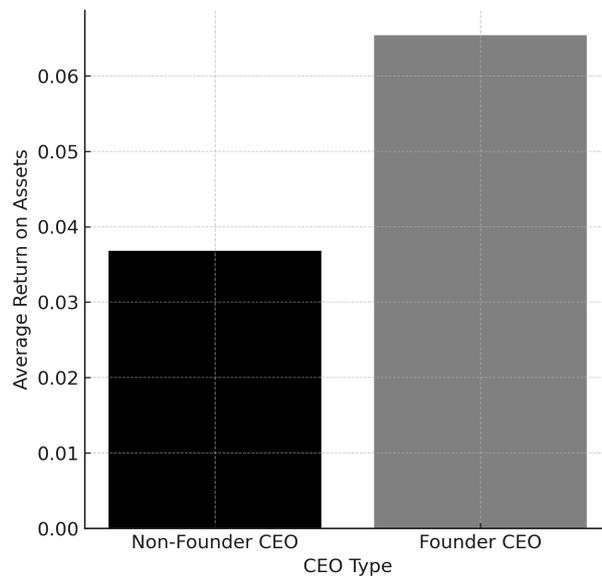
Figure 10 - Average ROA by CEO type

The time-series trend (Figure 11) indicates that ROA for both CEO types follows a broadly similar path across the period, without a persistent gap. This stability suggests that profitability is more tightly constrained by structural and industry factors than is short-horizon growth.
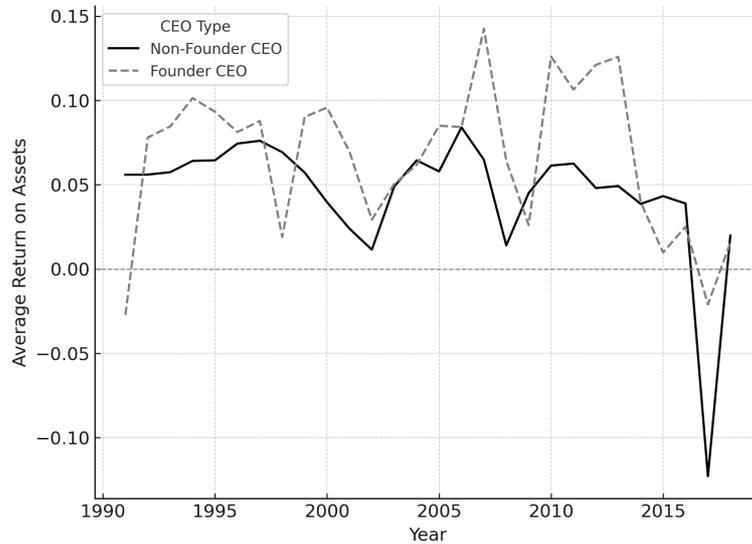
Figure 11 - ROA over time by CEO type

The box plot for ROA (Figure 12) shows comparable medians and interquartile ranges across CEO types, with less dispersion than for ΔSR, again consistent with tighter constraints on accounting returns.
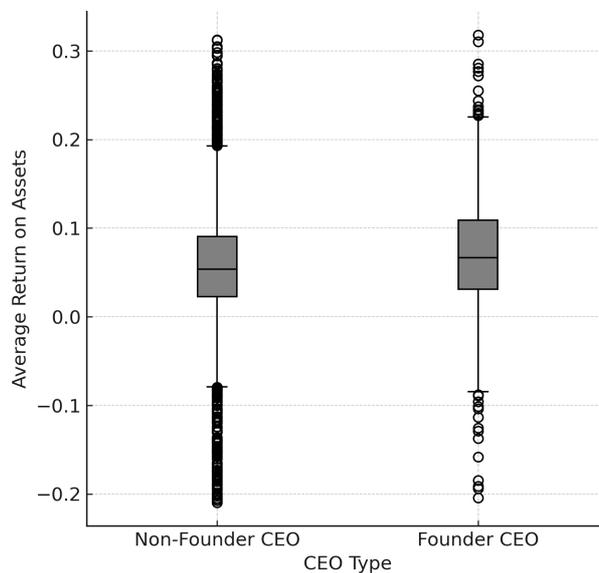
Figure 12 - Distribution of ROA by CEO type

Overall, these figures provide preliminary support for Hypothesis 1 at the descriptive level (founder-led firms display higher average growth) while differences in ROA are limited. The patterns motivate the move to regression-based estimation, where CEO human capital (education, functional

knowledge, industry experience and in-firm time), tenure and firm characteristics (size and age) are controlled explicitly[12].

5.3.3 Firm performance by CEO education level (Hypothesis 2a)

This subsection explores whether formal education is associated with systematic differences in firm performance and whether patterns vary by CEO type. It provides a descriptive basis for Hypothesis 2a, which tests moderation by education in the empirical models. The figures report grouped means and distributions for growth (ΔSR) and profitability (ROA) across education levels, distinguishing between FCEOs and NFCEOs. Observations are filtered to trim extreme outliers and to restrict firm age to 41-years or less.

Figure 13 presents the bar chart for ΔSR by education level. The data does not suggest a strong gradient with education; within each education category FCEOs display modestly higher average growth than NFCEOs, but differences are small at this descriptive stage.
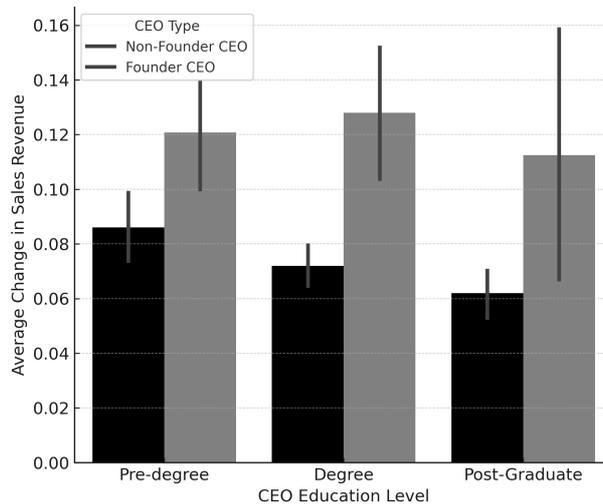
Figure 13 - ΔSR by CEO education level

Figure 14 shows the corresponding box plot. Medians are broadly similar across education levels, and the dispersion patterns remain stable once filtering is applied, indicating no systematic shift in the distribution of ΔSR by education category.

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[12] The exploratory figures presented in this subsection report descriptive summary statistics (means, distributions and grouped means) rather than model-based contrasts. They are intended to illustrate observable patterns prior to introducing covariates and formal estimation; no causal interpretation is implied.
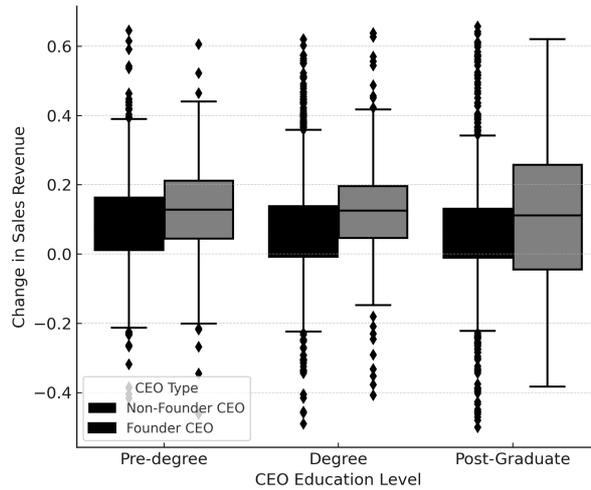
Figure 14 – Distribution of ΔSR by CEO education level

Figure 15 displays mean ROA by education level. For NFCEOs there is a slight increase in ROA at higher education levels, whereas the FCEO pattern is relatively flat. The magnitudes are modest and should be treated as indicative only.
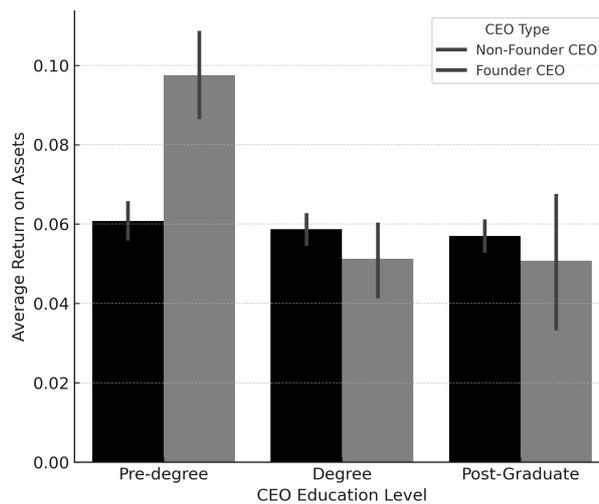
Figure 15 - ROA by CEO education level

Figure 16 reports the ROA distributions by education level. Medians and interquartile ranges are comparable across categories, with tighter dispersion than for ΔSR, consistent with profitability being more constrained at the firm or industry level.
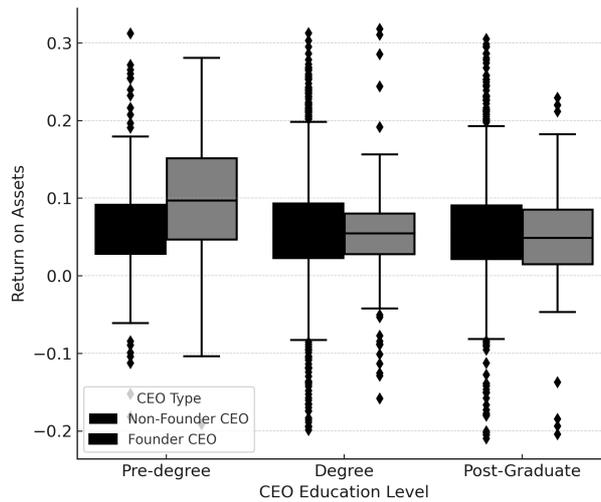
Figure 16 - Distribution of ROA by CEO education level

In summary, these descriptive patterns suggest that CEO education level has a limited association with ΔSR and ROA, and that any differences between FCEOs and NFCEOs are small in magnitude. They motivate formal tests of Hypothesis 2a in Section 5.4, where interactions between founder status and education are estimated alongside controls for CEO human capital, tenure and firm characteristics.

5.3.4 Firm performance by CEO functional knowledge (H2b)

This section explores whether varying levels of functional knowledge, defined as the presence or absence of training and/or professional qualification relevant to the firm's core activities or industry, are associated with differences in performance across FCEOs and NFCEOs. The bivariate figures are derived from grouped means and filtered datasets and provide the descriptive groundwork for the multivariate interaction tests in Section 5.4.
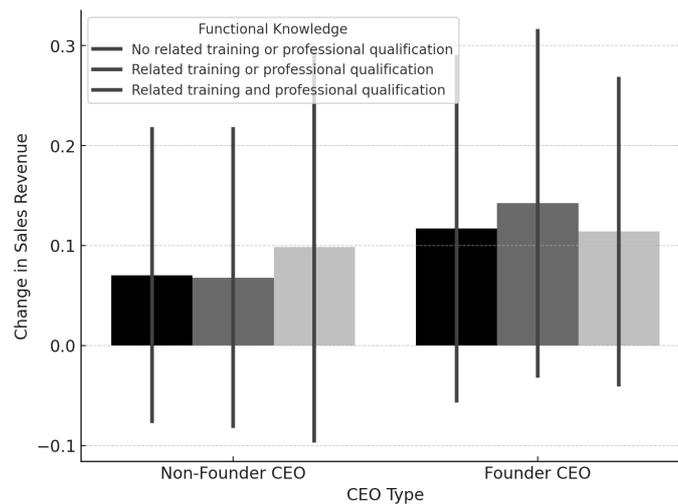
Figure 17 - Average ΔSR by CEO type and functional knowledge

Figure 17 presents a bar chart of average ΔSR by CEO type and functional knowledge level. The chart suggests that higher functional knowledge does not a pronounced gradient in firm growth for either FCEOs or NFCEOs.

Figure 18, an interaction plot, depicts the association between functional knowledge and ROA by CEO type. The graph highlights that NFCEOs with higher functional knowledge exhibit a stronger positive association with profitability, whereas the pattern for FCEOs is comparatively muted. This pattern is plausible. FCEOs, by virtue of having created the firm, are likely to possess a baseline level of firm-specific and industry-relevant knowledge. NFCEOs may enter without this embedded knowledge and, therefore, benefit more from broader or more formalised functional expertise (particularly in finance, operations or strategic management). This interaction may thus reflect differences in baseline knowledge and the marginal value of additional formal functional expertise across CEO types.
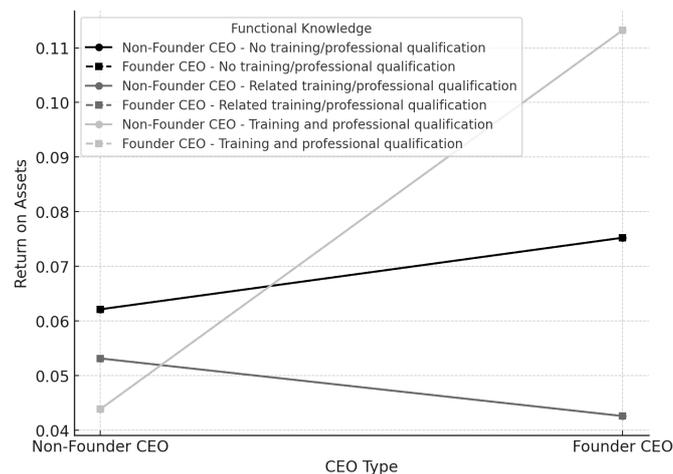
Figure 18 - Interaction effect of functional knowledge and CEO type on ROA

Further insights are provided by Figure 19, which shows the distribution of ROA for FCEOs and NFCEOs across functional knowledge levels. The visualisation indicates that NFCEOs with higher functional knowledge tend to exhibit a more stable and slightly higher median profitability than their founder-led counterparts, whose distribution remains wider. This reinforces the notion that functional expertise yields more consistent profitability benefits for NFCEOs than for FCEOs.
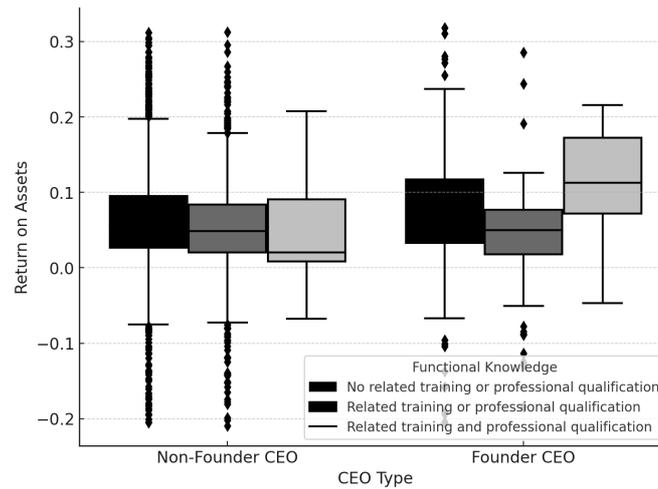
Figure 19 - Distribution of ROA by CEO type and functional knowledge

The time-series in Figure 20 examines how ROA evolves over time by functional knowledge and CEO type. NFCEOs with related training and professional qualifications tend to maintain steadier profitability trends, whereas FCEOs display more pronounced fluctuations. This aligns with the idea that functional knowledge plays a more stabilising role for professional executives, while founder-led firms may combine greater strategic experimentation with exposure to varying external conditions.
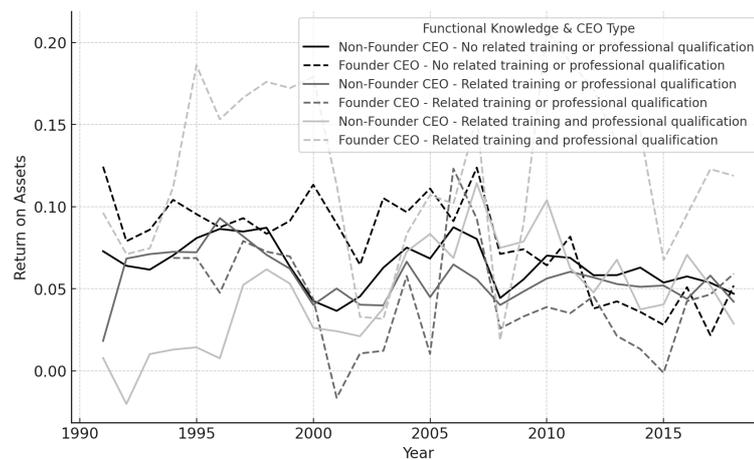
Figure 20 – Trend of ROA over time by functional knowledge and CEO type

Taken together, these bivariate results offer suggestive support for functional knowledge being more consequential for NFCEOs than for FCEOs with respect to profitability, while ΔSR shows no strong gradient by functional knowledge at the descriptive level. These patterns motivate the inclusion of interaction terms in the multivariate models in Section 5.4, where CEO type and functional knowledge are tested jointly with controls for CEO human capital, tenure and firm characteristics.

5.3.5 Firm performance by CEO industry experience (Hypothesis 2c)

This subsection explores whether CEOs' prior industry experience is associated with differences in performance outcomes, and whether such patterns differ between FCEOs and NFCEOs. While industry

experience is often linked to sector-specific knowledge and networks, its direct contribution to firm-level outcomes remains an empirical question. The figures provide descriptive insights into growth (ΔSR) and profitability (ROA) by CEO type and experience level, forming the basis for the interaction tests in Section 5.4.

Figure 21 presents a bar chart of average ΔSR by CEO type and industry experience level. The chart indicates no discernible gradient in firm growth attributable to industry experience for either FCEOs or NFCEOs. This visual confirmation supports the conclusion that, unlike functional knowledge, industry experience does not appear to significantly influence firm growth outcomes.
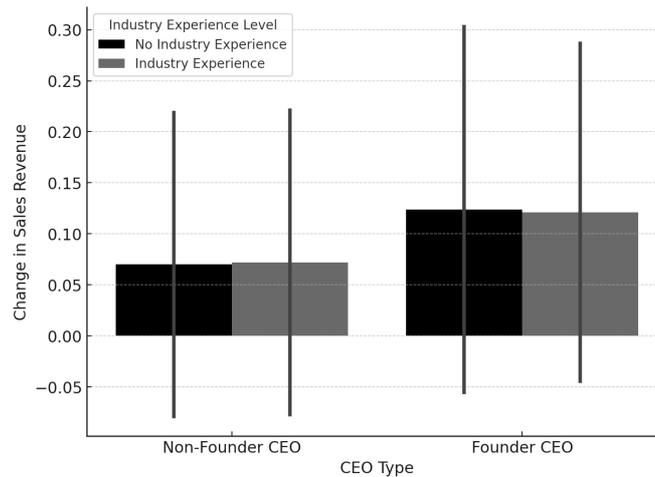
Figure 21 - Average ΔSR by CEO type and industry experience

Figure 22, an interaction plot, that examines the association between industry experience and ROA by CEO type. NFCEOs with industry experience show a slightly higher profitability, whereas the FCEO pattern is comparatively flat. The magnitudes are modest and do not, on their own, provide strong evidence of differential effects.
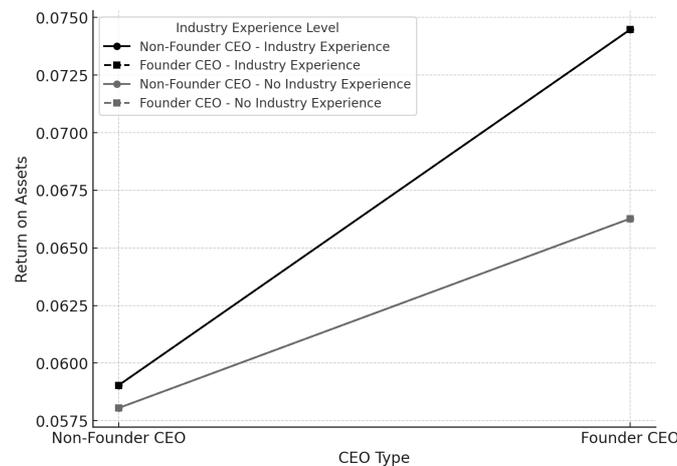
Figure 22 - Interaction effect of industry experience and CEO type on ROA

Further insight is provided by Figure 23, which reports the distribution of ROA for FCEOs and NFCEOs across experience levels. The visualisation suggests a somewhat more stable profitability distribution for NFCEOs, with FCEOs displaying greater variability. Median profitability remains similar across industry experience categories.
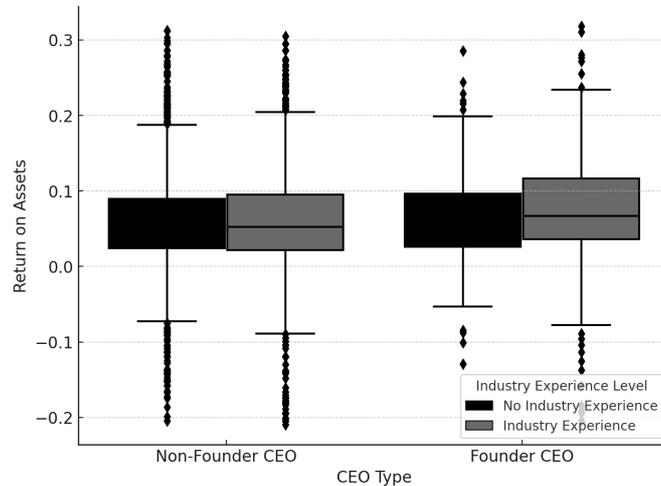
Figure 23 - Distribution of ROA by CEO type and industry experience

The time-series in Figure 24 examines ROA over time by industry experience and CEO type. NFCEOs tend to exhibit relatively stable profitability trends, whereas FCEOs display more pronounced fluctuations. This pattern is descriptive and is probed formally in the multivariate analysis.
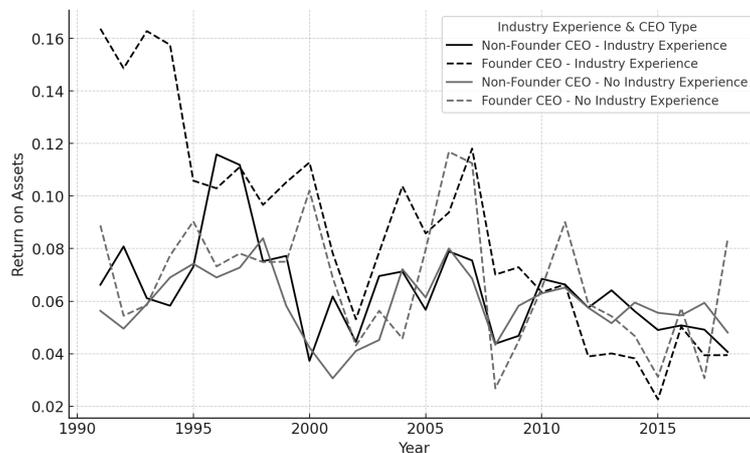
Figure 24 - Trend of ROA over time by industry experience and CEO type

In summary, the descriptive evidence suggests that industry experience is only weakly associated with ΔSR and ROA, and that any differences between FCEOs and NFCEOs are small in magnitude. These patterns are consistent with the view that industry experience alone may be insufficient to generate systematic performance differences, and they motivate the formal interaction tests for Hypothesis 2c in Section 5.4, where founder status and industry experience are estimated jointly with controls for CEO human capital, tenure and firm characteristics.

5.3.6 Firm performance by CEO in-firm time (Hypothesis 2d)

In-firm time, defined as the proportion of a CEO's career spent within the focal organisation, serves as a proxy for firm-specific human capital. Drawing on Becker's (1964) distinction between general and specific human capital, this construct captures the depth of experiential knowledge acquired through long-term immersion in routines, strategic processes and internal networks. While such embeddedness may enhance strategic alignment and resource orchestration (Kor, 2003), it may also engender cognitive rigidity or path dependency, particularly for FCEOs whose careers span multiple strategic cycles (Luo *et al.*, 2013). This subsection examines how the performance implications of in-firm time vary between FCEOs and NFCEOs for growth (ΔSR) and profitability (ROA).

Figure 25 presents a scatter plot with fitted trend lines showing the association between in-firm time and ΔSR by CEO type. The visualisation indicates a negative slope for FCEOs, with firm growth declining as the proportion of a CEO's career spent in the firm increases, whereas NFCEOs display no strong association at this descriptive stage.
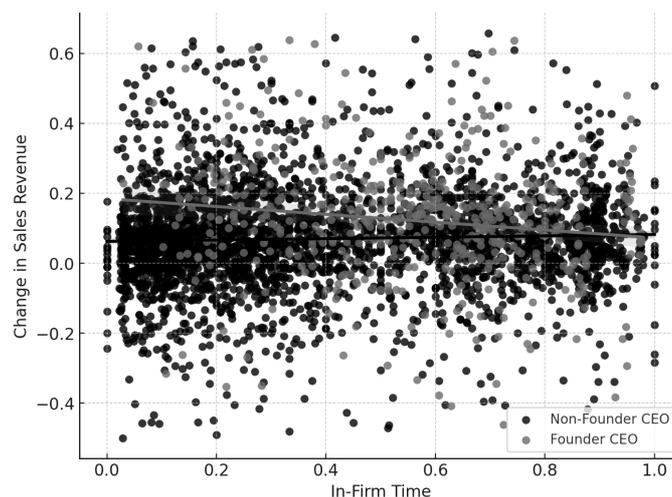
Figure 25 - Relationship between in-firm time and ΔSR by CEO type

Further evidence is provided in Figure 26, a slope chart comparing average ΔSR for CEOs with short in-firm time (≤36% of career in-firm) and long in-firm time (>36% of career in-firm). The 36% threshold reflects the sample median, giving balanced groups. The chart shows a sharper decline in ΔSR for FCEOs at higher in-firm time, while NFCEOs remain comparatively stable.
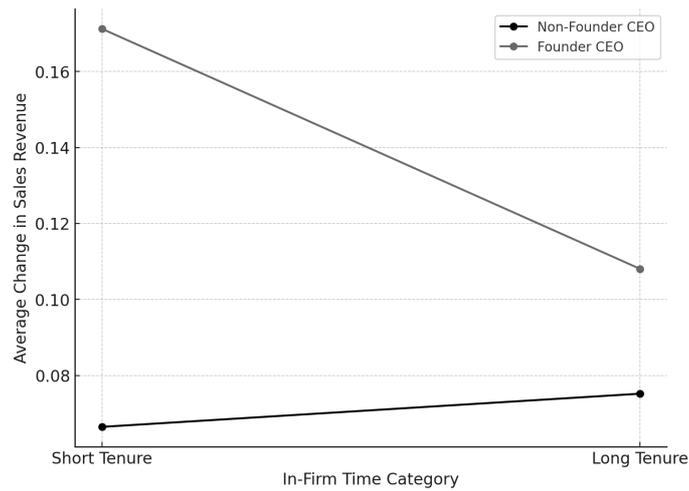
Figure 26 - Effect of in-firm time on ΔSR by CEO type

Turning to profitability, Figure 27 reports ROA distributions by CEO type and in-firm time. Median ROA and interquartile ranges are similar across in-firm time categories, suggesting no systematic profitability shift associated with in-firm time for either CEO type. Given differences in the career trajectories of FCEOs and NFCEOs, this pattern should be interpreted cautiously.
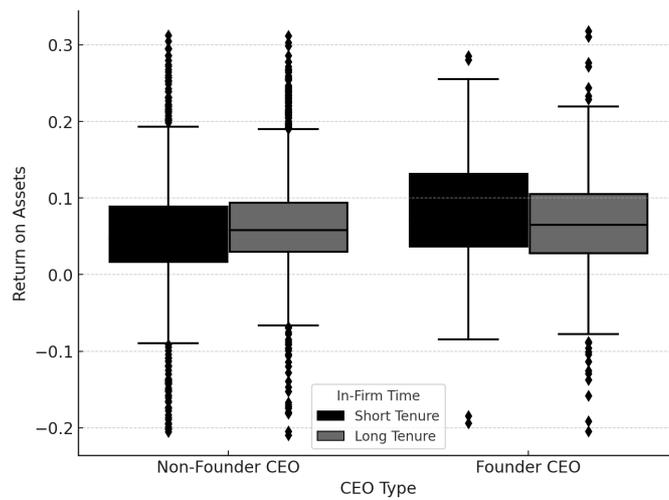
Figure 27 - Distribution of ROA by CEO type and in-firm time

Figure 28 examines the ROA time-series by in-firm time and CEO type. FCEOs with long in-firm time exhibit greater volatility across the period, whereas NFCEOs display steadier profitability paths.
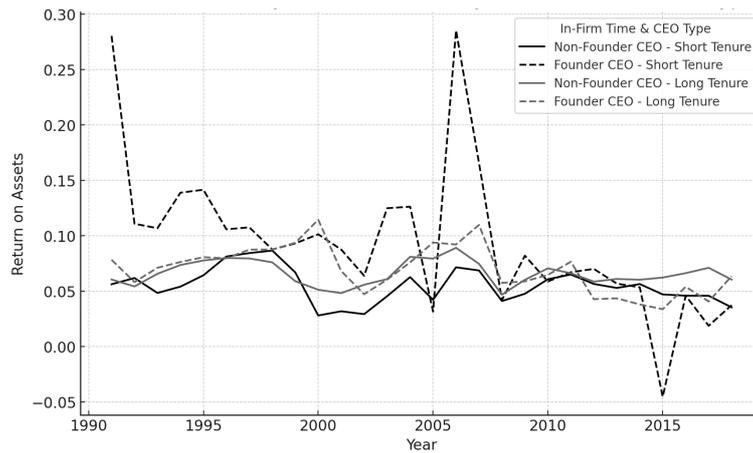
Figure 28 - Trend of ROA over time by in-firm time and CEO type

In summary, the descriptive evidence suggests a negative association between in-firm time and Δ SR for FCEOs, limited differences in ROA across in-firm time categories and greater profitability volatility for long-embedded FCEOs. These patterns are consistent with the possibility of diminishing returns to firm-specific embeddedness for founders, while NFCEOs see little systematic association. They motivate the formal tests of Hypothesis 2d in Section 5.4, where interactions between founder status and in-firm time are estimated alongside controls for CEO human capital, tenure and firm characteristics.

5.3.7 Firm performance by CEO tenure (Hypothesis 3)

This subsection explores the relationship between CEO tenure and firm performance outcomes, with particular emphasis on whether extended tenure has differential associations for FCEOs versus NFCEOs. The motivation reflects longstanding debates on whether tenure builds firm-specific knowledge and strategic consistency yet also risks rigidity and diminishing marginal returns as horizons lengthen. The figures visualise tenure-related performance dynamics prior to the formal multivariate tests that follow.

The visualisation of tenure against ΔSR (Figure 29) shows a downward descriptive association between growth and years in role. Growth rates are highest in the early tenure periods (0 to 10 years), particularly for FCEOs, and attenuate after around 20 years. This is consistent in direction with the regression estimates reported later and aligns with the idea that prolonged tenure can reduce agility in sustaining early-stage momentum.
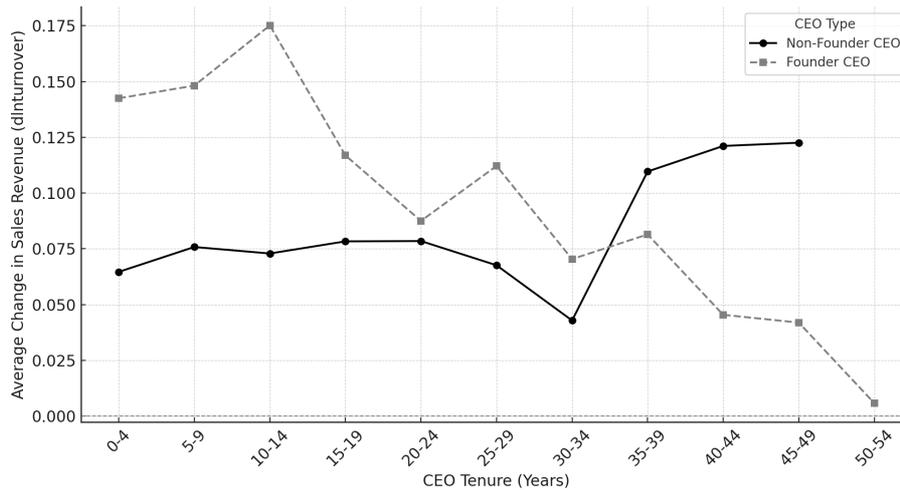
Figure 29 - CEO tenure versus ΔSR

The corresponding plot for ROA (Figure 30) indicates relatively stable profitability across tenure bands for NFCEOs, whereas FCEOs exhibit greater variability. ROA edges up slightly in earlier tenure for FCEOs and then plateaus beyond 20 years, suggesting challenges in maintaining profitability as tenure extends even where early growth is emphasised.
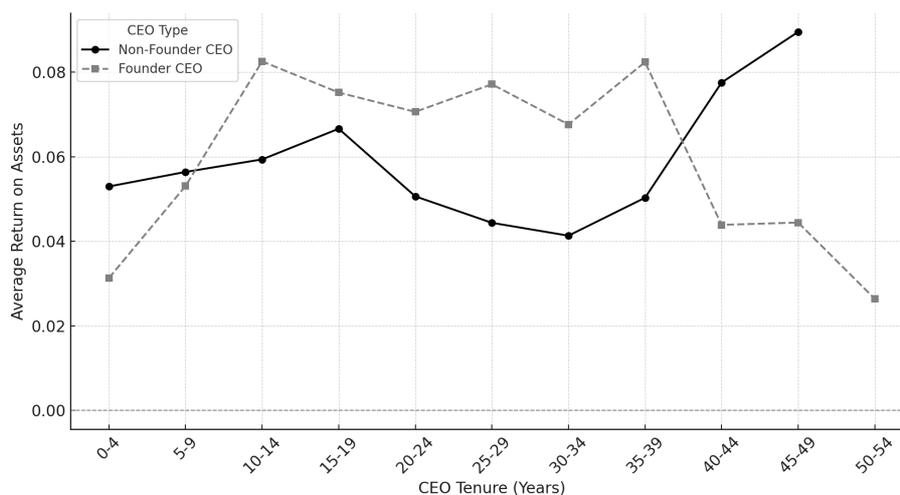
Figure 30 - CEO tenure versus ROA

Overall, the descriptive evidence suggests diminishing performance returns to extended tenure, particularly for FCEOs, where ΔSR declines with tenure and ROA shows greater variability at longer horizons. These patterns motivate the formal tests of curvilinear and interaction effects in the multivariate analysis, where founder status and tenure are estimated jointly with controls for CEO human capital and firm characteristics.

5.3.8   Firm age and performance patterns by CEO type

The relationship between firm age and performance has long been examined in relation to growth constraints, capability development and strategic flexibility. As firms mature, increased structural

complexity and formalisation may reduce responsiveness to changing conditions. These dynamics can be particularly salient for founder-led firms where early-stage routines and personalised control can persist (Hambrick and Fukutomi, 1991; Souder *et al.*, 2011). Penrose (1959) also emphasises the potential for resource rigidity as managerial capacity is absorbed by coordination rather than search. Against this background, this section describes how performance patterns vary with firm age across CEO types, and firm age is subsequently included as a key structural control in the multivariate models.

Figure 31 presents a scatter plot with fitted lines showing the association between firm age and ΔSR by CEO type. The relationship is negative and appears more pronounced for founder-led firms. NFCEO-led firms also display declining growth in older cohorts, but with a flatter gradient. This pattern is descriptive and suggests that the combination if maturity and founder leadership is associated with lower observed growth.
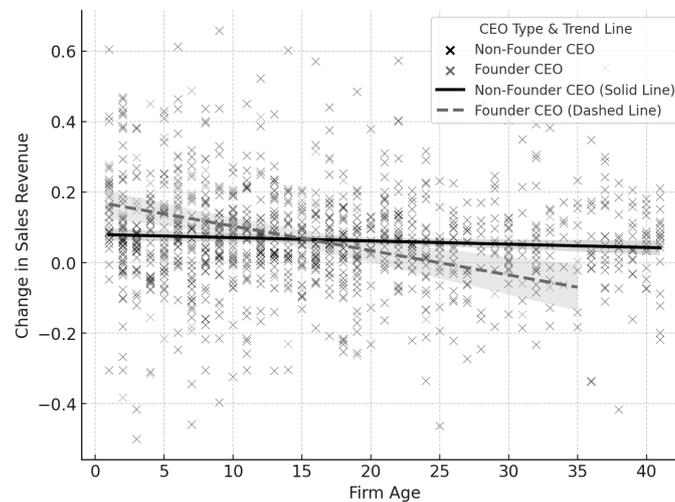
Figure 31 - Relationship between firm age and ΔSR by CEO type

To illustrate differences across the age distribution, Figure 32 shows ΔSR by firm age bands. The largest divergence occurs in the 30 to 39 band, where the founder-led trajectory declines more sharply while the non-founder trajectory remains comparatively flat. This is consistent with the idea that bureaucratisation and environmental complexity in later life-cycle phases can coincide with reduced growth in founder-led firms.
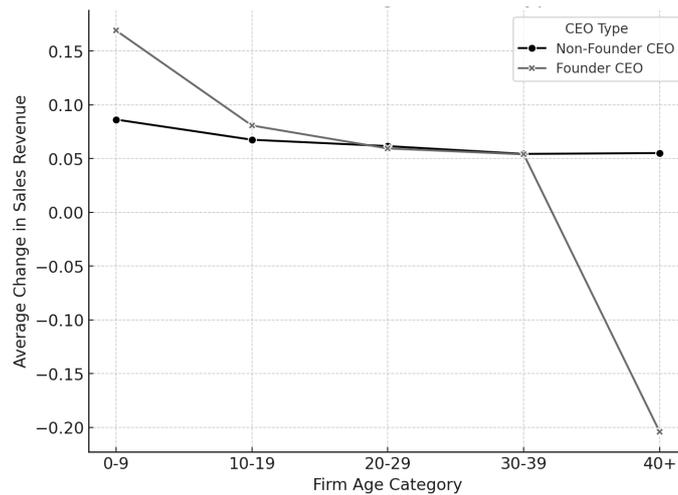
Figure 32 – Interaction effect of firm age and CEO type on ΔSR

Figure 33 reports ROA distributions by firm age band and CEO types. Profitability tends to increase modestly with age, in line with accumulated asset, and positioning. Founder-led firms exhibit greater variation in ROA at older ages (some outliers both high and low), whereas NFCEO-led firms show more compressed distributions across the same bands.
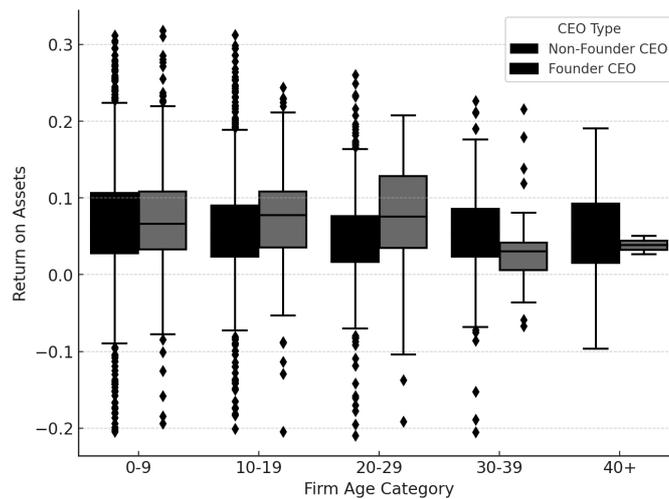
Figure 33 - Distribution of ROA by firm age and CEO type

Figure 34 presents a time-series view of ROA by firm age and CEO type. NFCEO-led firms display relatively stable profitability paths, especially beyond 30 years, while FCEO-led firms show more variability over the observation window.
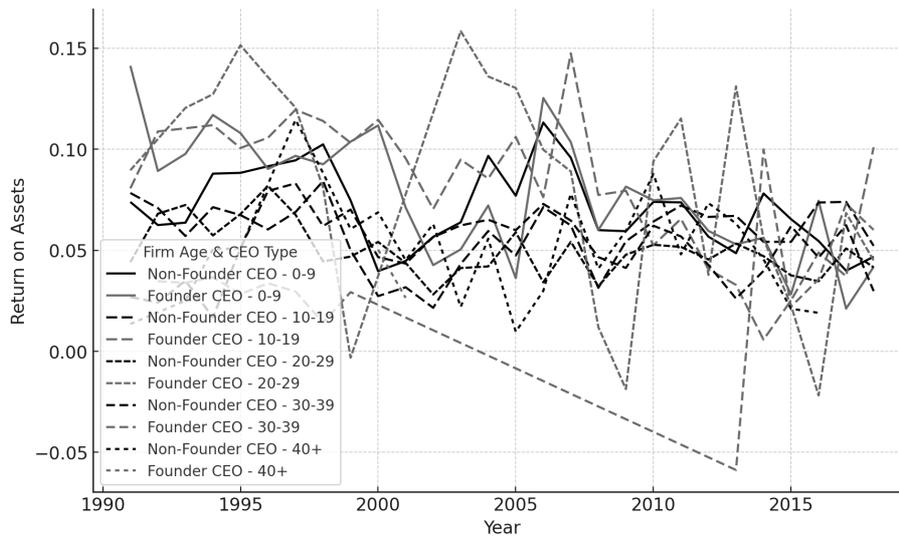
Figure 34 – Trend of ROA over time by firm age and CEO type

In summary, the exploratory evidence indicates that observed performance patterns differ across firm-age bands i.e. growth (ΔSR) declines with age for both CEO types and more steeply for founder-led firms whilst profitability (ROA) is more stable and somewhat higher in older firms, with wider dispersion for FCEOs. These patterns are contextual and motivate the controls used in Section 5.4; they are not advanced as hypotheses about firm-age moderation.

5.3.9 Firm size and performance patterns by CEO type

Firm size is a salient structural feature shaping performance. Larger firms may benefit from economies of scale, greater access to capital and formalised systems, whereas smaller firms often exhibit greater agility and strategic flexibility (Penrose, 1959; Coad et al., 2016). This section describes how patterns in growth (ΔSR) and profitability (ROA) vary across the size distribution by CEO type. Firm size (natural log of employee numbers) enters the multivariate models as a control.

Figure 35 presents a scatter plot with fitted lines showing the association between firm size and ΔSR by CEO type. Growth declines with size for both FCEOs and NFCEOs, with a slightly steeper negative gradient for founder-led firms at this descriptive stage.
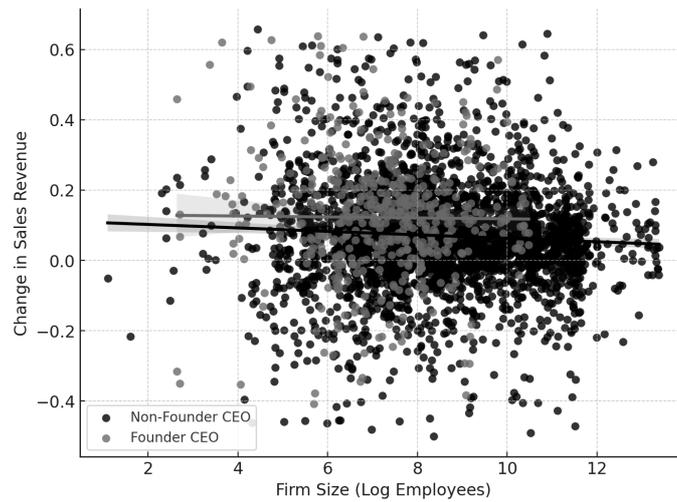
Figure 35 - Relationship between firm size and ΔSR by CEO type

To facilitate comparison, firms are grouped into size quartiles (small, medium-small, medium-large and large). Figure 36 (mean ROA by size group) shows a modest peak in medium-small category and a taper in the largest group. Although Figure 46 does not distinguish CEO type, supplementary tabulations indicate that the size–ROA pattern is similar for founder-led and non-founder-led firms.
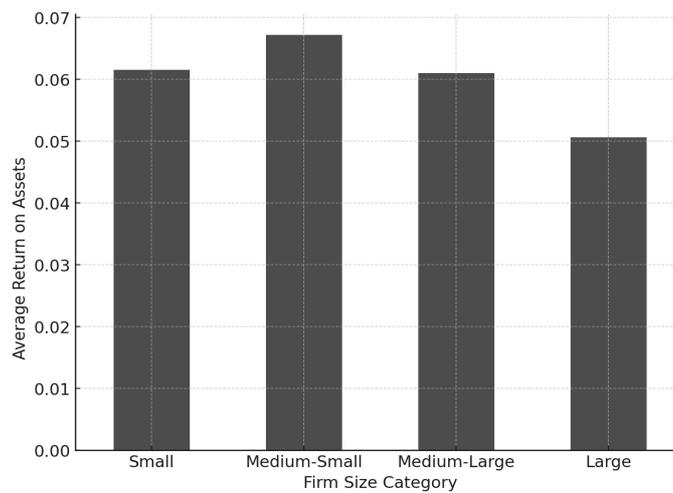
Figure 36 - Average ROA by firm size

Figure 37 reports the distribution of ΔSR by size and CEO type. Smaller firms display greater variability in growth, both higher upside and larger downside tails. Within these smaller firms, FCEOs exhibit slightly wider dispersion than NFCEOs, however, volatility narrows for both CEO types as firm size increases.
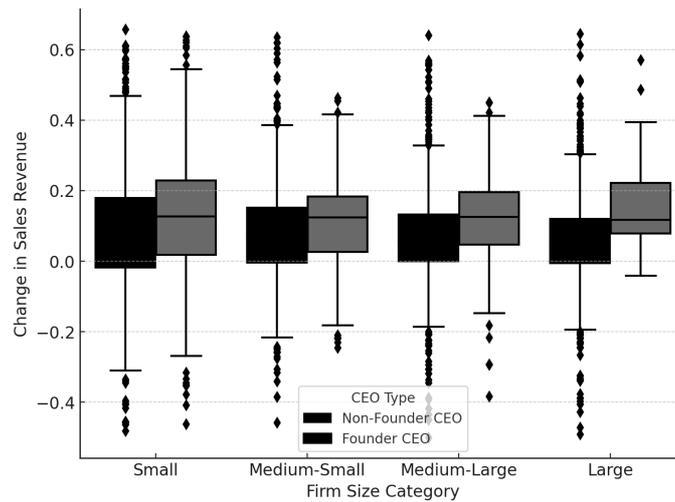
Figure 37 - Distribution of ΔSR by firm size and CEO type

Figure 38 presents ROA trends over time by size category. Larger firms display more stable profitability paths, particularly under NFCEO leadership. Differences in average levels across size groups are modest; the dominant feature is the reduction in variance with scale.
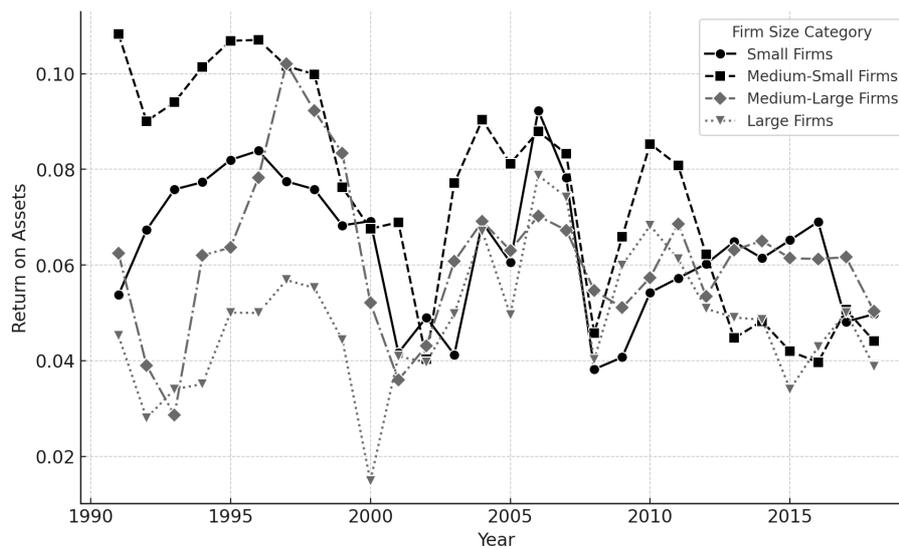
Figure 38 - Trend of ROA over time by firm size

In summary, the descriptive evidence indicates that growth (ΔSR) declines with size for both CEO types (more steeply for founder-led firms), while ROA varies modestly across size groups and is more stable in larger firms. These patterns are contextual and motivate the inclusion of firm size as a control in Section 5.4; they are not advanced as hypotheses about size-by-CEO-type moderation.

5.4   Hypothesis testing via multivariate regression

This section reports fixed-effects panel estimates that formally evaluate the relationships set out in the conceptual framework. The primary specification tests Hypothesis 1 on growth, measured as the change in sales revenue (ΔSR). Profitability, measured by ROA, is included as a secondary outcome to assess

whether any founder effect on growth is accompanied by differences in accounting returns. ROP is examined separately as a robustness outcome in Section 5.7 and is not presented here. All models include firm and year fixed effects, with standard errors clustered at the firm level, and control for firm size and firm age. CEO human-capital indicators (education, functional knowledge, industry experience and in-firm time) and tenure are introduced sequentially, followed by interaction terms corresponding to Hypotheses 2a to 2d and 3. Estimates are interpreted as within-firm contrasts over time; complementary propensity-score diagnostics and matched-sample effects are reported in Appendix E.

$$Y_{it} = \beta_1 \, FCEO_{it} + X_{it}' \, \theta + Z_{it}' \, \phi + \alpha_i + \tau_t + \varepsilon_{it} \qquad \text{(Equation 1)}$$

In equation 1, Y_{it} denotes the outcome for firm i in year t and is estimated separately as ΔSR_{it} (growth, the change in sales revenue) and as ROA_{it} (profitability). $FCEO_{it}$ equals one when the CEO is a founder. X_{it} contains firm-level controls (firm age and firm age). Z_{it} contains CEO covariates (education, functional knowledge, industry experience, in-firm time and tenure). α_i and τ_t are firm and year fixed effects capturing time-invariant heterogeneity and common shocks respectively whilst ε_{it} is an idiosyncratic error term. Models are estimated by OLS using the within (fixed-effects) estimator with standard errors clustered at the firm level and coefficients are interpreted as within-firm contrasts over time. Moderation Hypotheses 2a to 2d and 3 are examined by augmenting equation 1 with interaction terms of the form $FCEO_{it} \times M_{it}$, where M_{it} denotes the relevant moderator.

Variable/test		Change in sales revenue							
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Regression analysis:									
Sales revenue[1]		0.122***	0.123***	0.123***	0.123***	0.122***	0.123***	0.122***	0.126***
		(0.019)	(0.018)	(0.018)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
Founder CEO		0.057**	0.091***	0.101***	-0.085	0.098***	0.118***	0.055	0.187***
		(0.023)	(0.034)	(0.036)	(0.105)	(0.023)	(0.033)	(0.047)	(0.046)
CEO age[2]		-0.003	-0.006	0.001	-0.006	-0.003	-0.006	-0.004	-0.008
		(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Female CEO		0.007	0.008	0.007	0.010	0.007	0.010	0.008	0.009
		(0.023)	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Level of CEO education:									
Pre-degree		-0.005	-0.006	-0.005	-0.006	-0.005	-0.009	-0.005	-0.004
		(0.019)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.019)
Degree[3]									
Post-graduate		-0.014	-0.013	-0.013	-0.013	-0.011	-0.011	-0.014	-0.011
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)
Founder x level of education interaction:									
Pre-degree						-0.039			
						(0.036)			
Degree[3]									
Post-graduate						-0.107			
						(0.069)			
CEO education/training background:									
Generic		-0.000	0.003	-0.001	0.004	0.000	0.013	-0.001	-0.001
		(0.022)	(0.022)	(0.022)	(0.027)	(0.023)	(0.023)	(0.023)	(0.021)
Education		0.107***	0.106***	0.111***	0.107***	0.109***	0.105***	0.108***	0.102***
		(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.025)	(0.019)	(0.020)
Arts		-0.029	-0.032	-0.029	-0.029	-0.029	-0.025	-0.029	-0.027
		(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.023)	(0.025)	(0.026)
Social science		-0.019	-0.021	-0.019	-0.019	-0.017	-0.012	-0.019	-0.016
		(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.025)	(0.022)	(0.021)
Business[3]									
Natural science		-0.012	-0.011	-0.013	-0.011	-0.011	-0.008	-0.010	-0.012
		(0.018)	(0.019)	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)	(0.018)
Information and communiction technology		0.005	0.004	0.008	0.006	-0.001	0.032	0.004	-0.001
		(0.044)	(0.043)	(0.046)	(0.042)	(0.053)	(0.052)	(0.046)	(0.043)
Engineering		0.004	0.005	0.005	0.006	0.006	0.002	0.005	0.008
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Agriculture		0.019	0.024	0.018	0.021	0.019	0.026	0.022	0.026
		(0.031)	(0.033)	(0.032)	(0.031)	(0.031)	(0.033)	(0.031)	(0.034)
Health		0.057***	0.057**	0.040	0.057***	0.067***	0.074***	0.058***	0.059***
		(0.019)	(0.023)	(0.027)	(0.018)	(0.020)	(0.022)	(0.021)	(0.021)
Services		-0.039	-0.039	-0.037	-0.040	-0.037	-0.035	-0.037	-0.037
		(0.048)	(0.048)	(0.049)	(0.048)	(0.047)	(0.051)	(0.048)	(0.046)
Founder x education/training interaction:									
Generic							-0.088*		
							(0.045)		
Education[4]									
Arts[5]									
Social science							-0.655***		
							(0.056)		
Business[3]									
Natural science							-0.058		
							(0.041)		
Information and communiction technology							-0.135**		
							(0.061)		
Engineering							0.003		
							(0.051)		
Agriculture[4]									
Health							-0.091*		
							(0.052)		
Services[4]									
Length of tenure as CEO[6]		-0.002**	-0.001	-0.001*	-0.002*	-0.002**	-0.002*	-0.002*	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Founder x length of tenure[6] interaction			-0.003						
			(0.002)						

Variable/test	Change in sales revenue							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of employees[6]	-0.106***	-0.106***	-0.104***	-0.109***	-0.106***	-0.107***	-0.106***	-0.107***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)
Founder x number of employees[7] interaction				0.017				
				(0.012)				
Firm age[2]	-0.094***	-0.093***	-0.091***	-0.095***	-0.094***	-0.094***	-0.094***	-0.092***
	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Founder x firm age[2] interaction			-0.046					
			(0.030)					
CEO functional knowledge						0.001		
						(0.014)		
Founder x functional knowledge interaction						-0.024		
						(0.044)		
CEO industry experience							-0.003	
							(0.012)	
Founder x industry experience interaction							0.003	
							(0.050)	
CEO in-firm time								-0.146
								(0.190)
Founder x in-firm time interaction								-2.321**
								(0.910)
Constant	0.339***	0.335***	0.288***	0.369***	0.335***	0.356***	0.342***	0.334***
	(0.084)	(0.087)	(0.097)	(0.088)	(0.085)	(0.083)	(0.085)	(0.086)
Joint F-tests:								
Demographic[8]	2.603							
	(-0.052)							
Education [9]	0.955							
	(-0.386)							
Firm characteristics [10]	51.501							
	(0.000)							
All variables [11]	20.436							
	(0.000)							
Founder x tenure interaction		2.308						
		(0.101)						
Founder x firm age interaction			53.417					
			(0.000)					
Founder x firm size interaction				14.935				
				(0.000)				
Founder x education level interaction					1.544			
					(0.215)			
Founder x training interaction						40.282		
						(0.000)		
Founder x functional knowledge interaction						0.220		
						(0.640)		
Founder x industry experience interaction							0.007	
							(0.934)	
Founder x in-firm time interaction								6.671
								(0.010)
Observations	3,699	3,699	3,699	3,699	3,699	3,699	3,690	3,699
R-squared	0.088	0.090	0.091	0.089	0.089	0.094	0.088	0.094
Number of id	328	328	328	328	328	328	328	328

Notes:
All models are estimated using a fixed-effects (FE) estimator
Robust standard errors, in parentheses, are clustered at the firm level to account for within-firm error correlation.
*** p<0.01, ** p<0.05, * p<0.1
[1] Lagged natural log
[2] Variable rescaled from years to decades
[3] Base level of factor variable due to being largest category
[4] No observations in sample
[5] Omitted due to collinearity
[6] Variable rescaled from months to years
[7] Natural log
[8] Includes founder CEO, CEO age and female CEO variables
[9] Includes level of CEO education and CEO education/training background variables
[10] Includes firm age and number of employees variables
[11] Includes sales revenue, founder CEO, CEO age, female CEO, level of CEO education, CEO education/training background, length of tenure as CEO, firm age and number of employees variables

Table 24 – Fixed-effects regression results for ΔSR with joint F-tests of key variable groups – Models 1 to 8

Variable/test	Return on assets							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Regression analysis:								
Sales revenue[1]	0.020***	0.020***	0.021***	0.021***	0.020***	0.021***	0.020***	0.021***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Founder CEO	0.023	0.022	0.036**	-0.050	0.020	0.019	0.034*	0.060**
	(0.014)	(0.019)	(0.018)	(0.039)	(0.019)	(0.020)	(0.018)	(0.030)
CEO age[2]	0.008*	0.008*	0.009**	0.007	0.009**	0.008*	0.008**	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Female CEO	0.016	0.016	0.016	0.017	0.017	0.015	0.017	0.018
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Level of CEO education:								
Pre-degree	0.012	0.012	0.012	0.012	0.011	0.015*	0.012	0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)	(0.008)
Degree[3]								
Post-graduate	0.001	0.001	0.001	0.001	0.001	-0.001	0.001	0.002
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
Founder x level of education interaction:								
Pre-degree					0.023			
					(0.027)			
Degree[3]								
Post-graduate					-0.045*			
					(0.026)			
CEO education/training background:								
Generic	-0.010	-0.011	-0.010	-0.008	-0.013	-0.024**	-0.011	-0.011
	(0.011)	(0.011)	(0.010)	(0.012)	(0.012)	(0.012)	(0.010)	(0.010)
Education	0.029***	0.029***	0.030***	0.029***	0.029***	0.021**	0.028***	0.032***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.007)	(0.008)
Arts	0.003	0.003	0.003	0.003	0.003	0.000	0.003	0.003
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)
Social science	-0.006	-0.006	-0.006	-0.006	-0.004	-0.007	-0.005	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Business[3]								
Natural science	-0.003	-0.003	-0.003	-0.003	-0.003	-0.004	-0.005	-0.003
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
Information and communiction technology	0.001	0.001	0.002	0.001	0.002	0.022	0.005	-0.002
	(0.037)	(0.037)	(0.038)	(0.036)	(0.037)	(0.042)	(0.036)	(0.036)
Engineering	0.002	0.002	0.003	0.003	0.002	0.002	0.001	0.003
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Agriculture	-0.033***	-0.033***	-0.033***	-0.032**	-0.032**	-0.040***	-0.038**	-0.032***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.011)	(0.015)	(0.012)
Health	-0.017	-0.017	-0.022	-0.017	-0.005	-0.013	-0.019	-0.016
	(0.032)	(0.032)	(0.033)	(0.032)	(0.036)	(0.051)	(0.033)	(0.033)
Services	-0.034	-0.034	-0.033	-0.034	-0.032	-0.039	-0.037	-0.034
	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.026)	(0.028)	(0.028)
Founder x education/training interaction:								
Generic						0.031		
						(0.033)		
Education[4]								
Arts[5]								
Social science						-0.067***		
						(0.022)		
Business[3]								
Natural science						-0.021		
						(0.025)		
Information and communiction technology						-0.054		
						(0.048)		
Engineering						-0.003		
						(0.024)		
Agriculture[4]								
Health						-0.003		
						(0.056)		
Services[4]								
Length of tenure as CEO[6]	-0.001	-0.001*	-0.001	-0.001	-0.001*	-0.001*	-0.001*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Founder x length of tenure[6] interaction		0.000						
		(0.001)						

Variable/test	Return on assets							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of employees[6]	-0.029***	-0.029***	-0.028***	-0.030***	-0.029***	-0.028***	-0.029***	-0.029***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Founder x number of employees[7] interaction				0.009*				
				(0.005)				
Firm age[2]	-0.017***	-0.017***	-0.016***	-0.017***	-0.017***	-0.017***	-0.017***	-0.016***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Founder x firm age[2] interaction			-0.015					
			(0.010)					
CEO functional knowledge						-0.007*		
						(0.004)		
Founder x functional knowledge interaction						-0.010		
						(0.022)		
CEO industry experience							0.007	
							(0.005)	
Founder x industry experience interaction							-0.017	
							(0.023)	
CEO in-firm time								0.079
								(0.096)
Founder x in-firm time interaction								-0.678*
								(0.402)
Constant	0.146***	0.146***	0.129***	0.164***	0.142***	0.148***	0.141***	0.140***
	(0.029)	(0.029)	(0.033)	(0.030)	(0.029)	(0.029)	(0.030)	(0.029)
Joint *F*-tests:								
Demographic[8]	1.748							
	(0.157)							
Education [9]	0.214							
	(0.807)							
Firm characteristics [10]	24.355							
	(0.000)							
All variables [11]	6.600							
	(0.000)							
Founder x tenure interaction		1.662						
		(0.191)						
Founder x firm age interaction			7.628					
			(0.001)					
Founder x firm size interaction				20.354				
				(0.000)				
Founder x education level interaction					3.541			
					(0.030)			
Founder x training interaction						3.757		
						(0.001)		
Founder x functional knowledge interaction						0.354		
						(0.552)		
Founder x industry experience interaction							0.672	
							(0.413)	
Founder x in-firm time interaction								2.848
								(0.092)
Observations	4,063	4,063	4,063	4,063	4,063	4,063	4,053	4,063
R-squared	0.063	0.063	0.065	0.065	0.067	0.070	0.064	0.066
Number of id	337	337	337	337	337	337	337	337

Notes:

All models are estimated using a fixed-effects (FE) estimator

Robust standard errors, in parentheses, are clustered at the firm level to account for within-firm error correlation.

*** p<0.01, ** p<0.05, * p<0.1

[1] Lagged natural log

[2] Variable rescaled from years to decades

[3] Base level of factor variable due to being largest category

[4] No observations in sample

[5] Omitted due to collinearity

[6] Variable rescaled from months to years

[7] Natural log

[8] Includes founder CEO, CEO age and female CEO variables

[9] Includes level of CEO education and CEO education/training background variables

[10] Includes firm age and number of employees variables

[11] Includes sales revenue, founder CEO, CEO age, female CEO, level of CEO education, CEO education/training background, length of tenure as CEO, firm age and number of employees variables

Table 25 – Fixed-effects regression results for ROA with joint *F*-tests of key variable groups – Models 1 to 8

Variables	Change in sales revenue		Return on assets	
	Model 3a	Model 3b	Model 3a	Model 3b
Sales revenue[1]	0.016*	0.020**	-0.001	-0.001
	(0.009)	(0.010)	(0.003)	(0.003)
Founder CEO	0.062***	0.101***	0.021	0.024*
	(0.022)	(0.026)	(0.013)	(0.015)
Firm age range:				
<10 years[2]				
10-19 years	-0.059***	-0.049***	-0.011**	-0.011**
	(0.010)	(0.010)	(0.005)	(0.005)
20-29 years	-0.090***	-0.081***	-0.018***	-0.017**
	(0.015)	(0.016)	(0.007)	(0.007)
30-39 years	-0.123***	-0.118***	-0.026***	-0.023**
	(0.020)	(0.020)	(0.010)	(0.010)
40-49 years	-0.142***	-0.132***	-0.024**	-0.022*
	(0.026)	(0.025)	(0.011)	(0.011)
Founder and firm agerange interaction:				
<10 years[2]				
10-19 years		-0.072**		-0.004
		(0.031)		(0.011)
20-29 years		-0.091**		-0.014
		(0.045)		(0.019)
30-39 years		-0.089		-0.042
		(0.058)		(0.038)
40-49 years		-0.378***		-0.033
		(0.059)		(0.038)
Constant	0.018	-0.012	0.070***	0.068***
	(0.055)	(0.059)	(0.019)	(0.020)
Observations	3,927	3,927	4,331	4,331
R-squared	0.029	0.035	0.019	0.020
Number of id	335	335	348	348

Notes:
All models are estimated using a fixed-effects (FE) estimator
Robust standard errors, in parentheses, are clustered at the firm level to account for within-firm error correlation.
*** p<0.01, ** p<0.05, * p<0.1
[1] Lagged natural log
[2] Base level of factor variable due to being largest category

Table 26 – Fixed-effects regression results for ΔSR and ROA - Models 3a and 3b

As pre-specified in Section 3.3.1 ROA is analysed as a secondary outcome. The estimates indicate a positive founder differential for growth (ΔSR), but no statistically significant founder difference in profitability (ROA) within the period. This pattern is consistent with founder leadership translating more readily into resource mobilisation and sales than into contemporaneous accounting returns.

5.4.1 Impact of FCEOs on firm growth (Hypothesis 1)

Hypothesis 1 posits that firms led by FCEOs will exhibit superior growth performance relative to those led by NFCEOs. To test this proposition, Model 1 was constructed as a baseline regression, isolating the effect of FCEO presence on firm growth while controlling for firm and year fixed effects and core firm-level covariates (size and age).

The results from Model 1 provide strong support for this hypothesis. The coefficient on the FCEO variable is positive and statistically significant (coefficient=0.057, $p<0.05$; Table 24) indicating that founder-led firms grow more rapidly than their non-founder counterparts, all else being equal. This

result aligns with the findings from the bivariate exploratory analysis (Section 5.3), where visual trends in Figures 7 to 9 highlighted higher average growth and a wider performance range for FCEOs. Importantly, the regression findings confirm that this relationship holds in a multivariate setting, conditional on firm and year effects and the included controls, suggesting that the growth premium associated with founder leadership is not merely a function of firm size, age or industry. Across specifications, the founder coefficient remains positive and statistically significant in Models 2, 3, 5, 6 and 8, but is not statistically significant in Models 4 and 7 (Table 24).

However, the relationship between FCEOs and profitability (ROA) is less definitive. While the coefficient is positive, it does not achieve statistical significance (coefficient=0.023, $p>0.10$; Table 25). This suggests that founder-led growth strategies may prioritise expansion over short-term profitability, a conclusion also reflected in Figures 10 to 12, which showed limited divergence in profitability across CEO types.

The control variables in Model 1 offer further insights into firm performance dynamics. Firm size, operationalised as the natural logarithm of the number of employees, is negatively associated with firm growth (coefficient=-0.106, $p<0.01$; Table 24) indicating that as firms grow larger, their relative growth rates tend to decline. For profitability, firm size is negatively associated with ROA (coefficient=-0.029, $p<0.01$; Table 25). By contrast, older firms are associated with slightly higher profitability in these models (coefficient=0.017, $p<0.01$; Table 25), while showing lower growth (coefficient=-0.094, $p<0.01$; Table 24). These findings are consistent with Penrose's (1959) account of growth, where organisational experience and coordination demands weigh on expansion, even as maturity can support modest improvements in accounting returns.

In conclusion, the results from Model 1 provide strong support for Hypothesis 1, demonstrating that FCEOs positively influence firm growth. The visual analyses complement these findings, highlighting the higher growth trajectory of FCEO-led firms, while also revealing greater volatility in their performance compared to firms led by NFCEOs. Taken together with the extended set of specifications (Table 24), the founder–growth association is positive and statistically reliable in most models, albeit with attenuation in Models 4 and 7. At the same time, the estimates underscore the difficulty of translating growth orientation into contemporaneous profitability. These results set the stage for exploring the moderating effects of other CEO characteristics and firm-level variables in subsequent models.

5.4.2   Impact of education on firm growth (Hypothesis 2a)

Hypothesis 2a examines whether higher levels of CEO educational attainment are associated with superior firm performance and, specifically, whether any such association is stronger for FCEOs than NFCEOs. Consistent with Section 5.3, education is operationalised as categorical levels (pre-degree,

degree [base] and post-graduate). We estimate firm fixed-effects models estimates for growth (ΔSR) and profitability (ROA) and include founder×level of education interactions (Tables 24 and 25).

For ΔSR, the estimated difference between education levels and degree base category are small and statistically indistinguishable from zero. In Model 1, the indicator for pre-degree (base: degree) has a coefficient of -0.005 ($p>0.10$) and post-graduate has coefficient of-0.014 ($p>0.10$); in Model 6 the corresponding estimates are coefficient of -0.009 ($p>0.10$) for pre-degree and -0.011 ($p>0.10$) for post-graduate (Table 24). The founder differentials are likewise not statistically significant: in Model 5, founder×pre-degree has a coefficient of -0.039 ($p>0.10$) and founder×post-graduate -0.107 ($p>0.10$) (Table 24). Read alongside the exploratory comparisons in Section 5.3 which showed overlapping growth distributions across education levels, the multivariate evidence indicates that education level does not systematically differentiate ΔSR, nor does it yield a stronger growth effect for founders.

Turning to profitability, the results similarly provide little evidence that education level materially alters ROA. Relative to degree, pre-degree is typically small and not statistically significant (e.g., coefficient=0.012, $p>0.10$), with a single marginal instance in Model 6 (coefficient=0.015, $p<0.10$). Post-graduate is consistently not significant (e.g., coefficient≈0.001, $p>0.10$). For founder differentials, Model 5 indicates a marginally negative interaction for founder×post-graduate (coefficient=-0.045, $p<0.10$) whereas founder×pre-degree has a coefficient of 0.023 ($p>0.10$) (Table 25). Considered together with Section 5.3, these estimates suggest no systematic profitability premium by education level and only weak, model-specific evidence of a founder-specific differential.

In summary, the fixed-effects estimates do not support Hypothesis 2a in this sample. CEO education level is not associated with higher growth (ΔSR) on average, the founder×level of education terms do not indicate stronger effects for FCEOs, and there is no systematic relationship with ROP. For ROA, the pattern is similarly muted apart from a single marginally negative founder interaction at post-graduate (Model 5; Table 25). The concordance between the exploratory and multivariate evidence strengthens the inference that educational attainment level, as measured here, does not systematically differentiate performance outcomes, nor does it yield a distinct advantage under FCEO leadership over the study period.

5.4.3   Impact of functional knowledge on firm growth (Hypothesis 2b)

Hypothesis 2b posits that the association between functional knowledge and firm performance differs between FCEO and NFCEO-led firms. We estimate firm fixed-effects models that include an interaction between founder status and functional knowledge (Model 6), alongside the full set of firm and CEO controls (Tables 24 and 25).

For growth in sales revenue (ΔSR), the estimates provide no evidence of a systematic association with functional knowledge, nor of a founder-specific differential. In Model 6, the coefficient on

functional knowledge for NFCEOs is 0.001 ($p>0.10$; Table 24), and the founder×functional knowledge interaction is −0.024 (p 0.10; Table 24). Read alongside Section 5.3, where the distributions of ΔSR overlapped across functional knowledge levels, the multivariate results indicate that functional knowledge does not reliably raise or lower short-run revenue growth and there is no statistically detectable difference in this association under founder leadership.

Turning to profitability (ROA), the results suggest a small negative association on average, but again no reliable moderation by founder status. In Model 6, the functional-knowledge coefficient is −0.007 ($p<0.10$; Table 25), while the founder×functional knowledge interaction has a coefficient of −0.010 ($p>0.10$; Table 25). Thus, although higher functional knowledge is associated with a modest reduction in ROA for NFCEOs, the interaction term provides no evidence that this association differs systematically for founders.

In summary, the fixed-effects estimates do not support Hypothesis 2b in this sample. Functional knowledge shows no reliable association with ΔSR and only a small, marginal negative association with ROA for NFCEOs that does not differ statistically for founders. Taken together with the exploratory comparisons in Section 5.3, these results suggest that, as measured here, functional knowledge does not confer a consistent performance advantage, nor does it yield a distinct benefit under founder leadership over the study period.

5.4.4 Impact of industry experience on firm growth (Hypothesis 2c)

Hypothesis 2c examines whether the association between CEOs' industry experience and firm performance differs between FCEOs and NFCEOs. To evaluate this proposition, Model 7 introduces an interaction between founder status and industry experience, alongside the full set of firm and CEO controls (Tables 24 and 25).

For ΔSR, the Model 7 estimates provide no evidence of a systematic association with industry experience and no founder-specific differential. The coefficient on NFCEO industry experience is -0.003 ($p>0.10$; Table 24), and the founder×industry experience interaction coefficient is 0.003 ($p>0.10$; Table 24). Read alongside Section 5.3, where the distributions of ΔSR overlapped across industry-experience levels, the multivariate results indicate that industry experience does not reliably raise or lower short-run revenue growth and that this association does not differ under FCEO leadership.

Turning to ROA, the results are likewise muted. In Model 7, the coefficient on industry experience is 0.007 ($p>0.10$, Table 25), while the founder×industry experience interaction coefficient is -0.017 ($p>0.10$, Table 25). Thus, there is no statistical evidence that profitability varies with industry experience, nor that any association differs between FCEOs and NFCEOs, consistent with the descriptive comparisons in Section 5.3, which showed limited separation in median ROA across industry-experience categories.

In summary, the Model 7 fixed-effects estimates do not support Hypothesis 2c in this sample. Industry experience is not associated with higher growth (ΔSR) or profitability (ROA) on average, and the interaction terms provide no evidence of stronger or weaker associations under founder leadership. Considered together with the exploratory analysis in Section 5.3, these findings suggest that industry experience does not confer a distinct performance advantage, nor does it yield an incremental effect specific to founder-led firms over the study period.

5.4.5 Impact of in-firm time on firm growth (Hypothesis 2d)

Hypothesis 2d examines whether the association between in-firm time (the proportion of a CEO's career spent in the focal firm) and firm performance differs between FCEOs and NFCEOs. To evaluate this, Model 8 introduces an interaction between founder status and in-firm time, alongside the full set of firm and CEO controls (Tables 24 and 25).

For growth (ΔSR), the estimates indicate a negative and statistically significant founder moderation. In Model 8, the coefficient on in-firm time is -0.146 ($p>0.10$; Table 24), while the founder×in-firm time interaction coefficient is -2.321 ($p<0.05$; Table 24). Taken together, these estimates imply that longer in-firm time is associated with weaker growth for FCEOs than NFCEOs, even though the NFCEO slope itself is not statistically different from zero. This is consistent with the descriptive comparisons in Section 5.3, which showed no systematic growth premium at higher in-firm time.

For profitability (ROA), the main effect of in-firm time is not statistically significant for NFCEOs (coefficient=0.079, $p>0.10$; Table 25), whereas the founder moderation is marginally negative (coefficient=-0.678, $p<0.10$; Table 25). Thus, there is no evidence that longer in-firm time improves ROA on average, and weak evidence that the association is less favourable under FCEO leadership.

In summary, the Model 8 estimates provide no evidence that longer in-firm time raises ΔSR or ROA on average, and they indicate a negative FCEO moderation for both outcomes (significant for ΔSR and marginal for ROA). Considered alongside the exploratory analysis, these results suggest that greater in-firm embeddedness does not generally translate into superior contemporaneous performance and may be associated with diminishing returns to growth under FCEO leadership.

5.4.6 Impact of CEO tenure on firm growth (Hypothesis 3)

Before evaluating the results for Hypothesis 3, it is useful to distinguish in-firm time (Hypothesis 2d) from tenure (Hypothesis 3). In-firm time denotes the share of a CEO's career spent in the focal firm and captures accumulated firm-specific socialisation and knowledge, whereas tenure refers to the years served in the CEO role and reflects the period of active strategic leadership.

Hypothesis 3 examines whether the association between tenure and performance differs between FCEOs and NFCEOs. Model 2 evaluates this by including an interaction term between founder status and tenure, alongside firm and year fixed effects and the full set of controls (see Tables 24 and 25).

For growth (ΔSR), the estimates do not indicate a statistically detectable association with tenure for either group, or a founder-specific differential. In Model 2, the tenure coefficient (NFCEO baseline) is -0.001 ($p>0.10$, Table 24) and the founder×tenure interaction is -0.003 ($p>0.10$, Table 24).

For profitability (ROA), the main effect of tenure is small and only weakly supported, and the interaction is not significant. In Model 2, the tenure coefficient -0.001 ($p<0.10$, Table 25) and the founder×tenure interaction is 0.000 ($p>0.10$, Table 25). Thus, there is modest evidence of a slight average decline in ROA with longer tenure, but no indication that this association differs for FCEOs.

In summary, the Model 2 estimates do not support Hypothesis 3 with respect to ΔSR, and they indicate only a weak, non-founder-specific association for ROA. Taken together with the exploratory analysis, these findings suggest that time in the CEO role, in and of itself, does not systematically enhance contemporaneous growth or profitability in this sample.

5.5   Contextual factors in firm performance

This section considers firm-level characteristics that shape performance but are not the direct focus of the hypotheses. The objective is to situate the CEO-related findings within broader structural features, most notably firm age (addressed in Section 5.5.1) and firm size (addressed in Section 5.5.2), that provide context for interpreting the results reported above. We summarise fixed-effects estimates and, where relevant, founder interaction terms (Tables 24 and 25), with descriptive patterns documented in Section 5.3.

5.5.1   Firm age and performance context

This section examines whether firm age is associated with growth (ΔSR) and profitability (ROA), and whether any such associations differ between FCEO and NFCEO-led firms. Consistent with the approach throughout this chapter, we report firm fixed effects estimates and, where relevant, interactions with founder status (Tables 24 and 25). A supplementary specification using age brackets (Models 3a/3b; Table 27) is referenced where appropriate.

For growth (ΔSR), firm age is negatively and statistically significantly associated with performance. In Model 3, the firm-age coefficient is -0.091 ($p<0.01$, Table 24), indicating that, ceteris paribus, older firms grow more slowly. The founder×firm age interaction in Model 3 is -0.046 ($p>0.10$, Table 24), providing no evidence that the age–growth association differs systematically between FCEO- and NFCEO-led firms. Read alongside Section 5.3, where descriptive comparisons showed lower

central growth tendencies in older firms, the multivariate results confirm that the age penalty in growth persists when time-invariant firm heterogeneity and observed covariates are controlled.

Turning to profitability (ROA), firm age is also negatively and statistically significantly associated with outcomes in the continuous-age specification. In Model 3, the coefficient is -0.016 ($p<0.01$, Table 25), while the founder×firm age interaction is -0.015 ($p>0.10$, Table 25). Thus, profitability tends to be lower in older firms on average and there is no reliable founder-specific differential in this association in the baseline specification.

Using firms younger than ten years as the base category, the bracket specifications (Models 3a/3b; Table 27) corroborate the continuous-age results for growth. In Model 3b, each older bracket is associated with lower ΔSR relative to the base (10 to 19 years: coefficient=-0.049, $p<0.01$; 20 to 29: coefficient=-0.081, $p<0.01$; 30 to 39: coefficient=-0.118, $p<0.01$; 40 to 49: coefficient=-0.132, $p<0.01$) and Model 3a (without interactions) yields the same sign pattern with similar magnitudes. Founder interactions in Model 3b indicate that this age-related growth penalty is more pronounced in some brackets (10 to 19 years: coefficient=-0.072, $p<0.05$; 20 to 29: coefficient=-0.091, $p<0.05$; 40 to 49: coefficient=-0.378, $p<0.01$) whilst the 30 to −39 bracket is not significant ($p>0.10$).

For ROA, the bracket effects are also negative relative to the base (e.g., 30 to 39 years: coefficient=-0.023, $p<0.05$; 40 to 49: coefficient=-0.022, $p<0.10$; Model 3b) and founder interactions are not statistically significant across brackets (all $p>0.10$). Taken together, the bracket results reinforce the main conclusion that age is negatively associated with growth and profitability, with founder moderation appearing in some, but not all, growth brackets.

In summary, the fixed-effects results indicate a robust negative association between firm age and both growth (ΔSR) and profitability (ROA) in the continuous-age models, with no systematic FCEO differential. The bracket specifications (Models 3a/3b) corroborate this pattern and suggest that the age‑growth penalty is more pronounced in some older cohorts (notably 10 to 19, 20 to 29 and 40 to 49 years), though not uniformly so, whilst founder interactions for ROA are not statistically significant.

5.5.2   Firm size and performance dynamics

Model 4 examines the role of firm size, operationalised as the natural logarithm of the number of employees, in shaping firm performance. Although not tied to a specific hypothesis, this specification provides context for interpreting CEO-related effects alongside structural characteristics of the firm (Tables 24 and 25), with descriptive patterns documented in Section 5.3.

For growth (ΔSR), firm size is negatively and statistically significantly associated with performance. In Model 4, the coefficient on size is -0.106 ($p<0.01$, Table 24), indicating that larger firms grow more slowly in relative terms, ceteris paribus. This pattern is consistent across specifications

and aligns with the descriptive comparisons in Section 5.3, which showed lower central growth tendencies at larger scales.

For profitability, the association with size is likewise negative and statistically significant. In Model 4, the coefficient is -0.029 ($p<0.01$, Table 25) indicating that, on average, larger firms realise lower accounting returns once controls and firm/year fixed effects are taken into account. The founder×firm size interaction is marginally positive in Model 4 (coefficient=0.009, $p<0.10$, Table 25), but founder interactions are not systematic across specifications and do not alter the overall negative association between size and ROA.

In summary, firm size operates as a broad structural correlate of performance in this sample: larger firms exhibit lower relative growth (ΔSR) and lower profitability (ROA) in the fixed-effects models, with no consistent evidence that these associations depend on CEO origin. These results complement the CEO-focused analyses by situating observed leadership effects within persistent scale-related constraints.

5.6   Robustness: Propensity score matching

This subsection assesses robustness to non-random assignment of founder leadership by comparing founder-led firm-years with matched non-founder firm-years. Matching is based on the estimated propensity to be founder-led using firm size, squared firm age, years as CEO, in-firm time and CEO level indicators for industry experience, functional knowledge, education level and education or training. One-to-one nearest-neighbour matching with replacement[14] is implemented on the common support, a choice recommended when treated and control propensity-score distributions differ and when reducing bias is prioritised over variance, since replacement allows good controls to be reused (Rosenbaum and Rubin, 1983; Caliendo and Kopeinig, 2008; Stuart, 2010). This configuration is widely used in applied programme-evaluation settings and aligns with large-sample properties of matching estimators (Abadie and Imbens, 2006). Propensity-score overlap plots are shown in Figures E1 and E2 (Appendix E).

Covariate balance improves materially after matching. The mean standardised bias falls from 60.6 to 17.8 and the median from 52.3 to 18.7. The pseudo-R^2 from the propensity-score model declines from 0.422 to 0.035 and the LRχ^2 from 1655.24 to 60.13, indicating that covariates explain far less of treatment assignment in the matched sample. These diagnostics are standard for assessing balance in propensity-score designs and their interpretation follows established guidance that emphasises reductions in standardised differences, pseudo-R^2 and model χ^2 after matching (Caliendo

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[14] Caliper restrictions were examined during specification testing. A 0.2 SD caliper on the logit of the propensity score improved mean balance in some covariates but reduced matched sample size and increased variance. Replacement without a caliper delivered superior overall balance while preserving effective sample size, consistent with guidance in Caliendo and Kopeinig (2008) and Stuart (2010).

and Kopeinig, 2008; Austin, 2009; Stuart, 2010). Summary balance statistics and the standardised-difference plot appear in Table E1 and Figure E3 (Appendix E), respectively.

Average treatment effects on the treated (ATET) are consistent with the fixed-effects results. For ΔSR, the estimate is positive and statistically significant (ATET=0.053, z=2.88, *p*=0.004; Table E3). For ROA, the estimate is negative and not statistically significant (ATET=-0.156, z=−0.92, *p*>0.10; Table E3). Full ATET estimates and confidence intervals are reported in Table E3 and the underlying selection model is presented in Table E2 (Appendix E).

5.7 Robustness: Productivity

We assess labour productivity measured by ROP (sales revenue per employee) as a robustness check. As explained earlier in this thesis, employment enters the main specifications as a covariate and forms the denominator of ROP, which raises concerns about conditioning on a post-treatment quantity. Accordingly, ROP is not included in the propensity-score matching analysis and inferences are drawn cautiously from descriptive comparisons and fixed-effects panel estimates reported here.

5.7.1 Descriptive robustness (bivariate)

Building on these cautions, this subsection examines ROP descriptively as a robustness check on the main findings. The figures replicate the exploratory comparisons for Hypothesis 1, Hypotheses 2a to 2d, Hypothesis 3 and the contextual variables, but focus specifically on whether the founder-related patterns identified for growth extend to labour productivity. Across these comparisons, the descriptive evidence shows muted differences and substantial overlap, suggesting that the founder effect observed for ΔSR does not operate through contemporaneous productivity per employee.

Figure 39 reports average ROP by CEO origin. Mean productivity is very similar for FCEOs and NFCEOs, with only a negligible gap. Read alongside the positive founder differential in ΔSR, this pattern indicates that higher growth in founder-led firms is unlikely to be an artefact of systematically higher labour productivity within the period; any founder effect appears to operate primarily through the expansion margin rather than productivity per head.
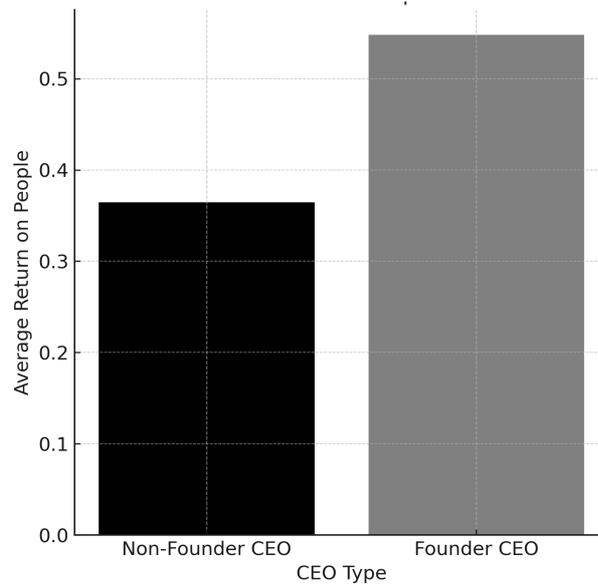
Figure 39 - Average ROP by CEO type

Figure 40 presents the ROP time series by CEO type. Both FCEOs and NFCEOs follow a relatively flat trajectory with minor fluctuations and no sustained divergence, reinforcing the absence of a systematic productivity premium associated with founder leadership over time. Figure 41, which displays the distribution of ROP by CEO type, shows substantial overlap in interquartile ranges and no pronounced tails, confirming that productivity is not descriptively differentiated by CEO origin.
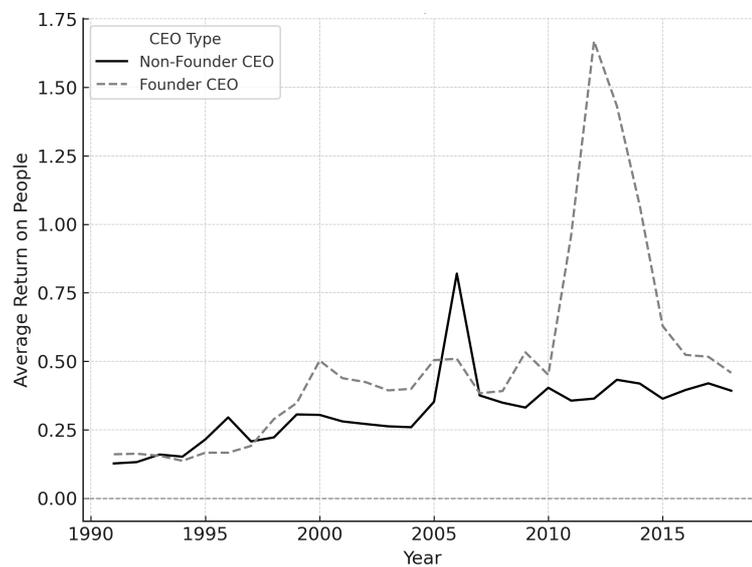
Figure 40 - ROP over time by CEO type
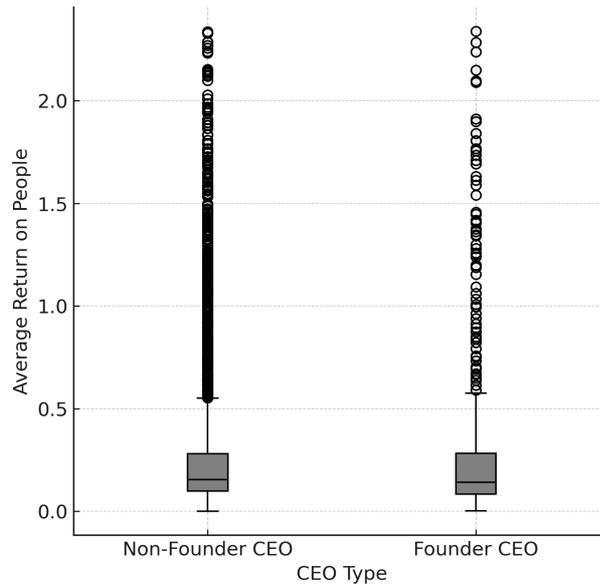
Figure 41 - Distribution of ROP by CEO type

Turning to the human capital moderators (Hypotheses 2a to 2c), Figures 42 and 43 show ROP by CEO education level and its distribution. Productivity is broadly similar across education categories for both FCEOs and NFCEOs, with no consistent pattern suggesting that higher formal qualifications translate into higher labour productivity. Figure 44 reports average ROP by CEO type and functional-knowledge category, and Figure 45 presents ROP by CEO type and industry experience. In both cases, mean differences are small and unsystematic, offering no descriptive indication that functional qualifications or prior industry experience generate distinct productivity outcomes for founder or non-founder-led firms.
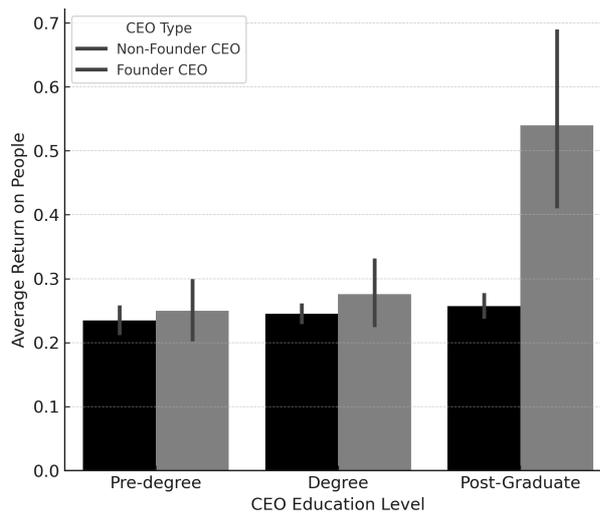
Figure 42 - ROP by CEO education level
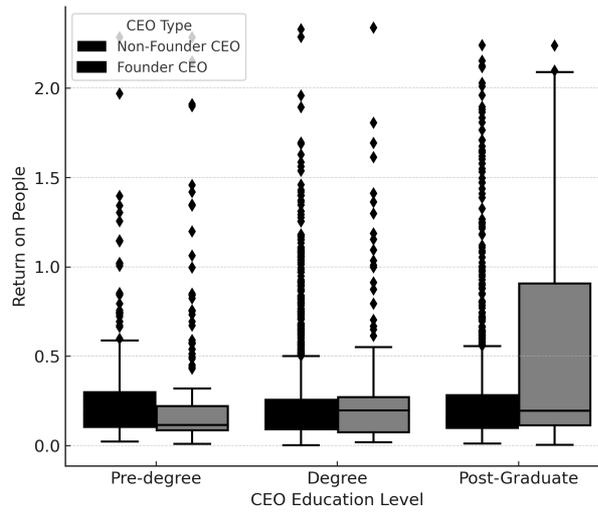
Figure 43 - Distribution of ROP by CEO education level
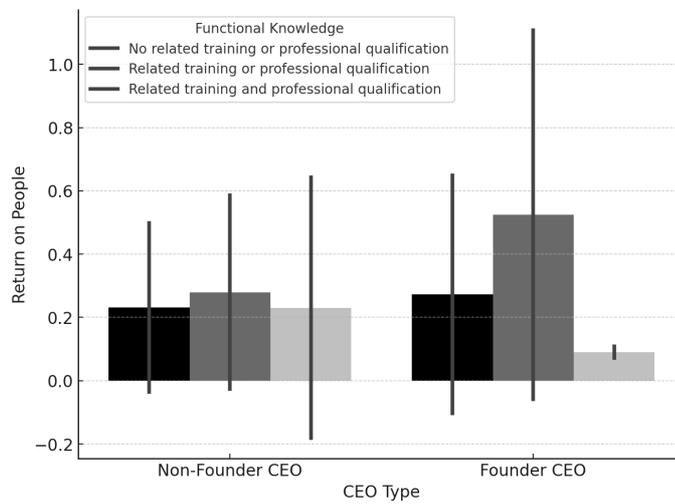
Figure 44 - Average ROP by CEO type and functional knowledge
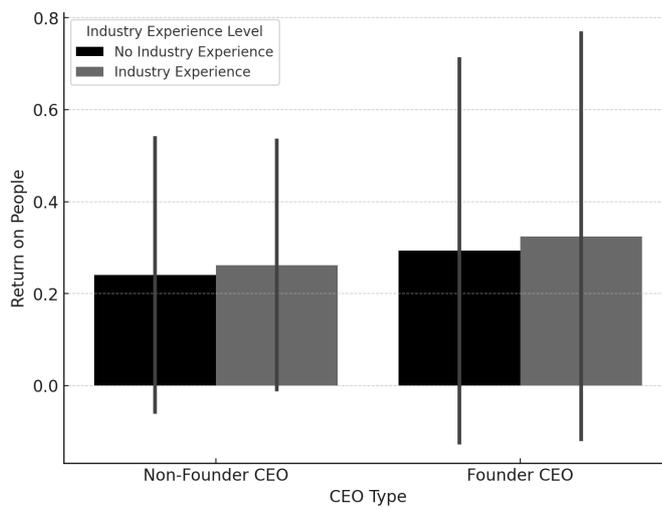
Figure 45 - Average ROP by CEO type and industry experience

Figure 46 examines in-firm time (Hypothesis 2d) by contrasting ROP for CEOs with shorter versus longer shares of their career spent in the focal firm. No stable pattern emerges for either FCEOs or NFCEOs, indicating that deeper in-firm embeddedness is not clearly associated with productivity differences per employee. Figure 47 plots ROP against CEO tenure (Hypothesis 3). FCEOs exhibit somewhat higher productivity in early tenure and greater volatility at longer tenures, while NFCEOs display a flatter profile. Given the absence of strong, monotonic trends and the results from the regression analysis, these visual patterns are treated cautiously and are not interpreted as evidence of systematic tenure–productivity effects.
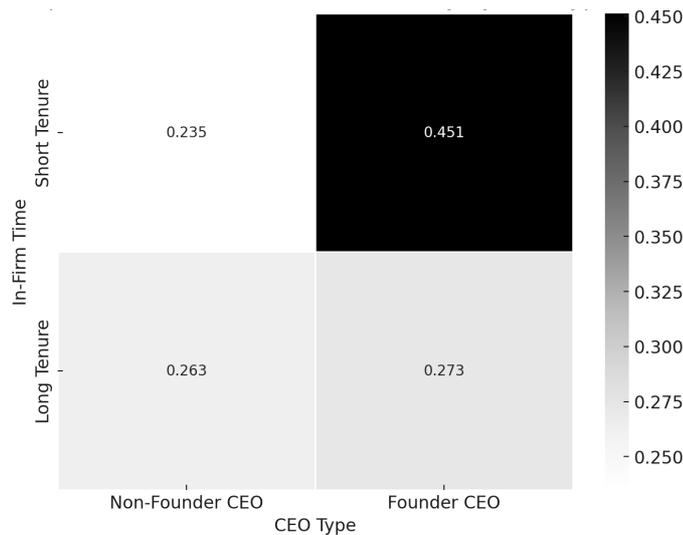
Figure 46 - Impact of in-firm time on ROP by CEO type
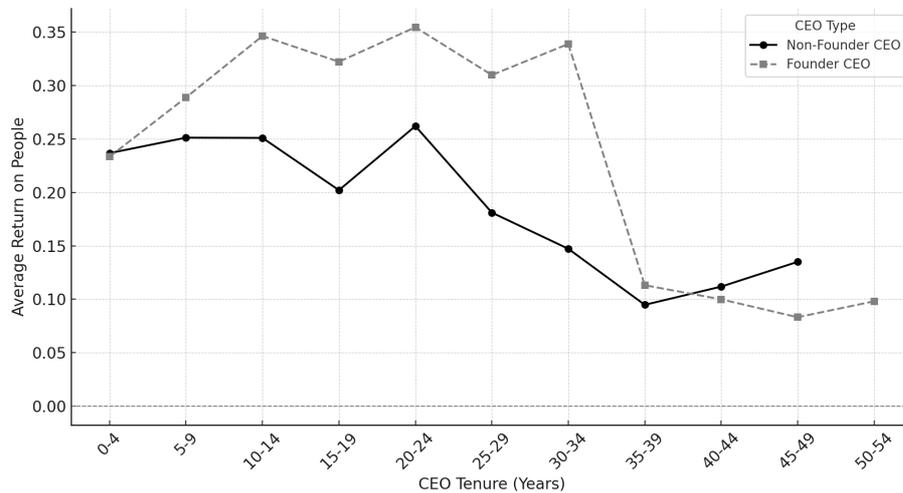
Figure 47 - CEO tenure versus ROP

Finally, the contextual figures extend the check to firm age and firm size. Figure 48 shows average ROP across firm-age bands by CEO type. Productivity remains relatively stable across age categories with only minor variation and no consistent founder–non-founder separation, suggesting that firm age is not a major determinant of labour productivity in this setting. Figure 49 reports ROP

across firm-size groups and CEO types. There is a slight tendency for larger firms to exhibit higher ROP, but the gradient is modest and does not yield marked separation between FCEOs and NFCEOs; any scale-related productivity gains appear broadly similar across leadership origins.
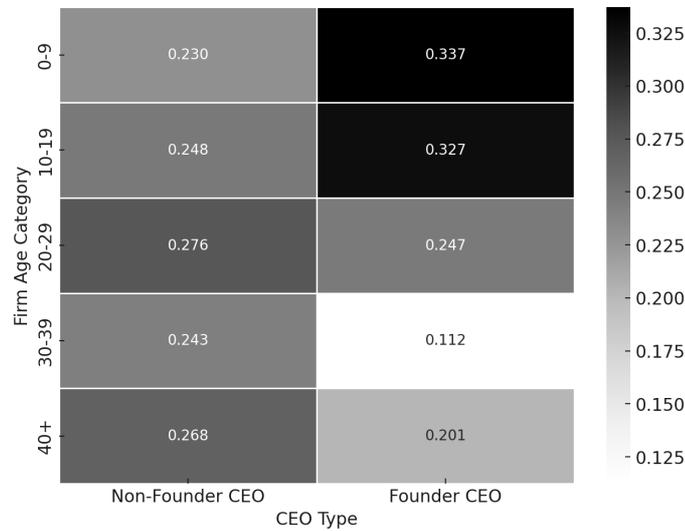
Figure 48 - Firm age and ROP by CEO type
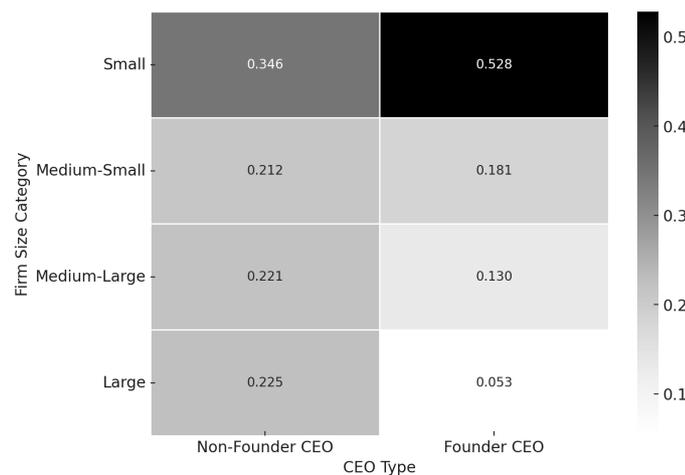
Figure 49 - Firm size and ROP by CEO type

Taken together, the descriptive robustness checks indicate that the founder-related growth premium documented in earlier sections does not coincide with a contemporaneous productivity premium. The ROP patterns are muted, overlapping and largely invariant to CEO origin, human capital markers and contextual factors, which supports the interpretation that, within the period examined, founder effects operate primarily through revenue growth rather than through higher labour productivity.

Variable/test	Return on people							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Regression analysis:								
Sales revenue[1]	0.229***	0.229***	0.228***	0.229***	0.229***	0.230***	0.229***	0.229***
	(0.051)	(0.051)	(0.050)	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Founder CEO	0.007	0.018	-0.003	0.000	0.002	0.025	-0.003	0.071
	(0.028)	(0.040)	(0.041)	(0.193)	(0.064)	(0.062)	(0.057)	(0.079)
CEO age[2]	-0.010	-0.011	-0.011	-0.010	-0.010	-0.014	-0.010	-0.008
	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Female CEO	0.000	0.001	0.000	0.001	0.000	-0.001	-0.000	0.010
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)	(0.018)
Level of CEO education:								
Pre-degree	0.002	0.001	0.002	0.002	0.002	0.007	0.002	0.000
	(0.025)	(0.025)	(0.025)	(0.025)	(0.024)	(0.026)	(0.025)	(0.024)
Degree[3]								
Post-graduate	-0.003	-0.002	-0.003	-0.003	-0.003	-0.000	-0.003	0.001
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
Founder x level of education interaction:								
Pre-degree					0.001			
					(0.072)			
Degree[3]								
Post-graduate					0.022			
					(0.066)			
CEO education/training background:								
Generic	-0.037	-0.035	-0.037	-0.036	-0.036	-0.036	-0.036	-0.039
	(0.029)	(0.029)	(0.029)	(0.030)	(0.030)	(0.031)	(0.030)	(0.028)
Education	-0.010	-0.010	-0.011	-0.010	-0.010	-0.021	-0.010	0.012
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.022)	(0.024)	(0.021)
Arts	0.004	0.003	0.004	0.004	0.004	0.002	0.004	0.000
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)
Social science	-0.015	-0.016	-0.015	-0.015	-0.016	-0.008	-0.015	-0.016
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)
Business[3]								
Natural science	-0.007	-0.007	-0.007	-0.007	-0.007	-0.004	-0.007	-0.005
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)
Information and communiction technology	0.005	0.004	0.004	0.005	0.005	0.011	0.001	-0.005
	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.026)	(0.022)	(0.019)
Engineering	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.004
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.021)	(0.022)
Agriculture	-0.000	0.002	-0.000	-0.000	-0.000	-0.004	0.002	-0.006
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.030)	(0.028)	(0.032)
Health	-0.006	-0.007	-0.002	-0.006	-0.010	-0.040	-0.006	-0.001
	(0.033)	(0.032)	(0.035)	(0.033)	(0.030)	(0.037)	(0.033)	(0.036)
Services	0.036	0.036	0.035	0.036	0.035	0.031	0.037	0.030
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.032)	(0.033)	(0.044)
Founder x education/training interaction:								
Generic						-0.042		
						(0.074)		
Education[4]								
Arts[5]								
Social science						-0.296**		
						(0.137)		
Business[3]								
Natural science						-0.060		
						(0.068)		
Information and communiction technology						-0.074		
						(0.054)		
Engineering						0.004		
						(0.110)		
Agriculture[4]								
Health						0.056		
						(0.079)		
Services[4]								
Length of tenure as CEO[6]	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Founder x length of tenure[6] interaction		-0.001						
		(0.002)						

Variable/test	Return on people							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of employees[6]	-0.238***	-0.237***	-0.238***	-0.238***	-0.238***	-0.238***	-0.238***	-0.239***
	(0.047)	(0.047)	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.047)
Founder x number of employees[7] interaction				0.001				
				(0.023)				
Firm age[2]	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.005
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Founder x firm age[2] interaction			0.011					
			(0.026)					
CEO functional knowledge						-0.009		
						(0.014)		
Founder x functional knowledge interaction						0.049		
						(0.059)		
CEO industry experience							-0.003	
							(0.012)	
Founder x industry experience interaction							0.015	
							(0.063)	
CEO in-firm time								0.643**
								(0.251)
Founder x in-firm time interaction								-1.211
								(1.143)
Constant	0.795***	0.794***	0.808***	0.797***	0.796***	0.812***	0.799***	0.769***
	(0.102)	(0.102)	(0.115)	(0.097)	(0.101)	(0.103)	(0.103)	(0.102)
Joint *F*-tests:								
Demographic[8]	0.523							
	(0.667)							
Education [9]	0.884							
	(0.414)							
Firm characteristics [10]	41.950							
	(0.000)							
All variables [11]	14.830							
	(0.000)							
Founder x tenure interaction		1.416						
		(0.244)						
Founder x firm age interaction			0.113					
			(0.893)					
Founder x firm size interaction				13.273				
				(0.000)				
Founder x education level interaction					0.12			
					(0.887)			
Founder x training interaction						1.513		
						(0.173)		
Founder x functional knowledge interaction						0.672		
						(0.413)		
Founder x industry experience interaction							0.035	
							(0.852)	
Founder x in-firm time interaction								1.167
								(0.281)
Observations	4,091	4,091	4,091	4,091	4,091	4,091	4,081	4,091
R-squared	0.443	0.444	0.444	0.443	0.444	0.449	0.444	0.448
Number of id	340	340	340	340	340	340	340	340

Notes:
All models are estimated using a fixed-effects (FE) estimator
Robust standard errors, in parentheses, are clustered at the firm level to account for within-firm error correlation.
*** p<0.01, ** p<0.05, * p<0.1
[1] Lagged natural log
[2] Variable rescaled from years to decades
[3] Base level of factor variable due to being largest category
[4] No observations in sample
[5] Omitted due to collinearity
[6] Variable rescaled from months to years
[7] Natural log
[8] Includes founder CEO, CEO age and female CEO variables
[9] Includes level of CEO education and CEO education/training background variables
[10] Includes firm age and number of employees variables
[11] Includes sales revenue, founder CEO, CEO age, female CEO, level of CEO education, CEO education/training background, length of tenure as CEO, firm age and number of employees variables

Table 27 – Fixed-effects regression results for ROP with joint *F*-tests of key variable groups – Models 1 to 8

5.7.2 Multivariate robustness (fixed effects)

This subsection reports fixed-effects panel estimates for ROP. Specifications mirror those used for ΔSR and ROA, with firm and year fixed effects, firm-clustered standard errors, and controls for firm size (ln employees) and firm age. CEO covariates are introduced sequentially, and interaction terms implement the moderation hypotheses. Given that employment is both a covariate and the denominator of ROP, these estimates are interpreted cautiously and are not treated as primary outcomes. Results are presented in Table 27 (Models 1 to 8) and Table 28 (age brackets, Models 3a and 3b).

Variables	Return on people	
	Model 3a	Model 3b
Sales revenue[1]	0.076***	0.076***
	(0.016)	(0.017)
Founder CEO	0.021	0.021
	(0.025)	(0.033)
Firm age range:		
<10 years[2]		
10-19 years	-0.002	-0.004
	(0.016)	(0.016)
20-29 years	0.041	0.045
	(0.027)	(0.027)
30-39 years	0.068*	0.075**
	(0.035)	(0.035)
40-49 years	0.085**	0.090**
	(0.040)	(0.040)
Founder and firm agerange interaction:		
<10 years[2]		
10-19 years		0.017
		(0.047)
20-29 years		-0.043
		(0.055)
30-39 years		-0.099*
		(0.053)
40-49 years		-0.083
		(0.055)
Constant	-0.248**	-0.246**
	(0.097)	(0.098)
Observations	4,285	4,285
R-squared	0.169	0.171
Number of id	344	344

Notes:
All models are estimated using a fixed-effects (FE) estimator
Robust standard errors, in parentheses, are clustered at the firm level to account for within-firm error correlation.
*** p<0.01, ** p<0.05, * p<0.1
[1] Lagged natural log
[2] Base level of factor variable due to being largest category

Table 28 – Fixed-effects regression results for ROP - Models 3a and 3b

In relation to Hypothesis 1, there is no statistically significant founder difference in ROP (coefficient=0.007, $p>0.10$; Table 27). Taken together with the main ΔSR results, this indicates that the founder growth premium does not reflect a contemporaneous productivity (per-employee) premium.

For Hypothesis 2a (education), the estimates show no systematic association between education level and ROP, and no meaningful founder moderation. In Model 1, pre-degree has a coefficient of 0.002 ($p>0.10$; Table 27) and post-graduate -0.003 ($p>0.10$; Table 27); in Model 6, pre-degree=0.007 ($p>0.10$; Table 27) and post-graduate=-0.000 ($p>0.10$; Table 27). Founder interactions in Model 5 (founder×pre-degree=0.001, founder×post-graduate=0.022, both $p>0.10$; Table 27) are likewise not significant.

For Hypothesis 2b (functional knowledge), there is no systematic relationship with ROP and no evidence of founder moderation. In Model 6, the functional-knowledge coefficient is -0.009 ($p>0.10$; Table 27) and founder×functional knowledge=0.049 ($p>0.10$; Table 27).

For Hypothesis 2c (industry experience), ROP is not significantly related to industry experience, and the association does not differ by CEO origin. In Model 7, industry experience has a coefficient of -0.003 ($p>0.10$; Table 27) and founder×industry experience=0.015 ($p>0.10$; Table 27).

For Hypothesis 2d (in-firm time), the results indicate a positive association between in-firm time and ROP for NFCEOs in Model 8 (coefficient=0.643, $p<0.05$; Table 27), while the founder×in-firm time interaction is not statistically significant (coefficient=-1.211, $p>0.10$; Table 27). Thus, productivity appears to increase with in-firm embeddedness among NFCEOs, but there is no reliable evidence that this slope differs for founders.

For Hypothesis 3 (tenure), there is no evidence of an association between CEO tenure and ROP and no founder differential. In Model 2, the tenure coefficient is 0.001 ($p>0.10$; Table 27) and founder×tenure=-0.001 ($p>0.10$; Table 27).

Turning to contextual factors, the continuous-age specification (Model 3, Table 27) shows no significant association between firm age and ROP (coefficient=0.003, $p>0.10$) and no significant founder×firm age interaction (coefficient=0.011, $p>0.10$). In the age-bracket specification (Table 28), older cohorts exhibit modestly higher ROP (30 to 39 years: coefficient=0.075, $p<0.05$; 40 to 49 years: coefficient=0.090, $p<0.05$; Model 3b). Founder interactions are generally not significant (all $p>0.10$) aside from a marginal negative effect in the 30 to 39-year bracket (coefficient=-0.099, $p<0.10$; Model 3b).

For firm size, ROP is negatively associated with size (coefficient=-0.238, $p<0.01$; Model 4, Table 27) and the founder×size interaction is not significant (coefficient=0.001, $p>0.10$; Model 4, Table 27), indicating no differential size–productivity relationship by CEO origin.

Overall, across Models 1 to 8 and the age-bracket extensions (Models 3a and 3b), the fixed-effects results provide no evidence of a founder productivity premium. The main patterns are a positive association between in-firm time and ROP for NFCEOs, a negative association between firm size and ROP and modest increases in ROP in some older age brackets, none of which display

consistent founder-specific differences. Taken together with the descriptive evidence in Section 5.7.1, these findings support the conclusion that the founder differential documented for growth (ΔSR) does not extend to contemporaneous labour productivity within the study period.

Chapter 6

Discussion

This chapter interprets the empirical findings in relation to the study's research questions and the core frameworks of Penrosean theory, the RBV and UET. It re-examines the founder effect as primarily growth-oriented rather than universal across performance dimensions and shows how its expression is conditioned by organisational age and size, by patterns of founder embeddedness (in-firm time versus tenure) and by the bounded influence of generic CEO human-capital markers. In doing so, it clarifies when founder leadership is most likely to translate into observable outcomes and when structural constraints and path dependence limit its impact.

Building on this synthesis, the chapter identifies the main theoretical contributions, including a more precise specification of the mechanisms and boundary conditions through which FCEOs act as growth catalysts. It then develops the practical implications for boards, investors, founders and policymakers in areas such as governance design, succession, top-team configuration and performance measurement. The chapter concludes by acknowledging the study's limitations and outlining priorities for future research on long-horizon founder effects and context-dependent CEO influence.

6.1   Aligning findings with hypotheses and literature

This chapter situates the findings of the study within the theoretical foundations outlined in earlier chapters. The aim is to reflect on the study's results in relation to the guiding research questions and conceptual model, as well as to critically analyse these outcomes considering the existing literature. By doing so, this discussion situates the findings within broader theoretical and practical contexts. Key themes emerging from the analysis, such as the unique contributions of FCEOs, the moderating roles of human capital attributes and the critical influence of firm characteristics like size and age, are explored in depth.

The chapter also focuses on the theoretical implications and practical applications of the study's findings. It critically analyses the relationships between FCEOs and firm performance, framed by Penrosean theory (Penrose, 1959), the RBV (Wernerfelt, 1984; Barney, 1991) and UET (Hambrick and Mason, 1984). The discussion also emphasises the role of firm-specific contextual factors, such as size and age, which emerged as significant contextual factors in understanding the dynamics of CEO leadership. Finally, the chapter outlines the limitations of the research and suggests directions for future inquiry.

6.2   Revisiting findings in light of the literature

The evidence points to a founder growth premium without a contemporaneous profitability premium, which aligns with accounts of managerial services and resource mobilisation in Penrose and with upper

echelons reasoning about how executives shape outcomes. This section revisits the results in the light of the literature, using Penrose's growth logic as the primary frame and UET and RBV to interpret the CEO channels and resource conditions. Two themes organise the discussion. First, the founder effect observed here is growth-centred rather than universal across performance metrics. Second, the translation of CEO attributes into firm outcomes is contingent on organisational context, particularly age and scale, which shape managerial discretion, information flows and adjustment costs, as discussed by Penrose (1959), Stinchcombe (1965), Porter (1985), Wernerfelt (1984), Barney (1991) and Peteraf (1993). The following subsections consider founder leadership (6.2.1), CEO human capital (6.2.2), embeddedness via within firm socialisation and time in office (6.2.3) and the structuring effects of age and size (6.2.4). As an additional robustness check, the propensity score matching preserves the founder growth premium while showing no profitability difference, consistent with the fixed-effects estimates (see Appendix E).

6.2.1 Founder leadership and growth

The finding that founder leadership is associated with stronger revenue growth (see Table 24), but not with a premium in profitability (Table 25) is theoretically coherent. FCEOs are argued to imprint strategic posture (entrepreneurial search, opportunity capture and risk acceptance) onto organisations (Hambrick and Mason, 1984; Barker and Mueller, 2002; Shane and Venkataraman, 2000). These mechanisms are most likely to surface first in the top line, because experimentation and market development precede the accumulation of process capabilities required for efficiency gains. The absence of a contemporaneous ROA premium therefore qualifies stronger claims of an all-round founder advantage and accords with the trade-off between exploration and short-run efficiency highlighted in the strategy and resources literatures (Penrose, 1959; Barney, 1991; Peteraf, 1993). From an agency perspective, concentrated founder ownership and identity may dampen classic agency frictions (Jensen and Meckling, 1976), but the behaviours it enables, such as aggressive investment and rapid scaling, need not improve near-term accounting returns (Quigley and Hambrick, 2014). This pattern also sits comfortably with evidence that CEO effects are bounded by organisational conditions (Quigley and Hambrick, 2014) and with the observation that founder imprinting moves growth more readily than contemporaneous efficiency. Read through a dynamic capability's lens, this pattern is consistent with sensing and seizing affecting the top line before reconfiguration is completed, as discussed by Teece *et al.*, (1997) and Eisenhardt and Martin (2000).

A natural corollary is that performance impacts may be temporally sequenced. Penrose's (1959) view of growth as capability development suggests that growth generates learning demands which must be absorbed before efficiency is realised. In resource-based terms, advantage rests on the progressive accumulation and alignment of valuable, rare and inimitable capabilities (Barney, 1991; Peteraf, 1993). This view implies that accumulation is path dependent and unlikely to be contemporaneous with the initial growth impulse. The lack of an immediate profitability premium in our setting can, therefore, be

read as a timing phenomenon rather than a contradiction and would suggest founder leadership expands the opportunity set, whilst efficiency gains mature as routines and coordination mechanisms are subsequently embedded.

6.2.2 CEO human capital: when and why does it travel?

Across levels of education, functional knowledge and industry experience, direct performance effects are weak once firm heterogeneity is absorbed, and founder interactions are not robust (Tables 24 and 25). Upper-echelons perspectives and related work on managerial skills anticipate this pattern when the indicators employed are generic rather than tailored to the firm's task environment (Hambrick and Mason, 1984; Becker, 1993). From a resource-based standpoint, performance follows when capabilities are valuable in situ and hard to imitate (Barney, 1991; Peteraf, 1993). Broad markers (e.g., highest degree) are, by construction, portable and widely observable; they are, therefore, poor proxies for the idiosyncratic complementarities that underpin advantage. Selection dynamics reinforce this attenuation whereby boards tend to hire CEOs whose observable credentials already fit the firm, so once firm fixed effects absorb unobserved capability baselines, the marginal return to generic markers is small. In settings where performance depends on the organisation's absorptive capacity, which might include its stock of problem-solving routines and ability to assimilate external knowledge, firm-level path dependence can dominate individual credentials (Cohen and Levinthal, 1990). The absence of robust founder differentials on these markers further implies that founder advantage derives less from formal credentials and more from path-creating authority, ownership and vision (Hambrick and Mason, 1984; Quigley and Hambrick, 2014).

A related issue concerns measurement granularity. The indicators available here capture general educational attainment or broad domains of experience, not the micro-complements between a CEO's specific expertise and a given firm's routines, technologies and markets. Under Penrose's (1959) growth logic and the RBV (Barney, 1991; Peteraf, 1993), it is precisely these often tacit, firm-specific complementarities that carry performance. The weak average effects we observe here are, therefore, consistent with theoretically expected measurement coarseness and suggest that CEO human capital creates value primarily when it is aligned with firm-specific architectures, rather than through generic traits alone.

6.2.3 Embeddedness: in-firm time versus tenure in office

Disentangling in-firm time (share of career within the focal firm) from tenure as CEO clarifies the role of embeddedness. The negative founder moderation for growth at higher in-firm time (see Table 24) fits arguments that deep socialisation can narrow search, reinforce existing coalitions and raise switching costs, thereby limiting strategic reconfiguration (Stinchcombe, 1965; Hambrick and Mason, 1984). By contrast, time in the CEO role shows no systematic association with growth and only a weak average link with profitability (Tables 24 and 25), indicating that it is where experience accumulates

(not simply how long one sits in the role) that conditions adaptive capacity. This asymmetry helps reconcile mixed findings in the tenure literature and helps to explain how firm-internal history can entrench schemas and alliances in ways that are distinct from learning-by-doing in the role (Hannan and Freeman, 1984; Quigley and Hambrick, 2014).

Seen through this lens, the governance question is less about imposing uniform tenure thresholds and more about maintaining variety of perspective. Board challenge, external scanning and top-team composition are mechanisms that widen the information set available to FCEOs and reduce the risks associated with over-embeddedness. The logic is consistent with Penrose's (1959) view of growth as the orchestration of diverse managerial services and with the upper-echelons emphasis on how executive experiences shape problem framing (Hambrick and Mason, 1984).

6.2.4 Context as structural drag: age and size

The literature on organisational life cycle and scaling points to bureaucratic frictions, coordination burdens and reduced discretion as firms age and grow (Penrose, 1959; Stinchcombe, 1965; Porter, 1985; Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). The results accord with this view as they show age is negatively related to growth and profitability in the continuous-age models and, additionally, the bracket analysis suggests that the age–growth penalty is stronger in some older cohorts (Table 27), albeit not uniformly so. Size is negatively related to growth and profitability (Tables 24 and 25). Together, these features imply that the conversion rate from CEO attributes to observable outcomes is state-dependent. In younger and smaller firms, founder discretion and opportunity pursuit are more readily expressed whereas in older and larger firms, systems dominate and the marginal impact of CEO-level traits on efficiency metrics is muted.

This state-dependence can also be read through the lens of capability accumulation. As firms scale, they develop more specialised routines and deeper asset positions which, whilst valuable, increase interdependencies and adjustment costs (Porter, 1985; Barney, 1991; Peteraf, 1993). The same structures that secure competitive advantage can therefore dampen the expression of executive discretion. In that sense, the finding that founder leadership moves top-line growth more readily than contemporaneous efficiency is not anomalous but characteristic of a context in which coordination complexity and path dependence shape what CEOs can accomplish at a point in time. As firms age and scale, reconfiguration demands rise and coordination becomes more costly, which dampens the expression of dynamic capabilities in the short run, consistent with Teece *et al*. (1997) and Eisenhardt and Martin (2000).

6.3   Key theoretical contributions

This section identifies the theoretical contributions that arise from the synthesis in Section 6.2, which was organised around Penrose as the primary lens and supported by UET and the RBV. Read

together, the evidence supports a founder centred effect on growth that is contingent on organisational age and scale. It clarifies the limited role of generic CEO human capital in this setting and specifies the conditions under which embedded experience constrains adaptation. The discussion is organised as refinements to upper echelons theory, to Penrosian and resource-based accounts of capability development, and to life cycle perspectives on constraint. These contributions rest on patterns that are robust to a matched comparison of founder and non-founder-led firm-years, which preserves the growth premium but not a profitability premium.

The first contribution is a reframing of the founder effect as a growth mechanism. The results support a founder premium in top line expansion while contemporaneous profitability does not display a corresponding premium. This profile is consistent with founder imprinting on search and opportunity capture as described by Hambrick and Mason (1984), Barker and Mueller (2002) and Shane and Venkataraman (2000). It is also consistent with the view that exploration and efficiency move on different clocks in Penrose (1959) and in the resource-based tradition in Barney (1991) and Peteraf (1993). In this sense, founders act as growth catalysts. They widen the opportunity set, commit to market development and accept risk. Efficiency gains then follow as routines are built and capabilities are aligned. This founder centred account qualifies broad assertions about universal CEO effects and locates the founder advantage in a specific performance channel that is theoretically coherent and empirically visible. It also aligns with evidence that CEO effects are bounded by organisational conditions as shown by Quigley and Hambrick (2014), thereby clarifying why founder imprinting moves growth more readily than contemporaneous efficiency.

The second contribution sets out the boundary conditions under which founders can express that growth mechanism. The evidence shows that age and size reduce the conversion of founder intent into outcomes. As organisations mature and grow, routines, coordination burdens and legacy assets become more binding, as discussed by Penrose (1959) on managerial services, by Stinchcombe (1965) on structural constraints and by Porter (1985) on the costs of coordination, with related arguments in the resource-based view from Barney (1991) and Peteraf (1993). The result is a state dependent founder effect. In younger and smaller firms, the discretion to pursue opportunities is greater. In older and larger firms, the same founder traits are filtered through systems that mute immediate efficiency changes. The theoretical claim is not that founders always outperform. It is that founder led advantage depends on organisational state.

The third contribution clarifies which founder attributes matter. The evidence shows that generic human capital markers such as levels of education, broad functional knowledge and industry experience have weak direct effects once firm heterogeneity is absorbed, and founder interactions on these markers are not robust. This is consistent with upper echelons theory as articulated by Hambrick and Mason (1984) and with the RBV in Barney (1991) and Peteraf (1993). It is also consistent with the role of absorptive capacity described by Cohen and Levinthal (1990), since the routines that enable the

assimilation and exploitation of knowledge are path dependent and firm level capability baselines can dominate individual credentials in shaping outcomes. Where founders create value it is through path creating authority, ownership and vision that is aligned with firm specific routines. The founder premium is therefore not credential driven. It is context and complementarity driven.

The fourth contribution distinguishes forms of founder embeddedness and links them to adaptation. In-firm time, defined as the share of a founder's career spent within the focal firm, captures the depth of within-firm socialisation and exposure to established routines and coalitions. By contrast, tenure in office reflects the duration for which the founder has formally occupied the CEO role, without necessarily indicating how extensively their prior career has been tied to the same organisation. The data shows that high in-firm time dampens the founder growth premium, while time in office does not display a comparable pattern once firm heterogeneity is controlled. This is consistent with Stinchcombe (1965), Hambrick and Mason (1984) and Hannan and Freeman (1984). The relevant point for theory is that where founder experience sits inside the organisation matters more than how long the founder has held the title. This distinction helps to explain why the tenure literature reports mixed results as studies that treat tenure as a proxy for embeddedness conflate conceptually different mechanisms. It also provides a founder-specific account of over embeddedness and aligns with evidence on bounded CEO effects in large, complex settings reported by Quigley and Hambrick (2014).

Taken together, these elements yield a single founder centred proposition. The conversion of founder attributes into observable outcomes depends on four interacting features. These are the discretion granted by age and size, the fit between founder traits and firm specific architectures, the locus of founder experience within the firm and the time required for capability accumulation to transmit initial growth effects into more durable performance outcomes. This resolves the apparent tension between a growth premium and the absence of an immediate profitability premium by framing founder influence as temporally and contextually contingent rather than universal. In doing so, it refines UET by specifying when founder effects are most likely to be observed, links Penrose's account of growth to resource-based mechanisms of capability development and it embeds both within a life cycle perspective on organisational inertia.

6.4 Key practical implications

The results have practical relevance for founders, boards, owners and investors. The aim in this section is to translate the growth-centred founder effect, the state dependence created by age and size, the limited average value of generic human-capital markers and the distinct roles of in-firm time and tenure into clear action for decision makers. The implications are organised across leadership choices, governance design, succession and selection, top-team architecture, performance measurement and external capital.

6.4.1 Implications for FCEOs

The evidence supports a founder premium in top-line expansion, while contemporaneous profitability does not show a corresponding premium. FCEOs should therefore plan explicitly for sequencing. Early phases should focus on market development and opportunity capture, followed by a deliberate shift into capability consolidation. This requires a staged operating plan that schedules investments in process, systems and managerial routines once growth initiatives have established traction. Founders should set expectations with boards and owners that efficiency gains are likely to arrive on a different timetable. Doing so reduces the risk that high-variance early performance is misread as under-performance rather than as the expected outcome of exploration.

The negative interaction between founder status and high in-firm time for growth indicates a practical risk from over-embeddedness. FCEOs can counter this by institutionalising external challenge and by widening the sources of information that inform strategic choices. Regular external reviews, the inclusion of independent non-executive directors with relevant market knowledge and structured exposure to customers and partners can offset narrowing effects, without requiring a change of CEO. Rotations across business units and time-bounded leadership of major change programmes also help to refresh perspective.

6.4.2 Implications for boards and owners

Boards should treat founder leadership as a growth mechanism and manage it as such. This implies the use of dual performance tracks. One track for growth outcomes, such as revenue run-rate, new market entries and share gains. A second track for efficiency outcomes, such as margin expansion and labour productivity, measured over a horizon that recognises capability build time. Linking incentives to both tracks with weightings that change over time helps to preserve discipline without discouraging exploration.

The state dependence created by age and size has consequences for oversight. In younger and smaller firms, the board's role is to support disciplined opportunity pursuit while guarding against unchecked risk. In older and larger firms, the board's role is to create space for reconfiguration by reducing coordination barriers and by simplifying decision rights where possible. In both cases boards should monitor in-firm time as a distinct signal of embeddedness and should calibrate the intensity of external challenge accordingly. Where in-firm time is high, boards can sponsor targeted injections of outside expertise rather than defaulting to the conclusion that overall tenure is the issue.

6.4.3 Succession and CEO selection

The weak average returns to generic human-capital markers in the fixed-effects models suggest that selection should prioritise complementarities with the firm's architecture over headline credentials. Boards should define the problem to be solved in terms of the organisation's state. In younger and

smaller firms, a founder successor or a successor with founder-like discretion and market building skill is likely to be effective. In older and larger firms' selection should emphasise capability to orchestrate change through complex systems and to convert established asset positions into sustained efficiency. Boards should, therefore, evidence fit through prior achievements that map to the firm's specific routines and markets rather than through generic indicators such as the highest degree held.

When evaluating internal founder transitions, boards should distinguish in-firm time from years in the role. Candidates with deep within-firm histories may require explicit counterweights in the TMT or board to offset narrowing effects. By contrast, candidates with shorter in-firm histories but sufficient exposure to the firm's interfaces may be better positioned to challenge established assumptions.

6.4.4 Top-team design and operating model

Given the sequencing from growth to efficiency, founder-led firms benefit from a top-team architecture that can pivot between exploration and consolidation. A practical design is to pair the FCEO with a senior operator (for example, COO or CFO) who leads capability build and routine formation once growth options have been proven. Clear decision charters and explicit divides between 'vision and search' versus 'systems and execution' help to convert founder intent into scalable processes without diluting accountability.

As age and size increase, programme structures that segment change into bounded workstreams with explicit interdependencies can lower coordination costs and preserve momentum. Boards should ensure that the top team combines founder knowledge with complementary skills in process design, data-informed decision-making and cross-functional integration so that growth initiatives are translated into durable improvements in profitability and operational discipline.

6.4.5 Performance measurement and incentives

Measurement should reflect the distinct clocks identified in the analyses. Near-term targets for growth should be balanced with medium-term targets for profitability and operational performance that allow time for capability maturation. Boards and founders can adopt a simple horizon structure: horizon one focused on current-year growth indicators; horizon two focused on profitability and operating metrics measured over a multi-year window that begins only after core growth initiatives are in place. This reduces the risk that growth investments are curtailed prematurely and aligns incentives with the expected trajectory of capability build.

Where labour productivity and related operating outcomes are a concern, managers should emphasise leading indicators of capability embedding such as adoption of new systems, cycle-time reductions and first-time-right measures, rather than relying solely on aggregate ratios. Such measures provide earlier, more interpretable feedback during periods of scale-up and are less sensitive to short-term fluctuations in revenue or headcount.

6.4.6 External capital and investor relations

Investors should be briefed using the same sequencing logic. Communications that distinguish clearly between growth progress and profitability/operational performance help external stakeholders to interpret interim volatility. In FCEO-led firms at earlier stages, updates should emphasise market learning, customer acquisition, pipeline quality and the credibility of growth options, while setting explicit milestones for when consolidation and margin improvement will be prioritised. As firms mature, the emphasis should shift towards the disciplined conversion of established positions into sustainable earnings, with clear reporting on programmes that address coordination frictions and cost discipline. Consistent signalling on this staged trajectory enables investors to align expectations with the firm's state, reducing pressure for premature optimisation while maintaining accountability for eventual financial performance.

6.4.7 Policy and ecosystem actors

Where policymakers or ecosystem bodies support FCEO-led firms, the results suggest that programmes which couple growth support with capability building are most likely to deliver durable performance. Support for export entry, procurement access and innovation should be paired with practical assistance on systems and process adoption. For more mature founder-led firms, advisory support that targets coordination and governance challenges is likely to have higher marginal benefit than generic training. Targeted interventions of this kind align public resources with the conditions under which founder leadership is most effective, rather than assuming a uniform founder advantage across all stages of firm development.

6.4.8 Summary of practice implications

In summary, the analyses indicate that founder leadership should be managed primarily as a growth mechanism, with an intentional shift over time toward consolidation and disciplined performance. Leadership configuration, governance arrangements and measurement systems need to reflect organisational age and size, with distinct horizons for short-run growth and medium-term profitability and capability development. Over-embeddedness requires deliberate mitigation through attention to in-firm time, supported by independent challenge and complementary executive roles. Selection and incentives should prioritise fit with firm-specific architectures and the demands of the firm's current stage, rather than relying on generic credentials or universal assumptions about founder advantage.

6.5 Empirical contributions

This study contributes a long-horizon view of founder leadership using a thirty-year longitudinal dataset. The length of the panel allows within-firm evolution to be observed across multiple macro and competitive regimes, which reduces the risk that results are driven by short windows. The LV decomposition presented earlier complements this by distinguishing systematic founder-related

variation from residual noise in growth and profitability, which indicates the outcome dimensions in which the effect is most evident. Together these features provide a stronger empirical basis for assessing whether founder effects are present and where they appear in practice, without restating the synthesis already provided in Section 6.2.

A further contribution arises from the identification strategy. Firm fixed effects absorb time-invariant unobserved heterogeneity at the firm level and the models incorporate CEO- and firm-level covariates with targeted interactions that are theoretically salient. This improves internal validity by exploiting within-firm variation over time rather than relying only on cross-sectional differences. Propensity-score matching provides a complementary check, preserving the founder premium in growth while showing no profitability premium (Appendix E). The approach yields evidence of a founder premium in growth and a more cautious reading for profitability, which helps to reconcile mixed findings when studies use single composite outcomes or shorter panels.

The study also refines measurement at the level of the CEO. In-firm time is distinguished from tenure in office, which improves empirical precision in a literature where tenure is often used as a proxy for embeddedness. The data shows that deeper within-firm socialisation is associated with a weaker founder–growth association, whereas years in the role do not display a comparable pattern once firm heterogeneity is controlled. This separation clarifies how embedded experience operates in founder-led settings and explains why studies that rely on tenure alone have reported mixed results.

In parallel, the study examines contextual moderators in a systematic way. Age and size are treated as continuous variables and, where appropriate, with brackets to probe non-linearities. The negative association of age and size with growth and profitability in this sample identifies organisational states in which founder leadership is more or less likely to translate into observable outcomes. This supplies disciplined evidence on boundary conditions rather than relying on narrative claims about maturity or scale.

The results also offer an empirical assessment of widely used human-capital markers at the top of the firm. Levels of education, broad functional knowledge and industry experience display weak average effects once firm fixed effects are included; interactions between founder status and these markers are likewise not robust. The contribution here is evidence-based. Generic markers are poor stand-ins for the complementarities that matter inside firms, which suggests that future work should prioritise measures that capture fit with firm-specific architectures rather than headline credentials.

Finally, the analysis is structured to align exploratory and inferential stages. The exploratory work in Chapter 5 documents distributions and patterns that motivate the models, and the fixed-effects regressions test the relationships while controlling for confounds. The alignment and the gaps between these stages are made explicit, which improves transparency and supports replication.

Taken together, these elements provide a clearer empirical baseline for studies of founder-led firms. The thirty-year panel, the LV decomposition and the fixed-effects identification show that founder effects are detectable on growth in this setting, that contemporaneous effects on profitability are not evident on average, that embeddedness needs to be measured within the firm as well as at the role level and that organisational state, in the form of age and size, conditions observed outcomes.

6.6   Summary of contributions

This chapter has shown that, in this setting, founder CEOs operate primarily as growth catalysts. Their effect is evident on top-line revenue growth but does not translate into a contemporaneous premium in profitability, with productivity evidence reinforcing this pattern on a robustness basis. The expression of this founder-related growth effect is conditioned by organisational age and size and is more visible in younger and smaller firms but increasingly constrained as firms mature and expand. Within-firm embeddedness further qualifies this pattern. High in-firm time weakens the association between founder status and growth, whereas tenure in the CEO role alone does not display a comparable effect once firm heterogeneity is controlled, underscoring the importance of where experience is accumulated rather than how long the title is held. Generic human-capital markers at CEO level exhibit limited average effects and indicate that what matters empirically is the alignment between founder attributes and firm-specific architectures. The chapter integrates these findings with the Penrosean, upper-echelons and resource-based frameworks developed in earlier chapters, supported by a thirty-year panel, LV decomposition and fixed-effects identification strategy and provides the platform for the limitations and future research directions set out in the next section.

6.7   Limitations and future research directions

While this study provides valuable insights into the relationship between FCEOs and firm performance, several limitations should be acknowledged. The findings reflect the characteristics of the firms and periods covered by the thirty-year panel, however, the composition of the sample and the institutional context may limit generalisability. External validity is bounded by the institutional setting of UK publicly listed firms operating under a single governance and reporting regime, so generalisation to private firms or to other jurisdictions should be made with care. Future research could test the scope of these results, by examining whether the patterns observed here are stable across other sectors and countries and different regulatory and technological regimes. Designs that allow finer comparison across industry lifecycles would help to separate founder effects from industry specific maturity effects and would clarify when founder leadership is most likely to influence outcomes.. We mitigate confounding using firm fixed effects and propensity score matching as summarised in Section 5.6 and detailed in Appendix E but residual risks from time varying shocks and reverse causality remain.

Although this study employs a robust thirty-year longitudinal dataset and a fixed effects identification strategy, the data available does not capture all dimensions of capability development or

strategic posture. Measures of organisational routines, coordination quality and absorptive capacity are necessarily indirect. Further work could draw on richer internal data on processes, decision rights and technology adoption. Linked datasets that combine financials with operational indicators and customer-level outcomes would allow a more detailed mapping from growth initiatives to subsequent improvements in profitability. Event-time designs that track the initiation and consolidation of substantial firm initiatives (such as enterprise-wide systems roll-outs, large product-platform launches, market entries, post-merger integrations or formal restructuring programmes) would provide additional insight into the strategic orientation of founder led firms.

Endogeneity remains a potential threat to inference. Fixed effects remove time invariant heterogeneity, and the matched comparison is reported in Appendix E, based on comparability on observables. However, unobserved time varying shocks and reverse causality in CEO transitions cannot be fully ruled out. Future research could follow founder appointments and departures in event time and use designs that exploit plausibly exogenous changes in governance or index membership to sharpen causal attribution.

Another potential avenue for future methodological extension lies in the use of between-effects estimators to examine persistent inter-firm differences in leadership and performance outcomes. While the fixed effects models employed in this thesis focus on within-firm variation and control for time invariant heterogeneity, they inherently mask how enduring organisational traits, such as governance routines, embedded cultures or resource endowments, may shape the effectiveness of different CEO types. A between-effects framework could show whether FCEOs systematically lead firms with different baseline characteristics. Advanced hybrid specifications, such as the Mundlak Adjustment, which estimates both within and between effects by including the group means of time varying regressors, offer a flexible structure for exploring CEO identity effects nested within firm level trajectories (Mundlak, 1978). This approach is well suited to extending the current investigation of general and firm specific human capital into a multilevel framework. Methodological treatments of this kind are used in organisational research, as discussed by Bell and Jones (2015) and Schunck (2013), and could provide a rigorous basis for future studies that explore how stable inter-firm variation moderates the relationship between CEO attributes and firm performance.

A further limitation lies in the operationalisation of CEO attributes. The indicators for education, functional knowledge and industry experience are coarse and portable and they do not capture fine-grained complementarities with firm-specific architectures. Future research could construct measures that reflect a firm's technologies, markets and routines more directly, and that identify the channels through which managerial knowledge is translated into practice. Studies that pair detailed programme-of-study information and role histories with verifiable achievement records at project and firm level (for example major system deployments, product-platform launches, market entries or post-merger integrations) would help to establish when combinations of founder traits and organisational features

deliver sustained performance. Such research would provide more granular evidence on the strategic value of different leadership profiles.

The integration of visual analysis into the results chapter provides descriptive context but does not identify dynamics. Although the fixed-effects models improve internal validity, they do not speak directly to sequencing or shock response. Future research could introduce explicit lag structures and quasi-experimental designs to test whether growth effects precede changes in financial performance, to assess the time required for capability development to be reflected in profitability, and to examine how these relationships respond to macroeconomic and industry specific disruptions. Designs that exploit policy changes, technology introductions or supply shocks would be particularly valuable during financial crises or industry-specific downturns. The matching results in Appendix E are consistent with this interpretation, preserving the founder growth premium while showing no profitability difference.

Another avenue for research concerns board dynamics, top team composition and governance arrangements. The results suggest that the expression of founder effects is conditioned by organisational age and size, and that high in-firm time is associated with a weaker association between founder status and growth. Future work could examine how board challenge, the inclusion of independent directors with domain knowledge and the configuration of senior roles influence adaptation in founder-led firms, consistent with evidence that governance structures shape strategic coordination in complex settings (Grosman *et al.*, 2019). Studies that track how leadership teams are assembled and reconfigured as firms scale up would clarify which combinations mitigate over-embeddedness and sustain founder advantages, building on research that documents the risks of cognitive and relational lock-in at extended tenures (Stinchcombe, 1965; Hannan and Freeman, 1984). Longitudinal analysis of staged leadership transitions in founder-led firms would also be valuable and would help to assess the effectiveness of planned changes in governance structures (Quigley and Hambrick, 2014).

The findings suggest that CEO education is not significantly associated with performance in this setting when controlling for firm heterogeneity, and that interactions between founder status and generic human capital markers are not robust. This does not imply that education is irrelevant; rather, it indicates that broad markers are weak proxies for the complementarities that matter in practice. Future research could employ measures that capture explicit matches between leadership experience and the firm's technologies, markets and routines, thereby testing whether performance depends on fit rather than CEOs headline credentials. In addition, studies that trace career trajectories across different educational backgrounds could identify the conditions under which formal education is more strongly associated with performance.

The analysis finds no systematic association between CEO tenure and either growth or profitability once firm heterogeneity is controlled. This does not preclude non-linear or contingent effects. Theory and prior evidence suggest that tenure may follow a curvilinear pattern as leaders move

from early 'exploration' to later 'consolidation': early tenure often features problem framing, agenda setting and experimentation, whereas mid-to-late tenure can bring routinisation, narrowing of search and potential entrenchment (Hambrick and Fukutomi, 1991; Miller, 1991). Future research should test whether such patterns vary across industries, firm ages and scales and whether the exploration-consolidation balance mediates tenure effects on outcomes. Designs should allow for changing role emphases across tenure phases, for example, from initiation and resource mobilisation to system-building and process formalisation, then to external representation and succession planning (Hambrick and Fukutomi, 1991), to identify when accumulated experience supports adaptation and when it constrains it. Such analyses would clarify how the effectiveness of FCEOs evolves across the firm life cycle and organisational states (Quigley and Hambrick, 2014).

Beyond CEO attributes, the study highlights broader contextual factors. Firm age and firm size are negatively associated with growth and, in this sample, are also linked to weaker profitability. Future research could examine how organisational design, process standardisation and digital infrastructure interact with these features to support or constrain adaptation in founder-led firms. Studies that trace the accumulation and reconfiguration of asset positions would identify the points at which coordination costs become binding and would shed light on whether particular operating models preserve strategic agility of founder-led firms compared to their non-founder counterparts.

A further methodological consideration concerns the start-of-year CEO indicator to address cases where a firm had more than one CEO within a given year. Future research could examine the performance implications of alternative coding choices for such cases, including end-of-year identification, tenure-weighted exposure within the year, or event-time windows around appointments and departures. It could also analyse different forms of turnover, including interim appointments, co-CEOs and rotating leadership structures, to assess how far these arrangements affect stability and adaptability during transitions. A further line of enquiry is whether the presence of multiple CEOs in a year is a marker of governance challenges or strategic misalignment and how firms design processes to maintain leadership continuity when executive turnover occurs. The coding choices matter for identification and underline the value of event-time designs in future work.

While the study explores the impact of human capital attributes, embeddedness and context, it does not directly measure cognitive processes. Future research could incorporate behavioural evidence to complement the current indicators, for example structures traces of how CEOs search for information, appraise risk and frame strategic choices. This would allow tests of how these cognitive processes interact with organisational state understood here as firm age and size, coordination burden, available slack and the turbulence of the external environment to produce the performance profiles observed in this thesis. Such extensions would sit squarely within the frames already used, since upper echelons reasoning links executive characteristics to strategic interpretation and action, and Penrose's account treats growth as the deployment of managerial services over time while absorptive capacity highlights

firm-level path dependence in how knowledge is taken up and applied (Hambrick and Mason, 1984; Penrose, 1959; Cohen and Levinthal, 1990).

This study contributes to the ongoing discourse on CEO leadership by providing a long-horizon analysis of founder effects with careful attention to measurement and identification (Hambrick and Mason, 1984; Penrose, 1959; Barney, 1991; Peteraf, 1993; Hambrick, 2007; Quigley and Hambrick, 2014). The limitations identified here indicate clear directions for future work that will clarify when FCEOs create value, how those effects are transmitted through organisations and how age, size and wider context shape the relationship between leadership and firm performance.

Chapter 7

Conclusions

This thesis explores the intricate dynamics of CEO leadership, focusing on FCEOs and their multidimensional impact on firm performance across growth and profitability, with additional robustness checks based on labour productivity. It draws on three key theoretical frameworks: Penrosean theory (Penrose, 1959), UET (Hambrick and Mason, 1984; Hambrick, 2007) and the RBV (Barney, 1991). Using a longitudinal dataset of UK-incorporated firms listed on the Main Market of the London Stock Exchange as at 31 December, 2018, the study examines how CEO characteristics such as education, functional knowledge, industry experience and tenure shape firm performance. The findings provide nuanced insights, revealing both the strengths and limitations of FCEOs in driving firm success.

Penrose (1959), offers the theoretical lens through which this study examines the role of FCEOs in fostering firm growth. Her theory posits that firm growth depends heavily on the capabilities and strategic decisions of management teams, particularly regarding resource deployment and utilisation. This study extends Penrose's insights by empirically testing the specific role of FCEOs in fostering firm growth. The findings suggest that FCEOs, owing to their deep commitment and intimate knowledge, are associated with stronger top-line expansion, particularly in younger firms. This aligns with Penrose's view that managerial resources are crucial to a firm's expansion. FCEOs, by virtue of their unique position and personal investment in the firm, are frequently better positioned to identify and exploit growth opportunities.

However, the findings reveal that the advantages conferred by FCEOs, particularly their entrepreneurial agility, may diminish as firms grow and age. As firms mature, they often encounter new challenges that require different managerial approaches, which FCEOs may not always be well-equipped to handle. This finding is consistent with Penrose's theory, which acknowledges that the skills and capabilities driving early-stage growth may not be the same as those needed in later stages. While FCEOs are effective in the early phases of a firm's life cycle, their ability to drive growth may weaken as the firm becomes more complex, demanding more sophisticated managerial expertise.

UET (Hambrick and Mason, 1984) provides a vital analytical framework, positing that organisational outcomes are shaped by the cognitive, experiential and value-driven attributes of top executives. This study supports UET by showing that beyond education and industry experience, FCEOs' strategic risk-taking, long-term vision and commitment to firm legacy shape their decision-making processes. These value-driven attributes influence growth strategies, investment decisions and governance approaches, reinforcing UET's premise that executive characteristics drive organisational outcomes. The empirical findings demonstrate that FCEOs who emphasise long-term value creation

often prioritise high-risk, high-reward strategies, which can be beneficial in early-stage firms but may introduce rigidity as firms mature.

The RBV also plays a central role in this research. According to the RBV, firms achieve competitive advantage by leveraging unique resources and capabilities that are VRIN (Barney, 1991). This thesis extends the RBV by positioning the FCEO as a critical strategic resource whose attributes significantly influence firm performance. The findings indicate that FCEOs, through their deep firm-specific knowledge and entrepreneurial orientation, often serve as a unique resource that drives firm growth and innovation. However, the estimates indicate that generic human-capital markers i.e. highest degree, broad functional knowledge and industry experience, display weak average associations with ΔSR and ROA once firm heterogeneity is controlled, and founder interactions on these markers are not robust. In RBV terms, performance turns on complementarities with firm-specific architectures rather than on portable credentials alone.

One key finding of this research is that FCEOs generally contribute positively to firm growth (ΔSR), particularly in younger firms or those in the earlier stages of development. This finding aligns with Penrose's theory, which suggests that managerial services and capability build are central to growth. By contrast, there is no contemporaneous founder premium in ROA, and ROP (examined as a robustness outcome) does not show a systematic founder differential. This profile is consistent with a sequencing logic in which exploration and market development move first, and efficiency gains are realised later as routines and capabilities are consolidated. Propensity-score matching corroborates this pattern by preserving the founder growth premium while showing no profitability difference in the matched sample.

CEO tenure and in-firm time also emerged as critical, but distinct, factors. In-firm time, the share of a CEO's career spent within the focal firm, dampens the founder–growth association, consistent with over-embeddedness narrowing search and raising switching costs. Tenure in the CEO role, by contrast, does not show a systematic association with growth and exhibits only a weak average link with profitability once firm heterogeneity is absorbed. The findings indicate that while experience and firm-specific knowledge matter, where experience accumulates (within-firm socialisation) is more consequential than how long one has held the title.

This thesis makes several important contributions to the existing literature. Firstly, it extends Penrosean theory by empirically testing the role of FCEOs in driving firm growth and by highlighting the conditions under which their effectiveness may diminish. By doing so, it provides a more nuanced understanding of the factors that influence firm growth, particularly in the context of founder-led firms. Secondly, the research contributes to UET by showing how specific CEO characteristics, such as education and industry experience, interact with the unique attributes of FCEOs to shape firm

performance. Finally, the thesis adds to the RBV literature by positioning the FCEO as a critical strategic resource that can drive competitive advantage.

In terms of practical implications, the findings highlight the need for firms to balance entrepreneurial leadership with professional management as they evolve. Boards should prioritise leadership development and succession planning, particularly in founder-led firms. Additionally, selection and development should emphasise complementarity with firm-specific architectures rather than headline credentials alone, and boards should monitor in-firm time as a signal of embeddedness. Measurement and incentives should recognise different horizons for growth and efficiency, reflecting the sequencing observed in the results.

The findings of this study underscore the evolutionary nature of CEO leadership effectiveness, particularly in the context of FCEOs. While these individuals play a crucial role in early-stage firm growth, their continued leadership can introduce structural inefficiencies as firms expand and face increasing operational complexity. The research contributes empirically by leveraging advanced econometric techniques, including fixed-effects regression models and LV decomposition, to ensure robust analytical outcomes. From a practical perspective, it highlights the importance of structured leadership transition strategies, the need for external governance mechanisms, and the potential for adaptive succession planning frameworks that balance entrepreneurial vision with professional management expertise. Collectively, these contributions provide valuable insights for academics, business practitioners and policymakers seeking to optimise firm leadership and governance.

This study provides a foundation for further theoretical and empirical exploration of the role of FCEOs in shaping firm performance. The findings indicate that FCEOs exhibit distinct leadership attributes that influence growth, profitability and productivity, yet their effectiveness varies depending on firm age, size, governance structures and CEO-specific characteristics. Given the empirical results, generic education, broad functional knowledge and industry experience do not display robust average effects once firm heterogeneity is absorbed; future work should therefore prioritise measures that capture complementarity with firm-specific architectures. Several avenues for future research emerge, alongside key practical considerations for firms, investors and policymakers.

A key area for future research involves the exploration of additional CEO attributes, such as emotional intelligence, strategic adaptability and risk tolerance, which are increasingly recognised as critical determinants of executive leadership effectiveness (Hambrick and Mason, 1984). Investigating how these characteristics interact with education, industry experience and governance mechanisms could provide a more nuanced understanding of how executive cognition and behavioural traits influence firm strategy and performance. Additionally, the role of entrepreneurial resilience and recovery dynamics warrants further study. The visual analyses in this study suggest that FCEOs exhibit greater dynamism in recovery periods following economic downturns, yet the mechanisms

underpinning this adaptability remain unclear. Future research could examine how FCEOs navigate crises, mitigate financial distress and drive post-shock growth compared to their non-founder counterparts.

Expanding this research to examine regional variations in CEO effectiveness would enhance the external validity of the findings. Comparative studies across different governance regimes and institutional environments, such as Asia, North America and Europe, could provide valuable insights into how cultural and regulatory factors moderate the relationship between FCEOs and firm performance. Additionally, longitudinal studies focusing on CEO career trajectories, particularly the transition from entrepreneurial to professionalised leadership, could offer insights into whether FCEOs who remain in leadership roles beyond the start-up phase exhibit distinct strategic behaviours compared to those who transition out.

The role of external environmental factors, such as technological disruption, economic volatility and regulatory changes, also warrants further examination. Future research could investigate how FCEOs navigate disruptive industry shifts, respond to market crises and adapt to evolving corporate governance standards. This would provide a deeper understanding of the conditions under which entrepreneurial leadership remains effective or becomes a liability as firms mature and the external environment evolves. Furthermore, an important avenue for future research lies in understanding how external shocks influence firm performance under different CEO leadership styles. The findings indicate that while FCEOs may experience higher growth volatility, they may also be better positioned to capitalise on market recoveries. Future research could explore whether specific CEO characteristics, such as risk tolerance and strategic agility, moderate a firms' ability to withstand and recover from crises.

Another key avenue for research concerns board dynamics, governance mechanisms and leadership transitions. Grosman *et al*. (2019) provide evidence that stronger governance mechanisms, such as independent board oversight and shareholder accountability, enhance decision-making quality and mitigate the risks of strategic inertia. This underscores the importance of structured governance interventions to sustain long-term firm performance under FCEO leadership. Given that governance plays a critical role in moderating the effectiveness of long-tenured FCEOs, future research could explore how board structures, investor activism and executive compensation policies influence leadership adaptability. Understanding the interplay between board oversight and CEO decision-making would provide valuable insights into how firms can sustain performance while mitigating risks associated with entrenched leadership. Additionally, longitudinal studies on CEO succession planning and founder transition strategies could offer empirical evidence on the effectiveness of staged leadership transitions in founder-led firms.

Finally, a broader research question relates to self-selection into leadership roles. The findings suggest that education plays a stronger role in compensating for the advantages conferred by being a founder, potentially indicating that individuals with lower formal education levels but strong entrepreneurial acumen may be more inclined to start their own firms rather than pursue executive roles in established organisations. Future research could investigate the extent to which educational background influences career pathways into CEO positions, exploring whether individuals with lower formal education but greater entrepreneurial ability are more likely to become founders rather than professional executives.

By addressing these avenues for future inquiry, subsequent research can refine and extend the theoretical contributions of this study while offering deeper insights into the evolving role of FCEOs and NFCEOs in shaping firm performance.

The findings of this research also carry significant practical implications for corporate governance, leadership development and investment decision-making. Firms that rely on founder-led leadership structures must consider how governance mechanisms evolve as the organisation matures. Boards should implement structured governance interventions to ensure that entrepreneurial leadership is effectively balanced with professional management as firms grow. The study underscores the need for independent board oversight to mitigate risks associated with long-tenured FCEOs and strategic rigidity. Moreover, progressive leadership transition models, including advisory boards and executive mentoring programmes, could facilitate the professionalisation of leadership over time while retaining the entrepreneurial drive that characterises founder-led firms.

Leadership development and succession planning are also critical areas for consideration. Firms should develop structured succession planning frameworks that align with the evolving leadership needs of growing organisations. This research suggests that while FCEOs drive early-stage firm growth, their leadership must adapt as firms scale and encounter operational complexities. Investing in leadership development programmes that provide managerial training for FCEOs could help facilitate a smoother transition from entrepreneurial to professionalised leadership. Additionally, staged CEO transitions, where founders transition into advisory roles while experienced executives assume operational leadership, may enhance firm adaptability and resilience during key growth phases.

The study also has implications for investors and policymakers, particularly regarding the governance of founder-led firms. Investors evaluating founder-led firms should assess the presence of governance structures that balance entrepreneurial leadership with external accountability. This includes examining board independence, evaluating leadership transition policies and assessing the adaptability of FCEOs to changing market conditions. Policymakers, in turn, can play a role in shaping governance regulations that incentivise responsible leadership transitions. Encouraging corporate

governance best practices, leadership training initiatives and investor protection mechanisms would contribute to the long-term sustainability of high-growth entrepreneurial firms.

By addressing these theoretical and practical considerations, this research provides a foundation for advancing knowledge on CEO leadership effectiveness while offering actionable strategies for firms, investors, and policymakers seeking to optimise governance, leadership transitions and long-term performance.

List of references

Abadie, A. and Imbens, G.W. (2006). Large Sample Properties of Matching Estimators for Average Treatment Effects. Econometrica, 74(1), pp.235–267. doi:https://doi.org/10.1111/j.1468-0262.2006.00655.x.

Acemoglu, D. and Pischke, J.-S. (1998). Why Do Firms Train? Theory and Evidence. The Quarterly Journal of Economics, 113(1), pp.79–119. doi:https://doi.org/10.1162/003355398555531.

Adams, R., Almeida, H. and Ferreira, D. (2009). Understanding the relationship between founder–CEOs and firm performance. Journal of Empirical Finance, 16(1), pp.136–150. doi:https://doi.org/10.1016/j.jempfin.2008.05.002.

Adner, R. and Helfat, C.E. (2003). Corporate effects and dynamic managerial capabilities. Strategic Management Journal, 24(10), pp.1011–1025. doi:https://doi.org/10.1002/smj.331.

Agarwal, R. and Gort, M. (1996). The Evolution of Markets and Entry, Exit and Survival of Firms. The Review of Economics and Statistics, 78(3), p.489. doi:https://doi.org/10.2307/2109796.

Aghion, P., Antonin, C. and Bunel, S. (2021). The power of creative destruction : economic upheaval and the wealth of nations. 1st ed. Cambridge, Massachusetts: The Belknap Press Of Harvard University Press.

Aguilera, R.V. and Jackson, G. (2003). The Cross-National Diversity of Corporate Governance: Dimensions and Determinants. The Academy of Management Review, 28(3), p.447. doi:https://doi.org/10.2307/30040732.

Aiello, F. and Ricotta, F. (2016). Firm heterogeneity in productivity across Europe: evidence from multilevel models. Economics of Innovation and New Technology, 25(1), pp.57–89. doi:https://doi.org/10.1080/10438599.2015.1057001.

Alchian, A.A. and Demsetz, H. (1972). Production, Information Costs, and Economic Organization. The American Economic Review, 62(5), pp.777–795.

Alvarez, S.A. and Barney, J.B. (2007). Discovery and creation: Alternative Theories of Entrepreneurial Action. Strategic Entrepreneurship Journal, 1(1-2), pp.11–26. doi:https://doi.org/10.1002/sej.4.

Arenius, P. and Minniti, M. (2005). Perceptual Variables and Nascent Entrepreneurship. Small Business Economics, 24(3), pp.233–247. doi:https://doi.org/10.1007/s11187-005-1984-x.

Argote, L. (1999). Organizational learning : creating, retaining, and transferring knowledge. Boston ; London: Kluwer Academic.

Argyres, N.S. and Zenger, T.R. (2012). Capabilities, Transaction Costs, and Firm Boundaries. Organization Science, 23(6), pp.1643–1657. doi:https://doi.org/10.1287/orsc.1110.0736.

Austin, P.C. (2009). Balance diagnostics for comparing the distribution of baseline covariates between treatment groups in propensity-score matched samples. Statistics in Medicine, 28(25), pp.3083–3107. doi:https://doi.org/10.1002/sim.3697.

Baker, W.E. and Sinkula, J.M. (2009). The Complementary Effects of Market Orientation and Entrepreneurial Orientation on Profitability in Small Businesses. Journal of Small Business Management, 47(4), pp.443–464. doi:https://doi.org/10.1111/j.1540-627x.2009.00278.x.

Baltagi, B.H. (2008). Econometric Analysis of Panel Data. Springer Texts in Business and Economics. Cham: Springer International Publishing. doi:https://doi.org/10.1007/978-3-030-53953-5.

Bamford, C.E., Bruton, G.D. and Hinson, Y.L. (2006). Founder/Chief Executive Officer Exit: A Social Capital Perspective of New Ventures. Journal of Small Business Management, 44(2), pp.207–220. doi:https://doi.org/10.1111/j.1540-627x.2006.00164.x.

Bansal, P. and Roth, K. (2000). Why Companies Go Green: A Model of Ecological Responsiveness. Academy of Management Journal, 43(4), pp.717–736. doi:https://doi.org/10.2307/1556363.

Barkema, H.G. and Schijven, M. (2008). How Do Firms Learn to Make Acquisitions? A Review of Past Research and an Agenda for the Future. Journal of Management, 34(3), pp.594–634. doi:https://doi.org/10.1177/0149206308316968.

Barker, V.L. and Mueller, G.C. (2002). CEO Characteristics and Firm R&D Spending. Management Science, 48(6), pp.782–801. doi:https://doi.org/10.1287/mnsc.48.6.782.187.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), pp.99–120.

Barney, J. and Felin, T. (2013). What Are Microfoundations? Academy of Management Perspectives, 27(2), pp.138–155. doi:https://doi.org/10.5465/amp.2012.0107.

Baron, J.N., Hannan, M.T. and Burton, M.D. (1999). Building the Iron Cage: Determinants of Managerial Intensity in the Early Years of Organizations. American Sociological Review, 64(4), p.527. doi:https://doi.org/10.2307/2657254.

Baron, R.A. (2007). Behavioral and cognitive factors in entrepreneurship: entrepreneurs as the active element in new venture creation. Strategic Entrepreneurship Journal, 1(1-2), pp.167–182. doi:https://doi.org/10.1002/sej.12.

Becker, B.E. and Huselid, M.A. (1998). High performance work systems and firm performance: A synthesis of research and managerial implications. In: Research in Personnel and Human Resources Management Vol: 16. JAI Press Inc., pp.53–101.

Becker, G.S. (1964). Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. National Bureau of Economic Research.

Becker, G.S. (1993). Human capital : a theoretical and empirical analysis, with special reference to education. Chicago: The University Of Chicago Press.

Begley, T.M. (1995). Using founder status, age of firm, and company growth rate as the basis for distinguishing entrepreneurs from managers of smaller businesses. Journal of Business Venturing, 10(3), pp.249–263. doi:https://doi.org/10.1016/0883-9026(94)00023-n.

Bell, A. and Jones, K. (2015). Explaining Fixed Effects: Random Effects Modeling of Time-Series Cross-Sectional and Panel Data. Political Science Research and Methods, 3(1), pp.133–153. doi:https://doi.org/10.1017/psrm.2014.7.

Berle, A. and Means, G.C. (1932). The Modern Corporation and Private Property. New Brunswick, N.J., U.S.A.: Transaction Publishers.

Berns, K.V.D. and Klarner, P. (2017). A Review of the CEO Succession Literature and a Future Research Program. Academy of Management Perspectives, 31(2), pp.83–108. doi:https://doi.org/10.5465/amp.2015.0183.

Bertrand, M. and Schoar, A. (2003). Managing with Style: The Effect of Managers on Firm Policies. The Quarterly Journal of Economics, 118(4), pp.1169–1208. doi:https://doi.org/10.1162/003355303322552775.

Bigley, G.A. and Wiersema, M.F. (2002). New CEOs and Corporate Strategic Refocusing: How Experience as Heir Apparent Influences the Use of Power. Administrative Science Quarterly, 47(4), pp.707–727. doi:https://doi.org/10.2307/3094914.

Bititci, U., Garengo, P., Dörfler, V. and Nudurupati, S. (2012). Performance Measurement: Challenges for Tomorrow. International Journal of Management Reviews, 14(3), pp.305–327. doi:https://doi.org/10.1111/j.1468-2370.2011.00318.x.

Blickle, G., Kramer, J., Zettler, I., Momm, T., Summers, J.K., Munyon, T.P. and Ferris, G.R. (2009). Job demands as a moderator of the political skill-job performance relationship. Career Development International, 14(4), pp.333–350. doi:https://doi.org/10.1108/13620430910979835.

Block, J.H., Thurik, R. and Zhou, H. (2013). What turns knowledge into innovative products? The role of entrepreneurship and knowledge spillovers. Journal of Evolutionary Economics, 23(4), pp.693–718. doi:https://doi.org/10.1007/s00191-012-0265-5.

Boeker, W. and Karichalil, R. (2002). Entrepreneurial Transitions: Factors Influencing Founder Departure. Academy of Management Journal, 45(4), pp.818–826. doi:https://doi.org/10.5465/3069314.

Boeker, W. and Wiltbank, R. (2005). New Venture Evolution and Managerial Capabilities. Organization Science, 16(2), pp.123–133. doi:https://doi.org/10.1287/orsc.1050.0115.

Bosma, N. and Levie, J. (2010). Global Entrepreneurship Monitor 2009 Executive Report. Global Entrepreneurship Research Association (GERA).

Bottazzi, G., Cefis, E. and Dosi, G. (2002). Corporate growth and industrial structures: some evidence from the Italian manufacturing industry. Industrial and Corporate Change, 11(4), pp.705–723. doi:https://doi.org/10.1093/icc/11.4.705.

Bottazzi, G., Dosi, G., Jacoby, N., Secchi, A. and Tamagni, F. (2010). Corporate performances and market selection: some comparative evidence. Industrial and Corporate Change, 19(6), pp.1953–1996. doi:https://doi.org/10.1093/icc/dtq063.

Bottazzi, G. and Secchi, A. (2006). Explaining the distribution of firm growth rates. The RAND Journal of Economics, 37(2), pp.235–256. doi:https://doi.org/10.1111/j.1756-2171.2006.tb00014.x.

Bottazzi, L., Da Rin, M. and Hellmann, T. (2016). The Importance of Trust for Investment: Evidence from Venture Capital. Review of Financial Studies, 29(9), pp.2283–2318. doi:https://doi.org/10.1093/rfs/hhw023.

Brännback, M., Carsrud, A.L. and Kiviluoto, N. (2014). Understanding the Myth of High Growth Firms The Theory of the Greater Fool. New York, Ny Springer.

Bratton, W.W. (2001). Berle and Means reconsidered at the century's turn. The Journal of Corporation Law, 26(3), pp.737–770.

Brinckmann, J., Grichnik, D. and Kapsa, D. (2010). Should entrepreneurs plan or just storm the castle? A meta-analysis on contextual factors impacting the business planning–performance relationship in small firms. Journal of Business Venturing, 25(1), pp.24–40. doi:https://doi.org/10.1016/j.jbusvent.2008.10.007.

Brush, C.G., Carter, N.M., Gatewood, E.J., Greene, P.G. and Hart, M.M. (2006). The use of bootstrapping by women entrepreneurs in positioning for growth. Venture Capital, 8(1), pp.15–31. doi:https://doi.org/10.1080/13691060500433975.

Bryman, A. (2016). Social Research Methods. 5th ed. Oxford: Oxford University Press.

Brynjolfsson, E. and Hitt, L. (1996). Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending. Management Science, 42(4), pp.541–558. doi:https://doi.org/10.1287/mnsc.42.4.541.

Burt, Ronald S. (2004). Structural Holes and Good Ideas. American Journal of Sociology, 110(2), pp.349–399. doi:https://doi.org/10.1086/421787.

Caliendo, M. and Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. Journal of Economic Surveys, 22(1), pp.31–72. doi:https://doi.org/10.1111/j.1467-6419.2007.00527.x.

Cannella, A.A., Park, J.-H. and Lee, H.-U. (2008). Top Management Team Functional Background Diversity and Firm Performance: Examining The Roles of Team Member Colocation and Environmental Uncertainty. Academy of Management Journal, 51(4), pp.768–784. doi:https://doi.org/10.5465/amr.2008.33665310.

Cantillon, R. (1755). Essai sur la nature du commerce en général. Paris: Institut Coppet.

Capasso, A., Gallucci, C. and Rossi, M. (2015). Standing the test of time. Does firm performance improve with age? An analysis of the wine industry. Business History, 57(7), pp.1037–1053. doi:https://doi.org/10.1080/00076791.2014.993614.

Cardon, M.S., Wincent, J., Singh, J. and Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. Academy of Management Review, 34(3), pp.511–532. doi:https://doi.org/10.5465/amr.2009.40633190.

Carmeli, A. and Schaubroeck, J. (2006). Top management team behavioral integration, decision quality, and organizational decline. The Leadership Quarterly, 17(5), pp.441–453. doi:https://doi.org/10.1016/j.leaqua.2006.06.001.

Carpenter, M.A., Geletkanycz, M.A. and Sanders, Wm.G. (2004). Upper Echelons Research Revisited: Antecedents, Elements, and Consequences of Top Management Team Composition. Journal of Management, 30(6), pp.749–778. doi:https://doi.org/10.1016/j.jm.2004.06.001.

Carroll, G.R. (1985). Concentration and Specialization: Dynamics of Niche Width in Populations of Organizations. American Journal of Sociology, 90(6), pp.1262–1283. doi:https://doi.org/10.1086/228210.

Carter, D.A., Simkins, B.J. and Simpson, W.G. (2003). Corporate Governance, Board Diversity, and Firm Value. The Financial Review, 38(1), pp.33–53. doi:https://doi.org/10.1111/1540-6288.00034.

Carter, R. and Hodgson, G.M. (2006). The impact of empirical tests of transaction cost economics on the debate on the nature of the firm. Strategic Management Journal, 27(5), pp.461–476. doi:https://doi.org/10.1002/smj.531.

Carton, R.B. and Hofer, C.W. (2010). Organizational Financial Performance: Identifying and Testing Multiple Dimensions. Academy of Entrepreneurship Journal, 16(1), pp.1–22.

Casson, M. (2005). Entrepreneurship and the theory of the firm. Journal of Economic Behavior & Organization, 58(2), pp.327–348. doi:https://doi.org/10.1016/j.jebo.2004.05.007.

Central Intelligence Agency (2024). Countries - The World Factbook. [online] www.cia.gov. Available at: https://www.cia.gov/the-world-factbook/countries/ [Accessed 7 Mar. 2025].

Chandler, A.D. (1990). Strategy and structure : chapters in the history of the industrial enterprise. Cambridge, Mass: M.I.T. Press.

Chandler, A.D., Hagström, P. and Sölvell, Ö. (2001). The dynamic firm : the role of technology, strategy, organization and regions. Oxford: Oxford University Press.

Chandler, G.N., McKelvie, A. and Davidsson, P. (2009). Asset Specificity and Behavioral Uncertainty as Moderators of the Sales Growth - Employment Growth Relationship in Emerging Ventures. Journal of Business Venturing, 24(4), pp.373–387. doi:https://doi.org/10.1016/j.jbusvent.2008.04.002.

Cheung, S.N.S. (1983). The Contractual Nature of the Firm. The Journal of Law and Economics, 26(1), pp.1–21. doi:https://doi.org/10.1086/467023.

Child, J. (1972). Organizational Structure, Environment and Performance: The Role of Strategic Choice. Sociology, 6(1), pp.1–22.

Child, J. (1973). Predicting and Understanding Organization Structure. Administrative Science Quarterly, 18(2), pp.168–185. doi:https://doi.org/10.2307/2392061.

Clifford, D.K. and Cavanagh, R.E. (1985). The winning performance : how America's high-growth midsize companies succeed. Toronto: Bantam Books.

Coad, A., Cowling, M. and Siepel, J. (2016). Growth Processes of high-growth Firms as a four-dimensional Chicken and Egg. Industrial and Corporate Change, 26(4), pp.537–554. doi:https://doi.org/10.1093/icc/dtw040.

Coad, A., Segarra, A. and Teruel, M. (2013). Like milk or wine: Does firm performance improve with age? Structural Change and Economic Dynamics, 24, pp.173–189. doi:https://doi.org/10.1016/j.strueco.2012.07.002.

Coase, R.H. (1937). The Nature of the Firm. Economica, 4(16), pp.386–405. doi:https://doi.org/10.2307/2626876.

Coff, R. and Kryscynski, D. (2011). Invited Editorial: Drilling for Micro-Foundations of Human Capital–Based Competitive Advantages. Journal of Management, [online] 37(5), pp.1429–1443. doi:https://doi.org/10.1177/0149206310397772.

Cohen, J., Cohen, P., West, S.G. and Aiken, L.S. (2003). Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. 3rd ed. New York: Routledge.

Cohen, W.M. and Levinthal, D.A. (1990). Absorptive Capacity: a New Perspective on Learning and Innovation. Administrative Science Quarterly, 35(1), pp.128–152. doi:https://doi.org/10.2307/2393553.

Colombo, M.G. and Grilli, L. (2005). Founders' human capital and the growth of new technology-based firms: A competence-based view. Research Policy, 34(6), pp.795–816. doi:https://doi.org/10.1016/j.respol.2005.03.010.

Crook, T.R., Todd, S.Y., Combs, J.G., Woehr, D.J. and Ketchen, D.J. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. Journal of Applied Psychology, 96(3), pp.443–456. doi:https://doi.org/10.1037/a0022147.

Cucculelli, M., Mannarino, L., Pupo, V. and Ricotta, F. (2014). Owner-Management, Firm Age, and Productivity in Italian Family Firms. Journal of Small Business Management, 52(2), pp.325–343. doi:https://doi.org/10.1111/jsbm.12103.

datapo.com. (2019). How many companies are there in the world? [online] Available at: https://datapo.com/news/how-many-companies-are-there-in-the-world/ [Accessed 13 Aug. 2019].

Davidsson, P. and Honig, B. (2003). The Role of Social and Human Capital among Nascent Entrepreneurs. Journal of Business Venturing, 18(3), pp.301–331.

Davidsson, P. and Wiklund, J. (2000). Conceptual and empirical challenges in the study of firm growth. In: D. Sexton and H. Landstrom, eds., The Blackwell Handbook of Entrepreneurship. Oxford: Blackwell, pp.26–44.

Delgado, M., Porter, M.E. and Stern, S. (2014). Clusters, convergence, and economic performance. Research Policy, 43(10), pp.1785–1799. doi:https://doi.org/10.1016/j.respol.2014.05.007.

Delmar, F., Davidsson, P. and Gartner, W.B. (2003). Arriving at the high-growth firm. Journal of Business Venturing, 18(2), pp.189–216. doi:https://doi.org/10.1016/s0883-9026(02)00080-0.

Delmar, F. and Shane, S. (2003). Does business planning facilitate the development of new ventures? Strategic Management Journal, 24(12), pp.1165–1185. doi:https://doi.org/10.1002/smj.349.

Delmar, F. and Wiklund, J. (2008). The Effect of Small Business Managers' Growth Motivation on Firm Growth: A Longitudinal Study. Entrepreneurship Theory and Practice, 32(3), pp.437–457. doi:https://doi.org/10.1111/j.1540-6520.2008.00235.x.

Denning, S. (2013). Did Ronald Coase Get Economics Wrong? [online] Forbes. Available at: https://www.forbes.com/sites/stevedenning/2013/09/25/did-ronald-coase-get-economics-wrong/?sh=7b74e7d91fb2 [Accessed 15 Jan. 2023].

Donaldson, L. (2001). The Contingency Theory of Organizations. Thousand Oaks, Calif. ; Milton Keynes Uk: Sage Publications.

Douma, S.W. and H Schreuder (2017). Economic approaches to organizations. Harlow, England ; New York: Pearson.

Driffield, N.L., Mickiewicz, T. and Temouri, Y. (2013). Institutional reforms, productivity and profitability: From rents to competition? Journal of Comparative Economics, 41(2), pp.583–600. doi:https://doi.org/10.1016/j.jce.2012.08.001.

Drucker, P.F. (1993). Innovation and entrepreneurship practice and principles. New York: Harperbusiness.

Drucker, P.F. (2006). The Practice of Management. New York, Ny: Collins.

Du, J., Mickiewicz, T. and Douch, M. (2021). Individual and Institutional Ownership, Firm Age and Productivity. Journal of Competitiveness, 13(1), pp.23–41. doi:https://doi.org/10.7441/joc.2021.01.02.

Dunkelberg, W.C. and Cooper, A.C. (1982). Patterns of Small Business Growth. Academy of Management Proceedings, 1982(1), pp.409–413. doi:https://doi.org/10.5465/ambpp.1982.4976865.

Duschl, M. and Peng, S.-S. (2015). The patterns of Chinese firm growth: a conditional estimation approach of the asymmetric exponential power density. Industrial and Corporate Change, 24(3), pp.539–563. doi:https://doi.org/10.1093/icc/dtv006.

Eesley, C.E. and Roberts, E.B. (2012). Are You Experienced or Are You Talented?: When Does Innate Talent versus Experience Explain Entrepreneurial Performance? Strategic Entrepreneurship Journal, 6(3), pp.207–219. doi:https://doi.org/10.1002/sej.1141.

Eisenhardt, K.M. (1989). Building Theories from Case Study Research. Academy of Management Review, 14(4), pp.532–550.

Eisenhardt, K.M. and Martin, J.A. (2000). Dynamic capabilities: what are they? Strategic Management Journal, 21(10-11), pp.1105–1121.

Eisenhardt, K.M. and Sull, D. (2001). Strategy as Simple Rules. [online] Harvard Business Review. Available at: https://hbr.org/2001/01/strategy-as-simple-rules.

Estrin, S., Mickiewicz, T. and Stephan, U. (2016). Human Capital in Social and Commercial Entrepreneurship. Journal of Business Venturing, [online] 31(4), pp.449–467. doi:https://doi.org/10.1016/j.jbusvent.2016.05.003.

Fagiolo, G. and Luzzi, A. (2006). Do liquidity constraints matter in explaining firm size and growth? Some evidence from the Italian manufacturing industry. Industrial and Corporate Change, 15(1), pp.1–39. doi:https://doi.org/10.1093/icc/dtj001.

Fahlenbrach, R. (2009). Founder-CEOs, Investment Decisions, and Stock Market Performance. Journal of Financial and Quantitative Analysis, 44(2), pp.439–466. doi:https://doi.org/10.1017/s0022109009090139.

Fama, E.F. and French, K.R. (1992). The Cross-Section of Expected Stock Returns. The Journal of Finance, 47(2), pp.427–465.

Fariñas, J.C. and Ruano, S. (2005). Firm productivity, heterogeneity, sunk costs and market selection. International Journal of Industrial Organization, 23(7-8), pp.505–534. doi:https://doi.org/10.1016/j.ijindorg.2005.02.002.

Finkelstein, S. and Boyd, B.K. (1998). How Much Does the CEO Matter? The Role of Managerial Discretion in the Setting of CEO Compensation. Academy of Management Journal, 41(2), pp.179–199. doi:https://doi.org/10.5465/257101.

Finkelstein, S. and Hambrick, D.C. (1990). Top-Management-Team Tenure and Organizational Outcomes: The Moderating Role of Managerial Discretion. Administrative Science Quarterly, 35(3), p.484. doi:https://doi.org/10.2307/2393314.

Finkelstein, S. and Hambrick, D.C. (1996). Strategic leadership : Top executives and their effects on organizations. St Paul: West Publishing.

Finkelstein, S., Hambrick, D.C. and Cannella, A.A. (2009). Strategic leadership : theory and research on executives, top management teams, and boards. New York: Oxford University Press.

Fisher, C.E., Chin, L. and Klitzman, R. (2010). Defining Neuromarketing: Practices and Professional Challenges. Harvard Review of Psychiatry, 18(4), pp.230–237. doi:https://doi.org/10.3109/10673229.2010.496623.

Foss, N.J. (1996). Knowledge-Based Approaches to the Theory of the Firm: Some Critical Comments. *Organization Science*, 7(5), pp.470–476. doi:https://doi.org/10.1287/orsc.7.5.470.

Foster, R.N. and Kaplan, S. (2001). Creative destruction : why companies that are built to last underperform the market, and how to successfully transform them. New York: Currency/Doubleday.

Freeman, J., Carroll, G.R. and Hannan, M.T. (1983). The Liability of Newness: Age Dependence in Organizational Death Rates. American Sociological Review, 48(5), p.692. doi:https://doi.org/10.2307/2094928.

Freeman, R.E. (1984). Strategic Management : A Stakeholder Approach. Cambridge: Cambridge University Press.

Gal, P.N. (2013). Measuring Total Factor Productivity at the Firm Level using OECD-ORBIS. OECD Economics Department Working Papers, 1049. doi:https://doi.org/10.1787/5k46dsb25ls6-en.

Gartner, W. and Liao, J. (2011). The effects of perceptions of risk, environmental uncertainty, and growth aspirations on new venture creation success. Small Business Economics, 39(3), pp.703–712. doi:https://doi.org/10.1007/s11187-011-9356-1.

Geroski, P.A. (1995). What do we know about entry? International Journal of Industrial Organization, 13(4), pp.421–440. doi:https://doi.org/10.1016/0167-7187(95)00498-x.

Geroski, P.A., Machin, S.J. and Walters, C.F. (2003). Corporate Growth and Profitability. The Journal of Industrial Economics, 45(2), pp.171–189. doi:https://doi.org/10.1111/1467-6451.00042.

Gimeno, J., Folta, T.B., Cooper, A.C. and Woo, C.Y. (1997). Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of Underperforming Firms. Administrative Science Quarterly, 42(4), pp.750–783. doi:https://doi.org/10.2307/2393656.

Girma, S., Thompson, S. and Wright, P.W. (2006). International Acquisitions, Domestic Competition and Firm Performance. International Journal of the Economics of Business, 13(3), pp.335–349. doi:https://doi.org/10.1080/13571510600961254.

Goergen, M. (2018). Corporate governance : a global perspective. Andover, Hampshire, United Kingdom: Cengage Learning Emea.

Gompers, P.A., Kovner, A., Lerner, J. and Scharfstein, D.S. (2006). Skill vs. Luck in Entrepreneurship and Venture Capital: Evidence from Serial Entrepreneurs. SSRN Electronic Journal. doi:https://doi.org/10.2139/ssrn.933932.

GOV.UK (2021). List of Ethnic Groups. [online] GOV.UK. Available at: https://www.ethnicity-facts-figures.service.gov.uk/style-guide/ethnic-groups/ [Accessed 7 Mar. 2025].

Graffin, S.D., Wade, J.B., Porac, J.F. and McNamee, R.C. (2008). The Impact of CEO Status Diffusion on the Economic Outcomes of Other Senior Managers. Organization Science, 19(3), pp.457–474. doi:https://doi.org/10.1287/orsc.1080.0354.

Grant, R.M. (2016). Contemporary Strategy Analysis : Text and Cases Edition. Somerset: Wiley Textbooks.

Great Britain. Office For National Statistics (2010). UK standard industrial classification of economic activities 2007 (SIC 2007) : structure and explanatory notes. Basingstoke: Palgrave Macmillan.

Grifell-Tatjé, E. and Lovell, C.A.K. (1999). Profits and Productivity. Management Science, 45(9), pp.1177–1193. doi:https://doi.org/10.1287/mnsc.45.9.1177.

Grosman, A., Aguilera, R.V. and Wright, M. (2019). Lost in translation? Corporate governance, independent boards and blockholder appropriation. Journal of World Business, 54(4), pp.258–272. doi:https://doi.org/10.1016/j.jwb.2018.09.001.

Haans, R.F.J., Pieters, C. and He, Z.-L. (2016). Thinking about U: Theorizing and testing U- and inverted U-shaped relationships in strategy research. Strategic Management Journal, 37(7), pp.1177–1195. doi:https://doi.org/10.1002/smj.2399.

Hahn, F. (1973). On the Notion of Equilibrium in Economics. Inaugural lecture. Cambridge University.

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010). Multivariate Data Analysis. 7th ed. Pearson.

Haleblian, J., Devers, C.E., McNamara, G., Carpenter, M.A. and Davison, R.B. (2009). Taking Stock of What We Know About Mergers and Acquisitions: A Review and Research Agenda. Journal of Management, 35(3), pp.469–502. doi:https://doi.org/10.1177/0149206308330554.

Hambrick, D.C. (2007). Upper Echelons Theory: An Update. Academy of Management Review, 32(2), pp.334–343.

Hambrick, D.C. and Fukutomi, G.D.S. (1991). The Seasons of a CEO's Tenure. Academy of Management Review, 16(4), pp.719–742. doi:https://doi.org/10.5465/amr.1991.4279621.

Hambrick, D.C., Geletkanycz, M.A. and Fredrickson, J.W. (1993). Top Executive Commitment to the Status quo: Some Tests of Its Determinants. Strategic Management Journal, 14(6), pp.401–418. doi:https://doi.org/10.1002/smj.4250140602.

Hambrick, D.C. and Mason, P.A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. Academy of Management Review, 9(2), pp.193–206. doi:https://doi.org/10.5465/amr.1984.4277628.

Hambrick, D.C. and Quigley, T.J. (2013). Toward more accurate contextualization of the CEO effect on firm performance. Strategic Management Journal, 35(4), pp.473–491. doi:https://doi.org/10.1002/smj.2108.

Hannan, M.T. and Freeman, J. (1984). Structural Inertia and Organizational Change. American Sociological Review, 49(2), pp.149–164. doi:https://doi.org/10.2307/2095567.

Harris, D. and Helfat, C. (1997). Specificity of CEO human capital and compensation. Strategic Management Journal, 18(11), pp.895–920. doi:https://doi.org/10.1002/(sici)1097-0266(199712)18:11%3C895::aid-smj931%3E3.0.co;2-r.

Hart, O. and Moore, J. (1990). Property Rights and the Nature of the Firm. Journal of Political Economy, 98(6), pp.1119–1158. doi:https://doi.org/10.1086/261729.

Hatch, N.W. and Dyer, J.H. (2004). Human capital and learning as a source of sustainable competitive advantage. Strategic Management Journal, 25(12), pp.1155–1178. doi:https://doi.org/10.1002/smj.421.

Hayward, M.L.A. and Hambrick, D.C. (1997). Explaining the Premiums Paid for Large Acquisitions: Evidence of CEO Hubris. Administrative Science Quarterly, 42(1), p.103.

He, L. (2008). Do founders matter? A study of executive compensation, governance structure and firm performance. Journal of Business Venturing, 23(3), pp.257–279. doi:https://doi.org/10.1016/j.jbusvent.2007.02.001.

Hemingway, E. (2003). Letter to Maxwell Perkins, 17 October. In: Ernest Hemingway: Selected Letters 1917-1961. New York: Scribner.

Hitt, M.A., Bierman, L., Shimizu, K. and Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. Academy of Management Journal, 44(1), pp.13–28. doi:https://doi.org/10.2307/3069334.

Honjo, Y. and Kato, M. (2021). Are founder-CEOs resilient to crises? The impact of founder-CEO succession on new firm survival. International Small Business Journal: Researching Entrepreneurship, 40(2), pp.205–235. doi:https://doi.org/10.1177/02662426211050794.

Hsu, D.H. (2007). Experienced entrepreneurial founders, organizational capital, and venture capital funding. Research Policy, 36(5), pp.722–741. doi:https://doi.org/10.1016/j.respol.2007.02.022.

Hughes, A. (1998). Growth Constraints on Small and Medium-Sized Firms. Working Paper No. 107, ESRC Centre for Business Research, University of Cambridge.

Huselid, M.A. (1995). The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance. Academy of Management Journal, 38(3), pp.635–672. doi:https://doi.org/10.2307/256741.

Jacobides, M.G., Cennamo, C. and Gawer, A. (2018). Towards a Theory of Ecosystems. Strategic Management Journal, 39(8), pp.2255–2276.

Janssen, F. (2009). The Conceptualisation of Growth: Are Employment and Turnover Interchangeable Criteria? The Journal of Entrepreneurship, 18(1), pp.21–45. doi:https://doi.org/10.1177/097135570801800102.

Jayaraman, N., Khorana, A., Nelling, E. and Covin, J. (2000). CEO founder status and firm financial performance. Strategic Management Journal, 21(12), pp.1215–1224. doi:https://doi.org/10.1002/1097-0266(200012)21:12%3C1215::aid-smj146%3E3.0.co;2-0.

Jensen, M.C. and Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. Journal of Financial Economics, 3(4), pp.305–360.

Kahneman, D. and Tversky, A. (1979). Prospect Theory: an Analysis of Decision Under Risk. Econometrica, 47(2), pp.263–292. doi:https://doi.org/10.2307/1914185.

Kaplan, R.S. and Norton, D.P. (1992). The Balanced Scorecard—Measures that Drive Performance. [online] Harvard Business Review. Available at: https://hbr.org/1992/01/the-balanced-scorecard-measures-that-drive-performance-2 [Accessed 21 Apr. 2024].

Kaplan, S.A., Sensoy, B.A. and Strömberg, P. (2005). What Are Firms? Evolution from Birth to Public Companies. National Bureau of Economic Research. doi:https://doi.org/10.3386/w11581.

Kaplan, S.N., Klebanov, M.M. and Sorensen, M. (2012). Which CEO Characteristics and Abilities Matter? The Journal of Finance, 67(3), pp.973–1007.

Kelly, L.M., Athanassiou, N. and Crittenden, W.F. (2000). Founder Centrality and Strategic Behavior in the Family-Owned Firm. Entrepreneurship Theory and Practice, 25(2), pp.27–42. doi:https://doi.org/10.1177/104225870002500202.

Killingsworth, J. (2018). Normal and Laplace Distributions - Jim Killingsworth. [online] jkillingsworth.com. Available at: https://jkillingsworth.com/2018/11/15/normal-and-laplace-distributions/ [Accessed 9 Apr. 2023].

King, G. and Nielsen, R. (2019). Why Propensity Scores Should Not Be Used for Matching. *Political Analysis*, 27(4), pp.435–454. doi:https://doi.org/10.1017/pan.2019.11.

Kirchhoff, B.A. (1992). Entrepreneurship's Contribution to Economics. Entrepreneurship Theory and Practice, 16(2), pp.93–112. doi:https://doi.org/10.1177/104225879201600207.

Klepper, S. (2002). Firm Survival and the Evolution of Oligopoly. The RAND Journal of Economics, 33(1), pp.37–61. doi:https://doi.org/10.2307/2696374.

Klotz, A.C., Hmieleski, K.M., Bradley, B.H. and Busenitz, L.W. (2013). New venture teams: A review of the literature and roadmap for future research. Journal of Management, 40(1), pp.226–255. doi:https://doi.org/10.1177/0149206313493325.

Kor, Y.Y. (2003). Experience-Based Top Management Team Competence and Sustained Growth. Organization Science, 14(6), pp.707–719. doi:https://doi.org/10.1287/orsc.14.6.707.24867.

Kor, Y.Y. and Mahoney, J.T. (2000). Penrose's Resource-Based Approach: The Process and Product of Research Creativity. Journal of Management Studies, 37(1). doi:https://doi.org/10.1111/1467-6486.00174.

Kor, Y.Y., Mahoney, J.T., Siemsen, E. and Tan, D. (2016). Penrose'sThe Theory of the Growth of the Firm:An Exemplar of Engaged Scholarship. Production and Operations Management, 25(10), pp.1727–1744. doi:https://doi.org/10.1111/poms.12572.

Kor, Y.Y. and Sundaramurthy, C. (2008). Experience-Based Human Capital and Social Capital of Outside Directors. Journal of Management, 35(4), pp.981–1006. doi:https://doi.org/10.1177/0149206308321551.

Kronmal, R.A. (1993). Spurious Correlation and the Fallacy of the Ratio Standard Revisited. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 156(3), p.379. doi:https://doi.org/10.2307/2983064.

Kumar, V. and Reinartz, W. (2016). Creating Enduring Customer Value. Journal of Marketing, 80(6), pp.36–68. doi:https://doi.org/10.1509/jm.15.0414.

Lane, P.J. and Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. Strategic Management Journal, 19(5), pp.461–477. doi:https://doi.org/10.1002/(sici)1097-0266(199805)19:5%3C461::aid-smj953%3E3.0.co;2-l.

Lazear, E.P. (2005). Entrepreneurship. Journal of Labor Economics, 23(4), pp.649–680. doi:https://doi.org/10.1086/491605.

Lazear, E.P. (2009). Personnel economics. Mit Press.

Lee, J.M.M., Kim, J.J. and Bae, J. (2016). Are Founder CEOs Better Innovators? Evidence from S&P 500 Firms. Academy of Management Proceedings, 2016(1), p.13311.

Lee, N. and Lings, I. (2008). Doing business research : a guide to theory and practice. London: Sage.

Li, M. and Patel, P.C. (2018). Jack of all, master of all? CEO generalist experience and firm performance. The Leadership Quarterly, 30(3), pp.320–334. doi:https://doi.org/10.1016/j.leaqua.2018.08.006.

Lind, J.T. and Mehlum, H. (2010). With or Without U? The Appropriate Test for a U-Shaped Relationship*. Oxford Bulletin of Economics and Statistics, 72(1), pp.109–118. doi:https://doi.org/10.1111/j.1468-0084.2009.00569.x.

Ling, Y., Simsek, Z., Lubatkin, M.H. and Veiga, J.F. (2008). Transformational Leadership's Role in Promoting Corporate Entrepreneurship: Examining the CEO-TMT Interface. Academy of Management Journal, 51(3), pp.557–576. doi:https://doi.org/10.5465/amj.2008.32626023.

Ling, Y., Zhao, H. and Baron, R.A. (2007). Influence of Founder—CEOs' Personal Values on Firm Performance: Moderating Effects of Firm Age and Size†. Journal of Management, 33(5), pp.673–696. doi:https://doi.org/10.1177/0149206307305564.

Locke, J. (1689). An Essay Concerning Human Understanding.

Luo, X., Kanuri, V.K. and Andrews, M. (2013). How does CEO tenure matter? The mediating role of firm-employee and firm-customer relationships. Strategic Management Journal, 35(4), pp.492–511. doi:https://doi.org/10.1002/smj.2112.

Mackey, A. (2008). The effect of CEOs on firm performance. Strategic Management Journal, 29(12), pp.1357–1367. doi:https://doi.org/10.1002/smj.708.

Malmendier, U. and Tate, G. (2005). CEO Overconfidence and Corporate Investment. The Journal of Finance, 60(6), pp.2661–2700. doi:https://doi.org/10.1111/j.1540-6261.2005.00813.x.

March, J.G. and Sutton, R.I. (1997). Crossroads—Organizational Performance as a Dependent Variable. Organization Science, 8(6), pp.698–706. doi:https://doi.org/10.1287/orsc.8.6.698.

Mathias, B.D., Williams, D.W. and Smith, A.R. (2015). Entrepreneurial inception: The role of imprinting in entrepreneurial action. Journal of Business Venturing, 30(1), pp.11–28. doi:https://doi.org/10.1016/j.jbusvent.2014.07.004.

Mayer, K.J. (2006). Spillovers And Governance: An Analysis Of Knowledge And Reputational Spillovers In Information Technology. Academy of Management Journal, 49(1), pp.69–84. doi:https://doi.org/10.5465/amj.2006.20785502.

McGahan, A.M. and Porter, M.E. (1997). How Much Does Industry Matter, Really? Strategic Management Journal, 18(S1), pp.15–30. doi:https://doi.org/10.1002/(sici)1097-0266(199707)18:1+%3C15::aid-smj916%3E3.3.co;2-t.

Melović, B., Veljković, S.M., Ćirović, D., Vulić, T.B. and Dabić, M. (2022). Entrepreneurial decision-making perspectives in transition economies – tendencies towards risky/rational decision-making. International Entrepreneurship and Management Journal, 18. doi:https://doi.org/10.1007/s11365-021-00766-2.

Michie, J. and Oughton, C. (2024) 'Edith Penrose's influence on economic analysis, strategic management and political economy', International Review of Applied Economics, 38(1–2), pp. 2–11. doi: 10.1080/02692171.2024.2336315.

Miller, D. (1991). Stale in the Saddle: CEO Tenure and the Match Between Organization and Environment. Management Science, 37(1), pp.34–52. doi:https://doi.org/10.1287/mnsc.37.1.34.

Minichilli, A., Zattoni, A. and Zona, F. (2009). Making Boards Effective: An Empirical Examination of Board Task Performance. British Journal of Management, 20(1), pp.55–74. doi:https://doi.org/10.1111/j.1467-8551.2008.00591.x.

Minniti, M., Bygrave, W.D. and Autio, E. (2005). Global Entrepreneurship Monitor 2005 Executive Report..

Mintzberg, H. (1994). The Fall and Rise of Strategic Planning. Harvard Business Review, pp.107–114.

Moroz, P.W. and Hindle, K. (2012). Entrepreneurship as a Process: Toward Harmonizing Multiple Perspectives. Entrepreneurship Theory and Practice, 36(4), pp.781–818. doi:https://doi.org/10.1111/j.1540-6520.2011.00452.x.

Mundlak, Y. (1978). On the Pooling of Time Series and Cross Section Data. Econometrica, 46(1), p.69. doi:https://doi.org/10.2307/1913646.

Nadkarni, S. and Herrmann, P. (2010). CEO Personality, Strategic Flexibility, and Firm Performance: The Case of the Indian Business Process Outsourcing Industry. Academy of Management Journal, 53(5), pp.1050–1073. doi:https://doi.org/10.5465/amj.2010.54533196.

Nelson, R.R. (2003a). On the uneven evolution of human know-how. Research Policy, 32(6), pp.909–922. doi:https://doi.org/10.1016/s0048-7333(02)00093-8.

Nelson, R.R. and Winter, S.G. (1982). An evolutionary theory of economic change. Cambridge, Mass. The Belknap Press Of Harvard Univ. Press.

Nelson, T. (2003b). The persistence of founder influence: management, ownership, and performance effects at initial public offering. Strategic Management Journal, 24(8), pp.707–724. doi:https://doi.org/10.1002/smj.328.

Nicolaou, N. and Shane, S. (2009). Can genetic factors influence the likelihood of engaging in entrepreneurial activity? Journal of Business Venturing, 24(1), pp.1–22. doi:https://doi.org/10.1016/j.jbusvent.2007.11.003.

Nielsen, S. (2010). Top management team diversity: A review of theories and methodologies. International Journal of Management Reviews, 12(3). doi:https://doi.org/10.1111/j.1468-2370.2009.00263.x.

Nonaka, I. and Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. New York: Oxford University Press.

Nyberg, A.J., Moliterno, T.P., Hale, D. and Lepak, D.P. (2014). Resource-Based Perspectives on Unit-Level Human Capital. Journal of Management, 40(1), pp.316–346. doi:https://doi.org/10.1177/0149206312458703.

Ōhno, T. (1988). Toyota Production System : beyond large-scale Production. New York: Productivity Press.

Osborne, J. (2010). Improving your data transformations: Applying the Box-Cox transformation. Practical Assessment, Research, and Evaluation, 15(1). doi:https://doi.org/10.7275/qbpc-gk17.

Parker, G., Alstyne, M.V. and Choudary, S.P. (2016). Platform revolution : how networked markets are transforming the economy and how to make them work for you. New York ; London: W. W. Norton & Company.

Parker, S.C. (2009). The Economics of Entrepreneurship. Cambridge University Press.

Parker, S.C. (2011). Intrapreneurship or entrepreneurship? Journal of Business Venturing, 26(1), pp.19–34. doi:https://doi.org/10.1016/j.jbusvent.2009.07.003.

Parker, S.C. and Belghitar, Y. (2006). What Happens to Nascent Entrepreneurs? An Econometric Analysis of the PSED. Small Business Economics, 27(1), pp.81–101. doi:https://doi.org/10.1007/s11187-006-9003-4.

Penman, S.H. (2013). Financial statement analysis and security valuation. New York: Mcgraw-Hill.

Penrose, E.T. (1959). The Theory Of The Growth Of The Firm. New York: John Wiley.

Penrose, E.T. (1995). The Theory of the Growth of the Firm. Oxford: Oxford University Press.

Peteraf, M.A. (1993). The cornerstones of competitive advantage: A resource-based view. Strategic Management Journal, 14(3), pp.179–191.

Pitelis, C.N. (2009). Introduction. Edith Penrose's 'The theory of the growth of the firm' fifty years later. In: The Theory of the Growth of the Firm. Oxford, UK: Oxford University Press, pp.ix–xlvii.

Ployhart, R.E. and Moliterno, T.P. (2011). Emergence of the Human Capital Resource: A Multilevel Model. Academy of Management Review, 36(1), pp.127–150. doi:https://doi.org/10.5465/amr.2009.0318.

Polanyi, M. (2009). The tacit dimension. Chicago, Ill: The University Of Chicago Press.

Politis, D. (2005). The Process of Entrepreneurial Learning: A Conceptual Framework. Entrepreneurship Theory and Practice, 29(4), pp.399–424. doi:https://doi.org/10.1111/j.1540-6520.2005.00091.x.

Popper, K.R. (2002). The logic of scientific discovery. London ; New York: Routledge.

Porter, M. (1996). What Is Strategy? [online] Harvard Business Review. Available at: https://hbr.org/1996/11/what-is-strategy.

Porter, M.E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Free Press.

Porter, M.E. (1985). Competitive Advantage: Creating and Sustaining Superior Performance. New York: Free Press.

Quigley, T.J. and Hambrick, D.C. (2014). Has the 'CEO Effect' Increased in Recent decades? A New Explanation for the Great Rise in America's Attention to Corporate Leaders. Strategic Management Journal, 36(6), pp.821–830. doi:https://doi.org/10.1002/smj.2258.

Rhodes, C. (2018). Business Statistics Briefing Paper Number 06152. London: House of Commons Library.

Richard, P.J., Devinney, T.M., Yip, G.S. and Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. Journal of Management, 35(3), pp.718–804. doi:https://doi.org/10.1177/0149206308330560.

Roberts, J. (2007). The modern firm : organizational design for performance and growth. Oxford: Oxford University Press.

Robinson, G. and Dechant, K. (1997). Building a Business Case for Diversity. Academy of Management Perspectives, 11(3), pp.21–31. doi:https://doi.org/10.5465/ame.1997.9709231661.

Rochet, J.-C. and Tirole, J. (2003). Platform Competition in Two-Sided Markets. Journal of the European Economic Association, [online] 1(4), pp.990–1029. doi:https://doi.org/10.1162/154247603322493212.

Rosenbaum, P.R. and Rubin, D.B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. Biometrika, 70(1), pp.41–55. doi:https://doi.org/10.2307/2335942.

Sarasvathy, S. (2008). Effectuation: Elements of Entrepreneurial Expertise. Effectuation: Elements of Entrepreneurial Expertise, 243. doi:https://doi.org/10.4337/9781848440197.

Saunders, M., Lewis, P. and Thornhill, A. (2015). Research Methods for Business Students. 7th ed. Harlow, Essex, England: Pearson Education Limited.

Say, J.-B. (1803). A Treatise on Political Economy.

Schein, E.H. (2017). Organizational Culture and Leadership. 5th ed. Hoboken, New Jersey Wiley.

Schildt, H.A., Maula, M.V.J. and Keil, T. (2005). Explorative and Exploitative Learning from External Corporate Ventures. Entrepreneurship Theory and Practice, 29(4), pp.493–515. doi:https://doi.org/10.1111/j.1540-6520.2005.00095.x.

Schumpeter, J.A. (1934). The Theory of Economic Development : an Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard Economic Studies.

Schumpeter, J.A. (1942). Capitalism, Socialism, and Democracy. New York: Harper.

Schunck, R. (2013). Within and between Estimates in Random-Effects Models: Advantages and Drawbacks of Correlated Random Effects and Hybrid Models. The Stata Journal, 13(1), pp.65–76. doi:https://doi.org/10.1177/1536867x1301300105.

Schwartz, S.H. (1999). A Theory of Cultural Values and Some Implications for Work. Applied Psychology, 48(1), pp.23–47. doi:https://doi.org/10.1111/j.1464-0597.1999.tb00047.x.

Shane, S. (2003). A General Theory of Entrepreneurship. Edward Elgar Publishing. doi:https://doi.org/10.4337/9781781007990.

Shane, S. and Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. Academy of Management Review, 25(1), pp.217–226. doi:https://doi.org/10.5465/amr.2000.2791611.

Shepherd, N., Mooi, E., Elbanna, S. and Lou, B. (2023). Fast and high-quality decision-making: The role of behavioral integration. European Management Review, 20(4). doi:https://doi.org/10.1111/emre.12573.

Simsek, Z. (2007). CEO tenure and organizational performance: an intervening model. Strategic Management Journal, 28(6), pp.653–662. doi:https://doi.org/10.1002/smj.599.

Simsek, Z., Heavey, C., Veiga, J.F. and Souder, D. (2009). A Typology for Aligning Organizational Ambidexterity's Conceptualizations, Antecedents, and Outcomes. Journal of Management Studies, 46(5), pp.864–894. doi:https://doi.org/10.1111/j.1467-6486.2009.00841.x.

Sirmon, D.G. and Hitt, M.A. (2003). Managing Resources: Linking Unique Resources, Management, and Wealth Creation in Family Firms. Entrepreneurship Theory and Practice, 27(4), pp.339–358. doi:https://doi.org/10.1111/1540-8520.t01-1-00013.

Sirmon, D.G., Hitt, M.A., Ireland, R.D. and Gilbert, B.A. (2011). Resource Orchestration to Create Competitive Advantage. Journal of Management, 37(5), pp.1390–1412. doi:https://doi.org/10.1177/0149206310385695.

Stanley, M.H.R., Amaral, L.A.N., Buldyrev, S.V., Havlin, S., Leschhorn, H., Maass, P., Salinger, M.A. and Stanley, H.E. (1996). Scaling behaviour in the growth of companies. Nature, 379(6568), pp.804–806. doi:https://doi.org/10.1038/379804a0.

Stephan, U., Hart, M., Mickiewicz, T. and Drews, C.-C. (2015). Understanding Motivations for Entrepreneurship Understanding Motivations for Entrepreneurship. London: Department for Business Innovation & Skills. BIS Research Paper No. 212.

Stinchcombe, A.S. (1965). Social structure and organizations. In: J.G. March, ed., Handbook of Organisations. Chicago: Rand McNally, pp.142–193.

Stuart, E.A. (2010). Matching Methods for Causal Inference: A Review and a Look Forward. Statistical Science, 25(1), pp.1–21. doi:https://doi.org/10.1214/09-sts313.

Stuart, R.W. and Abetti, P.A. (1990). Impact of entrepreneurial and management experience on early performance. Journal of Business Venturing, 5(3), pp.151–162. doi:https://doi.org/10.1016/0883-9026(90)90029-s.

Sutton, J. (2015). Technology and Market Structure : Theory and History. Cambridge: MIT Press.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. Strategic Management Journal, 17(S2), pp.27–43. doi:https://doi.org/10.1002/smj.4250171105.

Tabachnick, B.G. and Fidell, L.S. (2013). Using multivariate statistics. 6th ed. Boston Pearson.

Taouab, O. and Issor, Z. (2019). Firm Performance: Definition and Measurement Models. European Scientific Journal ESJ, 15(1), pp.93–106. doi:https://doi.org/10.19044/esj.2019.v15n1p93.

Teece, D., Peteraf, M.A. and Leih, S. (2016). Dynamic Capabilities and Organizational Agility: Risk, Uncertainty and Entrepreneurial Management in the Innovation Economy. California Management Review, 58(4), pp.13–35. doi:https://doi.org/10.1525/cmr.2016.58.4.13.

Teece, D.J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), pp.1319–1350.

Teece, D.J. (2014). The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in an (Economic) Theory of Firms. Academy of Management Perspectives, 28(4), pp.328–352. doi:https://doi.org/10.5465/amp.2013.0116.

Teece, D.J., Pisano, G. and Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), pp.509–533.

Ucbasaran, D., Westhead, P. and Wright, M. (2001). The Focus of Entrepreneurial Research: Contextual and Process Issues. Entrepreneurship Theory and Practice, 25(4), pp.57–80. doi:https://doi.org/10.1177/104225870102500405.

Ucbasaran, D., Westhead, P. and Wright, M. (2007). Opportunity Identification and Pursuit: Does an Entrepreneur's Human Capital Matter? Small Business Economics, 30(2), pp.153–173. doi:https://doi.org/10.1007/s11187-006-9020-3.

UNESCO Institute of Statistics (2015). International Standard Classification of Education: Fields of education and training 2013 (ISCED-F 2013) Detailed field descriptions. [online] UNESCO Institute for Statistics. doi:https://doi.org/10.15220/978-92-9189-179-5-en.

Unger, J.M., Rauch, A., Frese, M. and Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. Journal of Business Venturing, 26(3), pp.341–358. doi:https://doi.org/10.1016/j.jbusvent.2009.09.004.

Urquhart, A. and Zhang, H. (2021). PhD CEOs and firm performance. European Financial Management, 28(2). doi:https://doi.org/10.1111/eufm.12316.

Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. Administrative Science Quarterly, 42(1), pp.35–67. doi:https://doi.org/10.2307/2393808.

Venkatraman, N. and Ramanujam, V. (1986). Measurement of Business Performance in Strategy Research: A Comparison of Approaches. Academy of Management Review, 11(4), pp.801–814. doi:https://doi.org/10.5465/amr.1986.4283976.

Vissa, B. and Chacar, A.S. (2009). Leveraging ties: the contingent value of entrepreneurial teams' external advice networks on Indian software venture performance. Strategic Management Journal, 30(11), pp.1179–1191. doi:https://doi.org/10.1002/smj.785.

Wasserman, N. (2003). Founder-CEO Succession and the Paradox of Entrepreneurial Success. Organization Science, 14(2), pp.149–172. doi:https://doi.org/10.1287/orsc.14.2.149.14995.

Wasserman, N. (2008). The Founder's Dilemma. [online] Harvard Business Review. Available at: https://hbr.org/2008/02/the-founders-dilemma [Accessed 30 Dec. 2022].

Wasserman, N. (2013). The founder's dilemmas : anticipating and avoiding the pitfalls that can sink a startup. Princeton, N.J.: Princeton University Press.

Wernerfelt, B. (1984). A Resource-Based View of the Firm. Strategic Management Journal, 5(2), pp.171–180. doi:https://doi.org/10.1002/smj.4250050207.

Willard, G.E., Krueger, D.A. and Feeser, H.R. (1992). In order to grow, must the founder go: A comparison of performance between founder and non-founder managed high-growth manufacturing firms. Journal of Business Venturing, 7(3), pp.181–194. doi:https://doi.org/10.1016/0883-9026(92)90025-m.

Williamson, O.E. (1975). Markets and Hierarchies: Analysis and Antitrust Implications. New York: Free Press.

Williamson, O.E. (1979). Transaction-Cost Economics: the Governance of Contractual Relations. The Journal of Law and Economics, 22(2), pp.233–261.

Williamson, O.E. (1985). The economic institutions of capitalism firms, markets, relational contracting. New York, Ny Free Press.

Williamson, O.E. (1991). Strategizing, economizing, and economic organization. Strategic Management Journal, 12(S2), pp.75–94. doi:https://doi.org/10.1002/smj.4250121007.

Winston Smith, S. (2012). New Firm Financing and Performance. In: D. Cumming, ed., The Oxford Handbook of Entrepreneurial Finance. New York: Oxford University Press, pp.133–150.

Wooldridge, J.M. (2019). Introductory Econometrics: a modern approach. 7th ed. S.L.: Cengage Learning.

World Bank Open Data. (2022). Listed domestic companies, total | Data. [online] Available at: https://data.worldbank.org/indicator/CM.MKT.LDOM.NO?end=2019&start=1975&view=chart [Accessed 7 Jan. 2022].

Wright, P., Kroll, M., Krug, J.A. and Pettus, M. (2006). Influences of top management team incentives on firm risk taking. Strategic Management Journal, 28(1), pp.81–89. doi:https://doi.org/10.1002/smj.548.

Wu, S., Levitas, E. and Priem, R.L. (2005). CEO Tenure And Company Invention Under Differing Levels of Technological Dynamism. Academy of Management Journal, 48(5), pp.859–873. doi:https://doi.org/10.5465/amj.2005.18803927.

Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. Journal of Financial Economics, 108(1), pp.250–273. doi:https://doi.org/10.1016/j.jfineco.2012.11.003.

Yin, R.K. (2018). Case Study Research and Applications: Design and Methods. 6th ed. Thousand Oaks, California: Sage Publications.

Yu, X., Dosi, G., Lei, J. and Nuvolari, A. (2015). Institutional change and productivity growth in China's manufacturing: the microeconomics of knowledge accumulation and 'creative restructuring'. Industrial and Corporate Change, 24(3), pp.565–602. doi:https://doi.org/10.1093/icc/dtv011.

Zahra, S.A. (2007). Contextualizing theory building in entrepreneurship research. Journal of Business Venturing, 22(3), pp.443–452. doi:https://doi.org/10.1016/j.jbusvent.2006.04.007.

Zahra, S.A. and Covin, J.G. (1993). Business strategy, technology policy and firm performance. Strategic Management Journal, 14(6), pp.451–478. doi:https://doi.org/10.1002/smj.4250140605.

Zenger, T.R. (1992). Why Do Employers Only Reward Extreme Performance? Examining the Relationships Among Performance, Pay, and Turnover. Administrative Science Quarterly, 37(2), pp.198–219. doi:https://doi.org/10.2307/2393221.

Zhang, Y. and Rajagopalan, N. (2010). Once an outsider, always an outsider? CEO origin, strategic change, and firm performance. Strategic Management Journal, 31(3), pp.334–346. doi:https://doi.org/10.1002/smj.812.

Appendix A

Final list of firms

Description	Number	Comments/description
Firms listed on London Stock Exchange on 31 December 2018	2,144	
Less - firms listed on Alternative Investment Market and Professional Services Market or as "Admission to Trading Only"	(983)	Alternative Investment Market (923), Professional Services Market (21) and "Admission to Trading Only" (39)
Less - firms listed under ICB Industry "Financials" and ICB Super-Sector "Financial Services"	(429)	Refer to Section 3.0 for explanation
Less - blanks allocated under ICB Industry "Financials" and ICB Super-Sector "Financial Services" after further investigation	(17)	Acorn Income Fund LD, Blue Planet Financials Growth and Income Investment Trust, Ceiba Investments Limited, Gabelli Merger Plus+ Trust PLC, Gresham House Energy Storage Fund PLC, Honeycomb Investment Trust PLC, Investec Investment Trust PLC, JPEL Private Equity Limited, Merrill Lynch International & Co CV, PGIT Securities 2020 PLC, Ranger Direct Lending ZDP PLC, Regional REIT ZDP PLC, SDV 2025 ZDP PLC, Sherbourne Investors (Guernsey) C Limited, SQN Secured Income Fund PLC, UK Mortgages Limited and UIL Finance Limited
Less - blanks found to be in liquidation or ceased trading for other reasons	(2)	Ashpol PLC (dissolved 13 February 2018) and BBVA Capital Fund LD (ceased trading 2011)
Less - blanks found to be duplicate entries	(1)	The Governor and Company of Bank of Ireland (predecessor to Bank of Ireland Group)
Less - firms not incorporated in the UK	(245)	Argentina (2), Australia (6), Bahrain (1), Bermuda (16), British Virgin Islands (7), Canada (4), Cayman Islands (3), China (4), Curacao (1), Cyprus (11), Egypt (8), Finland (1), France (2), Germany (3), Gibraltar (1), Greece (2), Guernsey (19), India (3), Ireland (26), Isle of Man (7), Israel (4), Japan (4), Jersey (23), Kazakhstan (3), Kenya (1), Lebanon (2), Luxembourg (3), Mauritius (1), Morocco (1), Netherlands (5), Nigeria (3), Oman (1), Pakistan (1), Poland (2), Qatar (1), Romania (3), Russian Federation (22), Singapore (2), Slovenia (1), South Africa (6), South Korea (5), Spain (4), Switzerland (1), Taiwan (1), Turkey (3), United Arab Emirates (1), United States (11), Zambia (1) and Zimbabwe (2)
Less - Real Estate Investment Trusts or closed-end investment companies, which are part of ICB Industry "Financials" and ICB Super-Sector "Real Estate", but do not have executive management and with non-Executives overseeing Fund Manager activity	(12)	Drum Income Plus REIT PLC, Ediston Property Investment Company PLC, GCP Student Living PLC, LXI REIT PLC, Macau Property Opportunities Fund Limited, Residential Secure Income PLC, Schroder European Real Estate Investment Trust PLC, Supermarket Income REIT PLC, The Local Shopping REIT PLC, Triple Point Social Housing REIT PLC, Tritax Big Box REIT PLC and Vordere PLC

Less - firms where financial data could not be obtained from Bloomberg or human capital information was unavailable, sparse or confused	(5)	Bristol Water PLC, Dukemount Capital PLC, Ecclesiastical Insurance Office PLC, Fishguard & Rosslare Railways & Harbours Company and Northern Electric PLC
Less - firms owned by other listed firms with same board and reporting information	(1)	General Accident PLC
Less - firms that entered liquidation, were dissolved or became insolvent prior to 31 December 2018 but had not been removed from listing	(4)	LB-Shell PLC, Worldlink Group PLC, Worthington Group PLC and Xplorer PLC
Less - firms that entered liquidation, were dissolved or became insolvent after 31 December 2018 but financial information is not available on Bloomberg	(1)	Thomas Cook Group PLC
Less - shell companies or others where little information was found to be available	(1)	World Trade Systems PLC
Number of firms in data set	**443**	

Table A1 - Final list of firms

Appendix B

CEO distribution by firm equity symbol

CEO surname	#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
												Firm equity symbol															
A	0	1	5	6	9	11	12	15	18	20	20	22	22	23	23	23	23	23	26	32	35	37	38	39	39	39	39
B	0	9	20	27	33	35	39	44	49	52	55	56	58	67	70	72	77	77	87	99	104	105	108	113	113	113	113
C	0	8	11	23	24	25	26	30	33	41	45	47	48	53	55	57	59	59	60	69	74	76	79	83	83	83	83
D	0	2	7	13	13	15	16	19	24	26	27	29	31	36	37	38	44	44	49	55	58	58	58	58	59	59	59
E	0	2	3	5	5	6	7	8	8	8	8	10	12	12	13	13	15	15	19	20	22	22	22	22	23	23	23
F	0	0	1	5	7	11	14	15	16	17	17	19	21	24	25	26	30	30	35	40	41	42	42	42	43	43	44
G	0	2	7	16	18	19	21	26	34	35	35	35	36	40	42	42	44	44	51	58	59	60	62	64	64	64	64
H	0	9	21	34	40	43	47	47	56	58	58	59	66	74	77	77	80	80	85	95	105	106	108	113	113	113	113
I	0	1	1	1	2	2	3	3	4	4	4	4	4	5	5	5	6	6	6	7	7	7	7	7	7	7	7
J	0	2	6	6	8	8	10	10	12	13	13	13	15	15	15	15	16	16	17	17	17	17	17	18	18	18	18
K	0	2	8	13	13	14	14	16	20	20	20	20	20	21	23	25	27	27	28	32	35	35	35	36	36	36	36
L	1	6	9	14	15	17	18	20	22	25	25	26	27	32	33	33	37	38	40	45	48	50	50	52	52	52	52
M	1	12	21	31	38	40	42	45	55	57	61	68	73	88	92	93	95	95	104	113	117	119	119	120	120	120	120
N	0	1	2	3	3	3	3	3	3	4	4	5	6	9	9	9	9	9	10	14	16	16	16	16	16	16	16
O	0	1	1	3	3	3	6	6	9	9	9	9	9	10	10	10	10	10	10	14	17	17	17	17	17	17	18
P	1	4	10	17	19	21	21	23	25	26	27	27	29	37	39	40	42	42	48	52	53	57	58	60	60	60	60
Q	0	0	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5
R	0	4	8	9	10	13	13	16	17	18	19	19	21	28	28	28	28	28	34	38	43	43	45	46	46	46	46
S	0	10	15	26	31	31	34	37	43	50	50	54	58	67	69	70	74	74	78	96	100	103	106	109	109	109	110
T	0	4	8	14	20	23	24	25	26	29	29	29	29	33	34	34	37	37	38	39	44	44	44	46	46	46	46
U	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2
V	0	0	4	6	6	6	6	6	7	7	7	7	8	10	10	10	11	11	16	18	18	18	18	18	18	18	18

W	0	8	16	23	27	30	31	37	44	46	48	49	50	53	56	57	61	62	69	83	86	87	90	93	94	94	94
X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Y	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Z	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	2	4	4	4	4	6	6	6	6	6	6	6
Total CEOs	**3**	**88**	**187**	**298**	**349**	**381**	**413**	**457**	**531**	**571**	**587**	**613**	**649**	**745**	**774**	**786**	**836**	**839**	**922**	**1048**	**1113**	**1133**	**1153**	**1186**	**1190**	**1190**	**1193**
Repeats	0	0	0	0	1	1	1	1	1	4	0	0	2	2	0	0	0	1	3	7	1	2	1	4	0	0	0
	0	0	0	0	1	2	3	4	5	9	9	9	11	13	13	13	13	14	17	24	25	27	28	32	32	32	32
Unique CEOs	**3**	**88**	**187**	**298**	**348**	**379**	**410**	**453**	**526**	**562**	**578**	**604**	**638**	**732**	**761**	**773**	**823**	**825**	**905**	**1024**	**1088**	**1106**	**1125**	**1154**	**1158**	**1158**	**1161**

Notes:
1. CEO surname and firm equity symbol are recorded by the first letter or number only
2. Total CEOs, repeats and Unique CEOs are recorded cumulatively starting at company equity symbol # (which represents all numbered equity symbols) and ending at Z

Table B1 - CEO distribution by firm equity symbol

Appendix C

Data collection

Level	Description	Operationalisation
Firm	London Stock Exchange equity symbol	Letters/numbers
	Date admitted to London Stock Exchange	Date
	Firm type	'0' = Independent; '1' = Subsidiary
	SIC	*UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007)* (Great Britain. Office For National Statistics, 2010)
	Country of incorporation	*World Fact Book* (Central Intelligence Agency, 2024)
CEO	Name	Name
	Age	Number
	Gender	'0' = Male; '1' = Female
	Nationality	World Fact Book (Central Intelligence Agency, 2024)
	Cultural background	*List of Ethnic Groups* (GOV.UK, 2021)
	Education level	'0' = Not known; '1' = Pre-degree; 2 = Degree; 3 = Post-graduate
	Professional qualification	'0' = Not known; '1' = Yes
	Education/professional field	*International Standard Classification of Education Fields of Education & Training 2013 (ISCED-F 2013) - Detailed Field Descriptions* (UNESCO Institute of Statistics, 2015)
	Previous firm SIC same as current firm	'0' = No; '1' = Yes
	Internal appointment	'0' = No; '1' = Yes
	Founder	'0' = No; '1' = Yes
	Firm start date	Date
	Parallel directorships	Number
	Shareholding	Number
	Basic salary	Number
	Short-term incentives	Number
	Long-term incentives	Number
	CEO change date	Date

Financial	Number of employees	Number
	Number of shares	Number
	Institutional shareholding	Number
	Foreign ownership	Percentage
	Sales revenue	Value (£ millions)
	Operating income	Value (£ millions)
	Net debt	Value (£ millions)
	Net income	Value (£ millions)
	Total equity	Value (£ millions)
	Total assets	Value (£ millions)
	Total liabilities	Value (£ millions)
	Total investment	Value (£ millions)
	Share price	Value (£ millions)
	R&D expenditure to net sales	Value (£ millions)

Table C1 - Data collection

Appendix D

Pairwise correlations

#	Variable	1	2	3	4	5	6	7	8	9	10	11	12
1	Founder CEO	1.000											
		-											
2	Change in sales revenue	0.122**	1.000										
		(0.000)	-										
3	Return on assets	-0.026*	0.027	1.000									
		(0.047)	(0.052)	-									
4	Return on people	0.036**	0.055**	0.006	1.000								
		(0.007)	(0.000)	(0.675)	-								
5	Firm size	-0.206**	-0.064**	0.050**	-0.185**	1.000							
		(0.000)	(0.000)	(0.000)	(0.000)	-							
6	Firm age	-0.258**	-0.114**	0.020	0.029*	0.100**	1.000						
		(0.000)	(0.000)	(0.131)	(0.031)	(0.000)	-						
7	Length of tenure as CEO	0.388**	0.046**	0.013	0.015	-0.167**	0.019	1.000					
		(0.000)	(0.001)	(0.310)	(0.254)	(0.000)	(0.141)	-					
8	CEO in-firm time	0.110**	0.027	0.022	-0.017	0.0520**	0.044**	0.470**	1.000				
		(0.000)	(0.053)	(0.099)	(0.188)	(0.000)	(0.001)	(0.000)	-				
9	CEO industry experience	0.161**	0.008	-0.021	0.065**	-0.093**	-0.110**	-0.013	-0.175**	1.000			
		(0.000)	(0.556)	(0.116)	(0.000)	(0.000)	(0.000)	(0.329)	(0.000)	-			
10	CEO functional knowledge	-0.038**	-0.017	0.008	0.031*	-0.098**	0.060**	-0.008	-0.061**	-0.010	1.000		
		(0.004)	(0.233)	(0.526)	(0.020)	(0.000)	(0.000)	(0.549)	(0.000)	(0.428)	-		
11	Level of CEO education	-0.154**	-0.045**	-0.026	0.011	0.043**	0.033*	-0.235**	-0.178**	-0.060**	-0.051**	1.000	
		(0.000)	(0.001)	(0.052)	(0.415)	(0.001)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	-	
12	CEO education/training	-0.182**	-0.037**	-0.001	0.021	-0.071**	0.074**	-0.121**	-0.059**	0.056**	0.360**	0.290**	1.000
		(0.000)	(0.010)	(0.962)	(0.118)	(0.000)	(0.000)	(0.0000)	(0.0000)	(0.000)	(0.000)	(0.000)	-

Notes:
1. Entries are Pearson pairwise correlations; two-sided p-values in parentheses.
2. ** $p<0.01$; * $p<0.05$.
3. Correlations computed on the pooled firm-year panel using pairwise deletion.
4. Sample sizes: Univariate N ranges from 5,258 to 5,956 and pairwise N ranges from 4,987 to 5,956 across cells.
5. Firm age is reported in levels here; it enters the regression models as a quadratic.

Table D1 – Pairwise correlations

Appendix E

Propensity score matching

E.1 Motivation and design

This appendix reports a propensity score matching exercise that complements the fixed effects analysis. The aim is to reduce bias from observable differences between FCEO led and NFCEO led firm-years and to test whether the founder growth premium remains when like is compared with like. Propensity score methods seek covariate balance between treated and control observations so that the average treatment effect on the treated is identified under conditional independence and overlap. The design follows standard guidance in the evaluation literature with the propensity score used to form comparable groups and with balance assessed at the covariate level and in aggregate measures of fit and dispersion (Rosenbaum and Rubin, 1983; Stuart, 2010; Austin, 2009; Abadie and Imbens, 2006; Caliendo and Kopeinig, 2008).

E.2 Treatment, outcomes and covariates

The treatment indicator is 'founder_ceo' coded '1' for FCEOs and '0' otherwise. Two outcome variables correspond to the main results: ΔSR, defined as the log change in sales revenue and ROA, defined as return on assets. The propensity score is estimated with a logit model with the covariates employed to construct the matched comparison set, namely firm size (log employees), firm age and firm age squared, years in the CEO role, in-firm time, indicators for CEO industry experience and functional knowledge, CEO education level and an indicator for additional education and training. Observations with missing values on the treatment or covariates are excluded from the matching step and common support is enforced. Variable definitions are consistent with those reported in Chapter 4 and Section 5.1.

E.3 Matching algorithm

One-nearest-neighbour (1:1) matching with replacement is implemented on the estimated propensity score. This choice minimises within-pair distance and, with replacement, reduces bias by allowing the best control to serve as a match for multiple treated units when overlap is limited (Abadie and Imbens, 2006; Stuart, 2010)[15]. Alternative designs were considered, notably radius/calliper matching, k-nearest-neighbours without replacement, kernel/stratification matching and Mahalanobis matching within propensity-score callipers. These approaches can increase precision by using more controls per treated unit, but at the cost of potentially higher bias when overlap is uneven (Caliendo and Kopeinig, 2008; Austin, 2009; Stuart, 2010). Given the distribution of scores in this sample and the aim to

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[15] 1:1 nearest neighbour with replacement is widely used when overlap is imperfect because it minimises matching distance and controls bias; replacement allows high-quality controls to be reused while inflating variance modestly, a trade-off typically preferred when balance is the priority (Abadie and Imbens, 2006; Caliendo and Kopeinig, 2008; Stuart, 2010; Austin, 2009).

prioritise covariate balance over small gains in efficiency, 1:1 with replacement is appropriate and transparent.

Covariate balance is assessed before and after matching using standardised mean differences, variance ratios and global balance statistics from Stata16's 'pstest'. Propensity score overlap is examined with kernel densities for treated and control groups to verify common support and to ensure that matches are drawn from comparable regions of the score rather than by extrapolation. In line with recommended practice, we additionally report Rubin's summary diagnostics (mean/median absolute bias, pseudo-R^2 and LR χ^2) to document improvement in balance (Rosenbaum and Rubin, 1983; Austin, 2009; Stuart, 2010).

E.4 Balance and overlap diagnostics

Table E1 reports covariate balance before and after matching, treating the FCEO group as 'treated' and the NFCEO group as 'control'. Standardised mean differences are expressed in per cent using the pooled standard deviation and the variance ratio is defined as the ratio of treated to control variances. Matching improves balance on all covariates, although some residual differences remain, most notably for firm size, years in the CEO role and in-firm time. These patterns are common in firm-level applications and are acceptable when interpreted alongside the outcome models and other robustness checks. In line with applied guidance, absolute standardised mean differences at or below 10% and variance ratios near unity are typically regarded as indicative of adequate post-match balance (Austin, 2009; Caliendo and Kopeinig, 2008).

Covariate	Unmatched FCEO mean	Unmatched NFCEO mean	Unmatched SMD (%)	Unmatched variance ratio	Matched FCEO mean	Matched NFCEO mean	Matched SMD (%)	Matched Variance ratio
Length of tenure as CEO	16.60	6.99	104.50	3.40*	15.70	18.37	-29.00	0.62*
CEO industry experience	0.65	0.383	54.40	-	0.65	0.522	26.00	-
CEO in-firm time	0.51	0.39	45.10	0.75*	0.49	0.58	-30.50	0.74*
CEO functional knowledge	0.36	0.47	-18.50	1.13	0.35	0.28	11.40	1.38*
Level of CEO education	1.86	2.22	-47.80	1.20*	1.89	1.88	0.90	0.94
CEO education/training	3.11	4.20	-50.20	1.75*	3.14	3.07	3.30	0.81*
Firm size	6.79	8.27	-74.70	0.64*	6.75	7.54	-39.60	0.45*
Firm age	169.42	1,050.00	-89.40	0.04*	165.67	178.93	-1.30	1.24*

Notes:
* Variance ratio $V(T)/V(C)$ flagged by 'pstest' as outside its default balance interval. Unmatched: 0.86–1.17. Matched: 0.85–1.17. Asterisks do not denote statistical significance.

Table E1 – Balance table

Table E2 summarises the global balance diagnostics. The mean and median absolute standardised biases fall from 60.6% and 52.3% to 17.8% and 18.7%. The pseudo-R^2 declines from 0.422 to 0.035 and the likelihood ratio test declines markedly (LR χ^2 from 1,655.24 to 60.13). Taken

together, these shifts indicate that observable differences between treated and control observations are substantially reduced in the matched sample, consistent with the intended role of the propensity score design (Rosenbaum and Rubin 1983; Stuart 2010).

Sample	Pseudo-R²	LR χ²	p-value	Mean bias	Median bias	B	R	% variance
Unmatched	0.422	1,655.24	0.00	60.60	52.30	148.30*	0.10*	86.00
Matched	0.035	60.13	0.00	17.80	18.70	44.90*	0.48*	86.00

Notes:
 * Indicates failure of Rubin balance thresholds B>25% or R outside 0.5-2

Table E2 – Global balance diagnostics

Figure E1 shows that, before matching, the FCEO (treated) observations are concentrated at higher propensity scores, with limited overlap in the tails, indicating material differences in observed characteristics relative to NFCEOs. After matching (Figure E2), the treated and control propensity score distributions are more closely aligned, with visibly improved overlap across most of the common support. This reduction in separation is consistent with the improvements reported in Table E2 and supports use of the matched sample for estimating treatment effects.
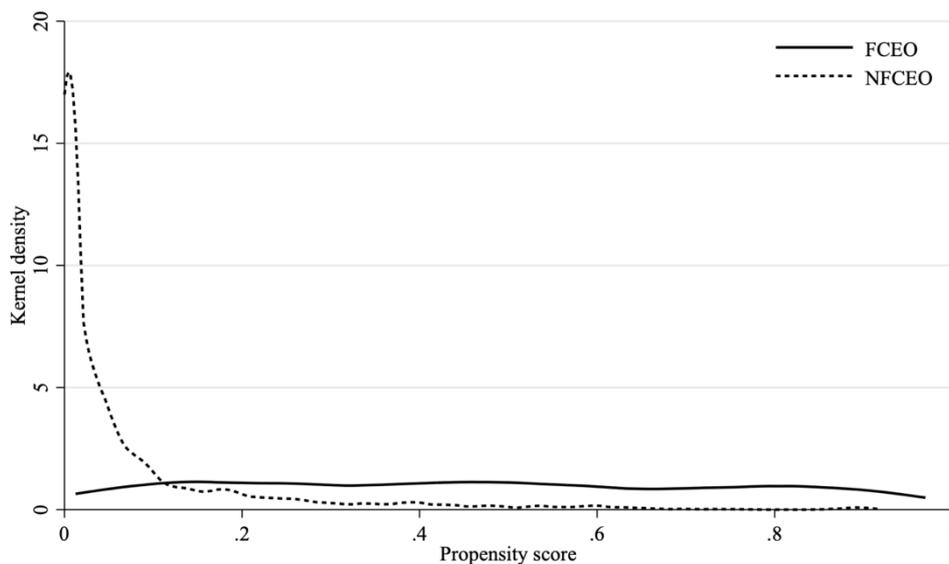
Figure E1 - Propensity score overlap before matching
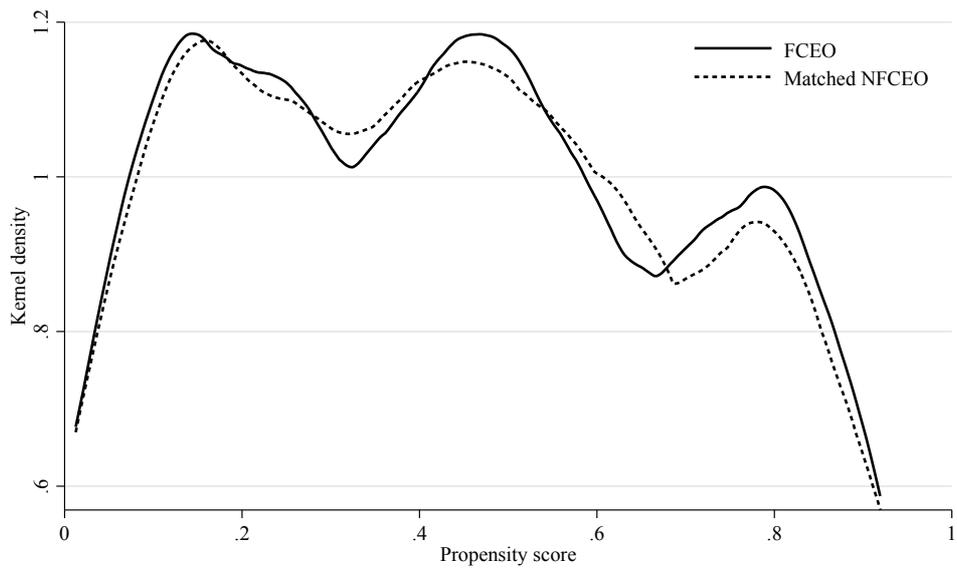
Figure E2 - Propensity score overlap after matching

Figure E3 plots standardised mean differences for each covariate before and after matching. Post-match values move closer to zero for all covariates, although firm size, CEO tenure and in-firm time exhibit the largest residual imbalances. These remaining differences are addressed by reporting outcome estimates on the matched data and retaining the fixed-effects panel models as the primary specification, in line with recommended practice for observational evaluations (Austin, 2009; Stuart, 2010).
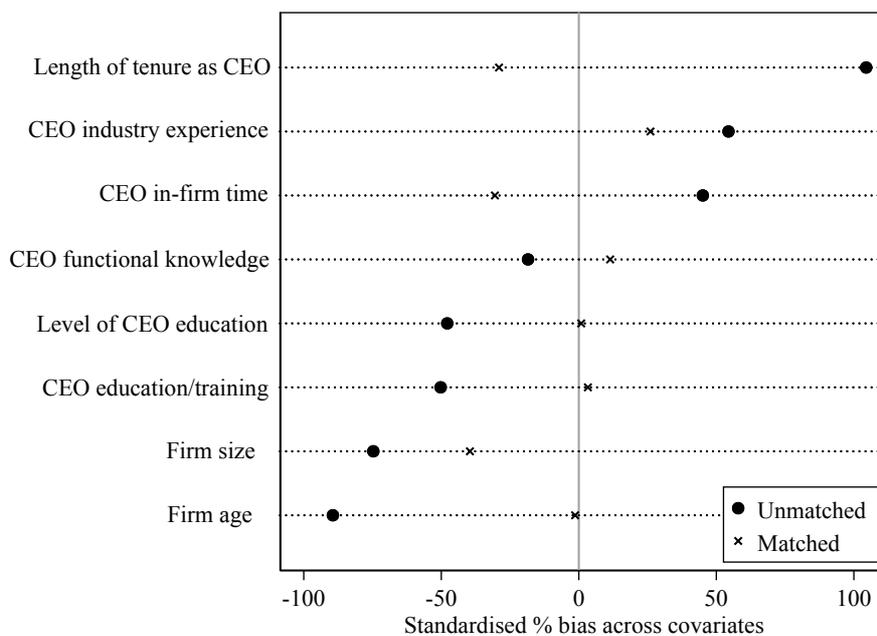
Figure E3 - Standardised mean differences before and after matching

E.5 Estimated effects

The matched estimates for ΔSR and ROA are reported in Table E3. The growth contrast remains positive and statistically significant while the profitability contrast is not statistically significant. These results mirror the fixed-effects estimates and support the interpretation that founder leadership translates into higher top-line growth within the period studied while accounting returns are not different in the same period (Rosenbaum and Rubin, 1983; Austin, 2009).

Dependent variable	ATET	Robust standard error	z-test statistic	p-value	95% confidence interval		Sample size
					Lower bound	Upper bound	
ΔSR	0.053	0.018	2.880	0.004	0.017	0.089	4,910
ROA	-0.156	0.170	-0.918	0.359	-0.491	0.178	5,395

Table E3 - Average treatment effect on the treated (ATET), matched sample

E.6 Interpretation and limitations

The matched comparison preserves the growth difference between founder and non-founder-led firm-years and does not detect a profitability difference. This pattern is consistent with the main panel estimates and supports the interpretation that founder leadership translates more readily into top-line growth than into contemporaneous accounting returns. Matching improves comparability on observables, yet it does not absorb unobserved time-varying shocks and does not resolve possible reverse causality in CEO transitions. These limitations are acknowledged in Section 6.7 and motivate future designs that follow appointments and departures in event time and that use additional sources of identification.

We do not estimate an average treatment effect on the treated for Return on People (ROP), defined as sales revenue per employee. The propensity-score matching design balances on contemporaneous employment using the natural log of employee number, and employment also forms the denominator of ROP. Conditioning on a quantity that is mechanically embedded in the outcome risks removing part of any founder operating through staffing choices and can distort the estimated contrast. Matching covariates should be pre-treatment and not lie on the causal pathway; in this setting employment is plausibly influenced by founder status in the same period as the productivity outcome. This creates a risk of biased or unstable estimates and weakens interpretability of any ATET for ROP. In addition, balance diagnostics indicate residual imbalance and flagged variance ratios for the natural log of employee number after matching, which would propagate directly into any ratio-based outcome. For these reasons, matched ATET estimates are reported for ΔSR and ROA, while ROP is assessed using the fixed effects panel framework with covariate adjustment. This approach follows advised practice for matching designs and for ratio outcomes whose denominators are

themselves treatment-affected (Rosenbaum and Rubin, 1983; Abadie and Imbens, 2006; Austin, 2009; Stuart, 2010; Kronmal, 1993; King and Nielsen, 2019).

Appendix F

Penrose ideas mapping

Figure F1 - Penrose ideas mapping

Pitelis (2009)

Idea
1. Firms are a function of their resources producing goods and services under the direction of their leadership which are then sold in external markets for the purpose of making profit
2. Whilst firm leadership has a level of control over internal processes it has no control over the external markets the firm operates in
3. Leader's actions are motivated by the drive towards profits as this secures the business and leads to growth, which then leads to greater levels of profit
4. The services that each firm offers are a function of the resources they employ. As these resources are different in every firm the services provide to the market are different. For the leaders of these firms, effective use of firm resources and innovation is imperative in achieving positive outcomes
5. Human resources, particularly at a leadership level, that have internal knowledge of the firm are important to growth and this knowledge cannot be acquired in the market
6. Some firm-specific knowledge can be communicated between human resources but some needs to be gained from experiential learning. This makes leadership within a firm particular to that firm
7. Firms always carry a level of unused resources. These spare resources are created due to firm specific knowledge being used by the leadership. These "spare" resources provide a stimulus for further growth and, to a degree, define the future direction of the firm
8. Firms are defined by the resources they utilise to deliver products and services to a market rather than the products and services. As a result, when firms grow it is natural for them to diversify
9. In the same way that there are economies of scale, there are also economies of growth
10. Whilst there is no limit to the size of a firm there are limits to its growth which are a function of the rate at which suitable experienced and knowledgeable leaders within the firm can make and implement growth plans. Firm growth is, therefore, limited by how quickly its leadership can assimilate and use knowledge gained within, and about, the firm
11. Firm growth is reliant on its leaders identifying suitable opportunities in external markets and exploiting them using the available firm resources. The ability to achieve profit and, thus, growth requires firm leaders to be able to identify deviations in the market and for them and the firm to be sufficiently agile to react to the change
12. For firms to ensure long run profitability, growth and survival they need to establish a level of defendable competitive advantage from which they can exploit the opportunities presented by market uncertainty and variation

Kor et al. (2016)

Group	Idea
a. The concept of the firm and its purpose	1. Firms are institutions created by people to serve people
	2. Firm growth happens in a uncertain and unstable environment where firm leadership has to balance the demands of multiple stakeholders
b. The firm as a bundle of resources and the central role of managers	3. The services that a firm provides are unique because the productive resources and how they are utilised are unique to a particular firm
	4. How the resource to service conversion process operates is a function of firm leadership
	5. Firm leaders operate at both a management and entrepreneurial level. The vision of the firm is shaped by the versatility of the leaders entrepreneurship
	6. Leaders with firm-specific experience are vital as they can identify and act on opportunities for firm growth
	7. Leaders with firm knowledge and entrepreneurial skills shape how firms respond to, and pursue, opportunity
c. Unused or underutilised resources as drivers of growth, diversification and innovation	8. Firm growth is achieved using unused or underutilised resources
	9. Firm diversification requires specialised resources or the specialised use of resources. Diversification and specialism enable a firm to survive, grow and respond to an ever-changing competitive environment in the long run
d. Managerial experience as a key bottleneck for rate of firm growth	10. Penrose suggests the issue for firms is not optimal size but how quickly they can grow
	11. The capability of a firm's leadership is the main constraint limiting firm growth (this is the core tenet in what is often referred to as the *Penrose Effect* or *Theory*)
	12. If a firm grows more quickly than its leadership and employees can assimilate new knowledge and experience, then firm efficiency will be degraded
e. Penrose Effect on acquisitions and international expansion as the mechanisms for firm growth	13. The rate that a firm can grow through acquisition is limited
	14. Leadership capability impacts the rate of international growth. A lack of firm capability can be overcome by international acquisitions and this might facilitate higher rates of growth than would be possible organically

Pitelis (2009) — **Hypothesis**

Idea	H1	H2a	H2b	H2c	H2d	H3
1. Firms are a function of their resources producing goods and services under the direction of their leadership which are then sold in external markets for the purpose of making profit	✓	✗	✗	✗	✗	✗
2. Whilst firm leadership has a level of control over internal processes it has no control over the external markets the firm operates in	✓	✗	✗	✗	✗	✗
3. Leader's actions are motivated by the drive towards profits as this secures the business and leads to growth, which then leads to greater levels of profit	✓	✗	✗	✗	✗	✗
4. The services that each firm offers are a function of the resources they employ. As these resources are different in every firm the services provide to the market are different. For the leaders of these firms, effective use of firm resources and innovation is imperative in achieving positive outcomes	✗	✓	✓	✓	✓	✗
5. Human resources, particularly at a leadership level, that have internal knowledge of the firm are important to growth and this knowledge cannot be acquired in the market	✗	✗	✓	✓	✓	✓
6. Some firm-specific knowledge can be communicated between human resources but some needs to be gained from experiential learning. This makes leadership within a firm particular to that firm	✗	✗	✗	✗	✗	✓
7. Firms always carry a level of unused resources. These spare resources are created due to firm specific knowledge being used by the leadership. These "spare" resources provide a stimulus for further growth and, to a degree, define the future direction of the firm	✓	✗	✓	✓	✓	✓
8. Firms are defined by the resources they utilise to deliver products and services to a market rather than the products and services. As a result, when firms grow it is natural for them to diversify	✗	✗	✓	✓	✓	✓
9. In the same way that there are economies of scale, there are also economies of growth	✓	✗	✗	✗	✗	✓
10. Whilst there is no limit to the size of a firm there are limits to its growth which are a function of the rate at which suitable experienced and knowledgeable leaders within the firm can make and implement growth plans. Firm growth is, therefore, limited by how quickly its leadership can assimilate and use knowledge gained within, and about, the firm	✗	✓	✓	✓	✓	✓
11. Firm growth is reliant on its leaders identifying suitable opportunities in external markets and exploiting them using the available firm resources. The ability to achieve profit and, thus, growth requires firm leaders to be able to identify deviations in the market and for them and the firm to be sufficiently agile to react to the change	✓	✗	✗	✗	✗	✓
12. For firms to ensure long run profitability, growth and survival they need to establish a level of defendable competitive advantage from which they can exploit the opportunities presented by market uncertainty and variation	✓	✗	✗	✗	✗	✓

Hypothesis legend:

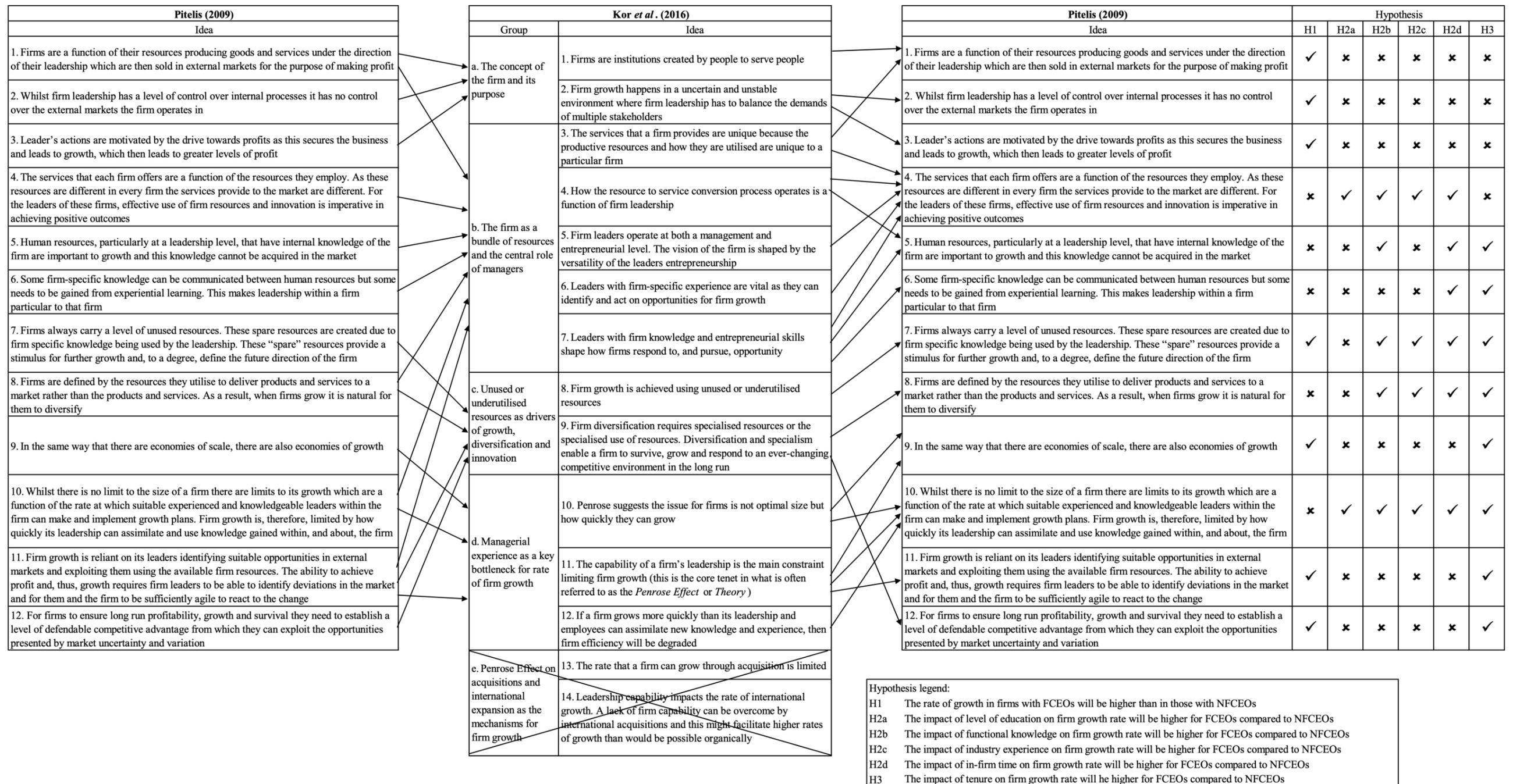|	
H1	The rate of growth in firms with FCEOs will be higher than in those with NFCEOs
H2a	The impact of level of education on firm growth rate will be higher for FCEOs compared to NFCEOs
H2b	The impact of functional knowledge on firm growth rate will be higher for FCEOs compared to NFCEOs
H2c	The impact of industry experience on firm growth rate will be higher for FCEOs compared to NFCEOs
H2d	The impact of in-firm time on firm growth rate will be higher for FCEOs compared to NFCEOs
H3	The impact of tenure on firm growth rate will he higher for FCEOs compared to NFCEOs

Figure F1 - Penrose ideas mapping