

The European
Journal of Finance



The effects of top management team strategic cognition on corporate financial health and value: an interactive multi-dimensional approach

Journal:	<i>The European Journal of Finance</i>
Manuscript ID	REJF-2021-0009.R1
Manuscript Type:	Special Issue
Keywords:	Firm solvency and value, risk appetite, strategic cognition, upper echelons theory, human capital, behavioural finance

SCHOLARONE™
Manuscripts

This is an Accepted Manuscript of an article published by Taylor & Francis in The European Journal of Finance on 15th Sept 2021, available online: <https://www.tandfonline...0/1351847X.2021.1977360>

The effects of top management team strategic cognition on corporate financial health and value: an interactive multi-dimensional approach

Abstract

The upper echelons theory posits that the values, personalities, experience and education background of the top management team (TMT) affect both executives' strategic cognition and corporate outcomes. Since TMT members differ in their cognitive structures, as also acknowledged by the presence of managerial biases and irrationalities in the behavioural finance theories, policy makers and scholars are saddled with the problem of identifying specific cognitive elements that can secure optimum organisational outcomes. Conceptual approaches or linear relationships between TMT strategic cognition (TMT-SC) and outcomes are unable to capture the complex interdependencies among TMT-SC, TMT attributes and performance. We propose and empirically test a dynamic multi-dimensional TMT-SC model. Using handpicked UK company panel data, we provide robust empirical evidence that extends our understanding of the theory. Our PLS-SEM analyses show that heterogeneity in TMT academic and professional qualifications, and work experience alone cannot provide optimal benefits to organisations. However, when they are combined with other TMT cognitive factors such as social networking, innovativeness and risk-taking levels, these aspects appear to improve firm value and financial health.

Keywords: Firm solvency and value, risk appetite, human capital, strategic cognition, upper echelons theory, behavioural finance

1. Introduction

Strategic decision-making processes reflect changes in the organisational environment in line with top management team (TMT) characteristics (Daniels et al. 1994; Naranjo-Gil et al. 2008; Mintzberg et al. 1976). Upper echelons theory (UET) suggests that the experience and education background of the TMT affects both executives' strategic cognition and corporate outcomes. TMT strategic cognition (TMT-SC) captures linkages in the cognitive trust pathways governing TMT mental models in the formulation and implementation of corporate strategies. Such mental models include the assumptions, theories and arguments that TMTs use to navigate through their complex networks of information during strategic decision-making. Changes in organisational performance should reflect TMT characteristics such as experience, education, risk-taking, innovativeness and social capital (Kor and Mesko 2013; Acquaah 2012; Berger et al. 2014; Hambrick and Mason 1984). Behavioural finance literature also acknowledges the relevance of managerial characteristics and biases (Baker and Wurgler 2011; Kaplan and Sorensen 2021).

Yet, there is no consensus regarding the effect of TMT attributes on firm outcomes (Hambrick et al. 2015; Buyl et al. 2011). Despite TMT-SC popularity (Kaplan 2011), our understanding of the relationship between TMT-SC and outcomes is limited by associations that are either conceptual and, therefore, untested, or that simply assume linear links (DeFond et al. 2005; Hamori and Koyuncu 2015; Kor 2003; Kunc and Morecroft 2010), which may mask complex interdependencies among TMT-SC, TMT attributes and performance. Considering the recent emphasis on the complexity of TMT constrained decision-making processes and cognition (Costanzo and Di Domenico 2015) and insights from configuration theory (Hughes et al. 2018) to explain complex interdependencies, we respond to the calls (Carpenter et al. 2004; Shepherd et al. 2017) for empirical research to examine the interactions among multiple dimensions of TMT-SC and firm outcomes.

Drawing on UET (Hambrick and Mason 1984) and strategic cognition and managerial capabilities literature (Kor and Mesko 2013; Teece 2007; Helfat and Peteraf 2009, 2015), we propose an interactive TMT-SC model that influences firm outcomes via random configurations and multiple

1
2 combinations of overlaps of TMT-SC dimensions. Particularly, we investigate the multi-faceted
3
4 micro dimensions of TMT-SC (i.e. different combinations of education background, work experience,
5
6 risk-taking and innovativeness, and networking capabilities) that shape TMT-SC, and relate them to
7
8 corporate performance. We provide empirical evidence based on handpicked data between 2008-2016
9
10 on the background and experience of over 14,175 TMT members of the FTSE 350 companies. Using
11
12 partial least squares-structural equation model (PLS-SEM) to capture the unique cognitive latent
13
14 constructs, we find that TMT education and experience alone do not generate positive effects on
15
16 corporate outcomes. Rather, it is the peculiar combinations of TMT education and experience together
17
18 with their innovativeness, risk appetite and networking capabilities which have positive effects on
19
20 corporate financial health and value as they provide firms with competitive advantages.
21
22
23
24

25 We contribute to the UET and strategic management literatures in several ways. First, our
26
27 study uses the two-stage throughput decision-making model (TPDMM) with PLS-SEM to examine
28
29 how TMT-SC influences firms' financial health and value in the UK. The throughput model is a
30
31 cognitive framework that captures different pathways and stages that can influence TMT strategic
32
33 decision-making (Rodgers 2010; Rodgers et al. 2013, 2017). This enables us to extend previous
34
35 studies which used conceptual approaches or simple OLS in examining the effect of TMT-SC on
36
37 performance (Cannella et al. 2008; Lee and Brinton 1996; Nadkarni and Narayanan 2007; Narayanan
38
39 et al. 2011; Talke et al. 2010). We argue that organisations are parts of complex social structures and,
40
41 therefore, their performance not only reflects TMT characteristics, but also the dynamic nature of the
42
43 structures and complex webs of the institutional, professional and social networks in which they are
44
45 embedded. Second, we contribute to the TMT-SC perspective by acknowledging dynamic
46
47 interactions among multiple cognitive elements (i.e., social networking, education, experience, risk-
48
49 taking and innovation capabilities) to measure the effects of the TMT-SC process on performance; in
50
51 so doing, we propose and demonstrate that TMT-SC influences firm outcomes via random
52
53 configurations and multiple combinations of overlaps of heterogeneous TMT-SC elements in a
54
55 dynamic framework. Third, we contribute to the strategic management literature by providing robust
56
57
58
59
60

empirical evidence about why some firms may perform better than their rivals. This study, thus, looks inside the minds of the strategists. This is relevant as we argue that heterogeneity in the resource configurations of rival firms (Molloy and Barney 2015; Wernerfelt 1984, 1995; Barney et al. 2001) emerges from the interactions between TMT-SC processes and dynamic capabilities.

This study proceeds as follows. In Section 2, we provide the literature review and discuss the theoretical background, and in Section 3 we develop hypotheses. Our methods, data and latent constructs are elaborated in Section 4. Section 5 explains the measurement validations and provides the results of the analyses. Section 6 provides a discussion for practical implications and future research, and Section 7 concludes the paper.

2. Literature review and theoretical framework

2.1. Issues related to behavioural finance considering cognitive biases

Since the seminal work of Modigliani and Miller (1958), much research effort has been directed at understanding firms' financing and investment decisions and the corresponding effects on firm value. Until recently, the standard approach has been to assume the rationality of managers and investors. For example, a large body of research exists examining the role of security signaling in the face of informational asymmetries in a rational framework (e.g. Leland and Pyle 1977; Ross 1977; Myers and Majluf 1984). Another strand of research examines the use of capital structure to mitigate agency problems (Jensen and Meckling 1976; Grossman and Hart 1982; Jensen 1986; Fairchild 2005a). This approach assumes a principal-agent problem based on selfish managerial rationality.

However, the cognitive and psychological biases may have a significant effect on decision-making and outcomes in corporations and financial markets. This has resulted in the development of behavioural finance with behavioural assumptions, examining the effects of investors' biases on financial markets, and behavioural corporate finance, focusing on the effects of managerial biases on corporate finance decisions. Within behavioural corporate finance, scholars are increasingly recognising that the bias of overconfidence may play a significant role in managers' financing and

1
2 investment decisions (Baker and Wurgler 2011; Kahneman and Lovallo 1993; Shefrin 2001; Goel
3 and Thakor 2008; Malmendier and Tate 2005; Heaton 2002, Gervais et al. 2003, Hackbarth 2009).
4
5 Heaton (2002) cites the psychological research (Weinstein 1980; March and Shapira 1987) that
6
7 supports the view that people are overoptimistic/overconfident. This research demonstrates that
8
9 agents tend to be more optimistic about outcomes a) they believe they can control, and b) to which
10
11 they are highly committed. Both findings support the view that managers may be overconfident about
12
13 the success of their ventures.
14
15

16
17 Departing from focusing only on individuals, Gervais and Goldstein (2003) show the importance of
18
19 a concerted effort in a team of rational and overconfident individuals. They argue that performance
20
21 can be enhanced via the hard work and effort triggered by the overconfident individual, and this
22
23 Pareto improvement can be applied to corporate TMTs. Fairchild (2005c) extends Gervais and
24
25 Goldstein's (2003) study and incorporates the dimension of the overconfident individual's
26
27 negotiating power that reduces the efforts of the rational peer. As this occurrence reduces the firm
28
29 value, Fairchild (2005c) proposes an optimal solution by considering the concept of fairness in a
30
31 game-theoretic setting, as fairness during bargaining would restore the incentives of the rational
32
33 player to increase their effort. Similarly, Meissner et al. (2018) examine the decision-making in teams
34
35 (i.e. top management team) as opposed to individual decision-making. They demonstrate that
36
37 demographic diversity alleviates group-level overconfidence and cognitive conflicts in teams owing
38
39 to the diverse perspectives and ideas pertaining to a specific team. This discussion has implications
40
41 for the relevance of human and/or social capital in our empirical analyses.
42
43
44
45
46
47

48
49 Decision-making at firm level is complicated and prone to cognitive biases. The effects of
50
51 psychological factors on corporate financial policies have been broadly studied, more studies
52
53 beginning to recognise the importance of this field of research (Bertrand and Schoar 2003; Heaton
54
55 2002; Malmendier and Tate 2005; Ben-David, Graham, and Harvey 2010). Overconfident executives
56
57 are likely to overestimate the probability of success of projects, and make optimistic forecasts
58
59 (Statman and Caldwell 1987; March and Shapira 1987; Kahneman and Lovallo 1993). It is further
60

1
2 shown that overconfident managers issue excessive levels of debt and avoid new equity issues
3
4 (Malmendier et al. 2011; Hackbarth 2008). Moreover, Atallah et al. (2018) show that overconfident
5
6 executives lengthen the maturity of borrowings and consider overconfidence a preferable managerial
7
8 trait, as it reduces the agency cost of debt financing. Further, Hirshleifer et al. (2012) argue that
9
10 overconfident CEOs are better innovators (i.e. as per their entrepreneurial characteristics), which is
11
12 parallel to the consideration of innovativeness and risk-taking levels in our empirical analyses. As
13
14 high risk-taking and responsibility tend to be linked with overconfident/overoptimistic managers, one
15
16 would expect such managers to produce very good or very bad corporate outcomes. The perception
17
18 of risk for overconfident executives can be shaped by some emotional and cognitive factors.
19
20

21
22
23 Doukas and Petmezas (2007) examine the correlation between managerial overconfidence and post-
24
25 merger return using data from UK private firms. They find that self-attribution, which naturally leads
26
27 to overconfidence, encourages managers to engage in more acquisitions after the initial success. Their
28
29 work also reports that overconfident managers generate lower announcement returns and poorer long-
30
31 term performance than their rational peers. Xia and Pan (2006) present a dynamic model of takeover
32
33 which incorporates managerial overconfidence. It is shown that a high level of overconfidence can
34
35 lead to negative return on a bidding firm's shareholders. On the other hand, Brown and Sarma (2007)
36
37 argue that it is of equal importance to study the extent to which a CEO is able to impose his or her
38
39 overconfidence on corporate decisions. During the period 1994-2003, they suggest that Australian
40
41 CEOs' dominance is at least as significant as overconfidence in deciding to make an acquisition.
42
43

44
45 Malmendier and Tate (2005) consider the relationship between managerial overconfidence, internal
46
47 funds and corporate investment. Gervais et al. (2003) employ a real-options framework in order to
48
49 consider the combined effects of managerial risk-aversion and overconfidence on the decision to
50
51 invest immediately in a project, or to delay investment. Kahneman and Lovallo (1993) argue that
52
53 managerial optimism may lead to managers making 'bold forecasts' regarding prospective projects,
54
55 while at times making timid choices due to risk aversion. Heaton (2002) argues that overconfidence
56
57 leads to managers overestimating the net present value of new investment projects. Hence, they will
58
59
60

1
2 invest in negative NPV projects that they mistakenly believe to be positive NPV. Hence,
3
4 overconfidence is value-reducing. Similarly, Malmendier and Tate (2005) argue that overconfidence
5
6 may result in corporate investment distortions. Overconfident managers view external funds as
7
8 unduly costly. Therefore, they over-invest when they have abundant internal funds, and underinvest
9
10 when they require external financing. Zacharakis and Shepherd (2001) consider the investment
11
12 appraisal process of venture capitalists. They argue that, due to time and resource constraints, VCs
13
14 may be overconfident in their ability to evaluate business plans. In particular, they may overestimate
15
16 the bad signals that they receive, and this may lead to the excessive rejection of potentially good
17
18 projects. Statman and Tyebjee (1985) examine the effect of managerial overconfidence on the
19
20 forecasts of revenue and costs in the NPV calculation. They argue that overconfidence results in the
21
22 manager overestimating the expected revenues and underestimating the expected costs for a potential
23
24 project. Hence, the NPV is inflated by overconfidence, resulting in managers taking up too many bad
25
26 projects. Pruitt and Gitman (1987) conducted a mail survey of US managers in order to analyse
27
28 various aspects of managerial bias in capital budgeting forecasts. They support Statman and Tyebjee
29
30 (1985) that capital budgeting forecasts are optimistically biased by people with work experience.
31
32 Considering conflicts between shareholders and executives, Hackbarth (2008) reported that the
33
34 capital structure chosen by overconfident managers always deviates from optimal capital structure
35
36 theory, which becomes a challenge to the trade-off theory. He shows that, compared with the rational
37
38 managers, overconfident executives tend to use more debt. This is because overconfident managers
39
40 are prone to overestimate the profitability of the invested project and underestimate its risks.
41
42 Heaton (2002) integrates the managerial overconfidence assumption and free cash flow theory,
43
44 establishing an under-investment/over-investment trade-off related to free cash flow without invoking
45
46 asymmetric information or rational agency costs and using the optimism management hypothesis to
47
48 explain the pecking order theory. He reports that optimistic managers overestimate their ability to
49
50 create value for their firms, and also overestimate the future free cash flow brought by their
51
52
53
54
55
56
57
58
59
60

1
2 investment, believing that capital markets undervalue their firms' risky securities, and may pass up
3 positive net present value projects that must be financed externally.
4

5
6 Hackbarth (2009) employs a real options framework, combined with an earnings-based leverage
7 model to analyse the link between overconfidence, investment and debt. Specifically, he focuses on
8 the conflict between shareholders and bondholders, embodied in Myers' (1977) under-investment
9 problem. Debt induces an inefficient delay in investment, but mild overconfidence mitigates this
10 problem. Hackbarth further demonstrates that an increase in risk-shifting opportunities exacerbates
11 under-investment, and that leverage is inversely related to the value of investment opportunities.
12

13
14 Entrepreneurs are more prone to cognitive biases than others, and might display a higher level of
15 optimism. For example, Palich and Bagby (1995) find that entrepreneurs tend to think positively
16 about equivocal business situations. Wu (2005) suggests that entrepreneurs are overconfident in their
17 ability, leading to excessive risk tolerance. An entrepreneur would choose an industry with a high
18 cost of ability uncertainty over one with a low cost of ability uncertainty. Busenitz and Barney (1997)
19 claim that 'entrepreneurial cognition' (Busenitz and Lau, 1996), such as overconfidence, is what
20 makes one an entrepreneur. Landier and Thesmar (2009) provide a similar discussion and evidence
21 for French entrepreneurs with persistent biases/beliefs that lead to high expectations.
22

23
24 Malmendier and Tate (2005) categorise CEOs according to their degree into three groups: the first
25 group is CEOs with finance education - namely, those who have graduated with a degree in finance,
26 accounting and economics; the second group is those with a technical education, for instance,
27 computing or engineering; the third group consists of those with other degrees, such as law or
28 literature. However, there have been few attempts to link education background theoretically to
29 managerial overconfidence. It is suggested that the education background of CEOs has an influence
30 on their level of overconfidence. The authors imply that a CEO's human capital is tied to corporate-
31 specific riskiness. This aspect is related to our measure regarding human capital with social capital
32 implications, which we will discuss in detail in the following sections.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Despite the fact that heavy use of debt increases the risk of bankruptcy, and that overconfident CEOs
4 may perceive less risk due to the illusion of control, some researchers uncover the positive role of
5 overconfidence in reducing bondholder-shareholder conflict. Hackbarth (2009) incorporates an
6 earning-based capital structure model into a real option framework and finds that overconfidence as
7 a commitment device drives CEOs to achieve results closer to first-best option. He provides evidence
8 that overconfidence, which results in higher leverage, could reduce agency costs and reconcile
9 manager-shareholder conflicts. Similarly, Fairchild (2005b) investigates the combined effects of
10 overconfidence, asymmetric information and moral hazard on financing decisions, and reaches the
11 conclusion that overconfidence does not necessarily undermine shareholder value.

12
13
14
15
16
17 Additionally, Fairchild (2009) sheds light on life-cycle financing choices and proposes the model of
18 'excessive life-cycle debt sensitivity due to managerial overconfidence'. He states that overconfident
19 managers might perceive value-reducing projects as value-increasing.

20 21 22 23 24 25 26 27 28 29 30 31 **2.2. Overconfidence as a cognitive bias and firm performance**

32
33 While rational managers argue that they are attempting to maximise their shareholders' value, we can
34 hear the same statement from irrational (overconfident) managers as well. However, what we hear
35 from the latter should be less convincing due to their cognitive biases. Some researchers argue that
36 managerial overconfidence can affect the financing behaviour and thus the value of the firm.
37 Hackbarth (2008) incorporates well-documented managerial traits into a trade-off model of capital
38 structure to study their impact on corporate financial policy and firm value. Optimistic managers
39 choose higher debt levels and issue new debts more often. However, biased managers' higher debt
40 levels restrain them from diverting funds, which increases firm value by reducing this manager-
41 shareholder conflict. Although higher debt levels delay investment, mildly biased managers'
42 investment decisions can increase firm value by reducing this bondholder-shareholder conflict.

43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
Ahmed et al. (2020) consider a theoretical model in which overconfident managers take strategic
decisions regarding corporate hedging to manage risk and relate these decisions to firm performance

1
2 and value creation. They argue that overconfidence leads managers to overestimate their ability, but
3
4 underestimate the financial distress costs. Their empirical and theoretical analyses report both value-
5
6 enhancing and value-destroying outcomes of corporate risk management, depending on the situations
7
8 involving managers' ability, risk appetite levels and overconfidence.
9
10

11 Overconfident managers may misjudge negative NPV projects as positive-NPV ones, and hence
12
13 destroy firm value by over-investing (Heaton 2002). Gervais et al. (2003) argue in their real option-
14
15 based approach that risk-averse managers hesitate more than overconfident managers with respect to
16
17 taking up new projects. This implies that overconfident managers may adopt risky investment policies
18
19 and that their efforts may deteriorate due to their optimism. The authors further state that
20
21 compensating overconfident managers means transferring wealth from shareholders to managers.
22
23 They propose that a moderate level of overconfidence and optimism mitigates agency costs by
24
25 reducing the need for option compensation, thus enhancing firm value. While massive research has
26
27 focused on the adverse impact of optimistic bias, it should be noted that overconfidence sometimes
28
29 plays a positive role and increases firm value. As Gervais et al. (2003) state, unlike risk-averse rational
30
31 managers who will postpone a project until uncertainty is eliminated, overconfident managers appear
32
33 to be less hesitant before making decisions. Hence, with a moderate level of over-optimism, the
34
35 interests of managers and shareholders can be aligned and agency costs can be reduced. There are
36
37 conflicting arguments regarding the benefits of holding free cash flow (FCF). Jensen (1986) argues
38
39 that the presence of FCF can make managers over-invest in projects or squander cash for their
40
41 personal use. Myers and Majluf (1984), on the other hand, favour the presence of FCF because when
42
43 managers need external financing, they might reject positive-NPV projects, which leads to under-
44
45 investment inefficiencies. The underlying reason is that managers perceive their stocks to be
46
47 undervalued and hence avoid issuing equities. Heaton (2002) blends these two arguments: optimistic
48
49 managers who need external financing may cause under-investment by passing up valuable projects
50
51 as they believe external funding is too costly. In such cases, FCF would avoid this under-investment.
52
53 The other side of the coin is that optimistic managers can overestimate future cash flows and thus
54
55
56
57
58
59
60

1
2 over-value investments. Hence, managerial optimism and the availability of FCF together could lead
3
4 to over-investment. Chatterjee and Hambrick (2007) hypothesise that the higher intensity of CEO
5
6 narcissism leads to more extreme firm performance, i.e. very high returns or big losses. Also, Gider
7
8 and Hackbarth (2010) state that mildly biased managers can enhance firm value. These issues suggest
9
10 that it is difficult to observe a linear association between firm value and managerial overconfidence.
11
12
13
14

15 **2.3. Strategic decision-making by top management team**

16
17 Organisations are made up of normative, cultural-cognitive, legal and regulatory elements which
18
19 influence TMT-SC (Scott 2013). The UET provides a strategic armoury during TMT strategic
20
21 decision-making and enables TMTs to predict rival firms' behaviour; furthermore, it suggests that
22
23 TMT characteristics matter more when more complex decisions need to be addressed. This is
24
25 consistent with McGuinness (2019), who discusses the role of upper echelons, resource dependence
26
27 and stakeholder theories in affecting TMT decision-making and how TMT demographics influence
28
29 corporate value. Helfat and Peteraf (2009) and Kor and Mesko (2013) argue that managerial
30
31 capabilities are governed by TMT cognitive abilities which enable managers to integrate, build and
32
33 re-engineer firms' resources and competencies, and adopt appropriate processes to achieve
34
35 evolutionary fitness for the organization. TMT cognitive footprint influences the manner in which
36
37 firms employ their capabilities (Barney et al. 2001; Helfat and Peteraf 2009; Ndofor et al. 2015;
38
39 Wernerfelt 1995). Moreover, firms maximise yields not because they have better resources, but
40
41 because they have unique capabilities of making good use of the resources via enhanced TMT-SC
42
43 (Cannella et al. 2008; Nadkarni and Narayanan 2007; Narayanan et al. 2011; Talke et al. 2010) and
44
45 more effective strategy implementation processes (Barney 1991).
46
47
48
49
50

51
52 TMT-SC involves intuition, conscience, consciousness, sensing, seizing, reflexivity and
53
54 reconfiguration, which constitute the main micro components of TMT dynamic capabilities (Teece
55
56 2007). Intuition and consciousness influence the attention to, and absorption of new knowledge,
57
58 whereas conscience is related to ethical stance. Sensing involves the alertness and discovery process
59
60

1
2
3 (Helfat and Peteraf 2009; Ndofor et al. 2015). Sensing is drawn from TMT perception, competence,
4
5 experience and trust relations, whereas seizing involves taking advantage of opportunities by
6
7 designing new business models (Kor and Mesko 2013). Reflexivity and reconfiguration are processes
8
9 adopted by TMT to achieve evolutionary fitness, and involve speed of adjusting to technological
10
11 change, selection, configuration, alignment and modification of corporate resources (Helfat and
12
13 Peteraf 2015). TMT-SC is influenced by TMT education, experience, risk-taking and innovativeness,
14
15 social and human capital and the availability of adequate and relevant information (Hambrick et al.
16
17 2015; Wang et al. 2016; Carpenter et al. 2004; Sparrow 1999). Social relations are important since
18
19 they partly influence TMT logical sense-making (Ibarra and Andrews 1993; Robert et al. 2008).
20
21
22

23
24 Scholars have acknowledged the connection between reputation and firm performance. For
25
26 instance, Tischer et al. (2014) find that positive (negative) announcement effects exist regarding
27
28 upgraded (downgraded) companies. Following event announcements that impact on the perceptions
29
30 of corporate reputation, investors gain new information from the changes in published rankings to
31
32 adjust share prices. Further, regarding reputation linked to corporate environmental responsibility, Jo
33
34 et al. (2015) report that the latter enhances operating performance not only in the manufacturing sector
35
36 but also in the financial services sector. Boldness in strategic implementation can positively influence
37
38 firm performance. It is argued that high levels of managerial self-belief, commitment and
39
40 determination are needed to outperform rivals. Such elevated levels are not just useful, but indeed
41
42 essential. In tough competitive situations where positive thinking can influence outcomes, only those
43
44 who are willing to go beyond what seems reasonable will be able to succeed and outperform their
45
46 rivals (Rosenzweig 2013). However, during times of crisis, greedy CEOs neglecting socially
47
48 responsible investment experience greater losses in the short run. Note that it took a relatively long
49
50 time to recover from the 2008 global financial crisis (Sajko et al. 2021).
51
52
53

54
55 Haynes (2015), in illustrating the dark side of leadership, focuses on the 'exaggerated pride
56
57 or self-confidence, often resulting in retribution' (Hayward and Hambrick 1997, p. 106) and greed as
58
59 the 'desire for and active pursuit of extraordinary material wealth' (Haynes et al. 2017, p. 6). Haynes
60

1
2
3 (2015) highlights a theoretical link between these two extreme traits and posits that the presence of
4
5 either or both can have a negative effect on human and social capital in entrepreneurial ventures. In
6
7 turn, these mediators are likely to influence the potential success – or the lack thereof – of new
8
9 ventures and lead to suboptimal financial results. Black et al. (2019) find that self-efficacy has a
10
11 positive influence on team cohesion, with high self-efficacy shown to be an important mediator of
12
13 the relationship between emotional intelligence and team cohesion. Particularly, high emotional
14
15 intelligence promotes the development of self-efficacy, resulting in increased team cohesion, which
16
17 then improves team performance. In another account on entrepreneurs' self-efficacy and
18
19 performance, Baron et al. (2016) draw on goal-setting theory, which suggests that difficult goals
20
21 enhance performance in many tasks. However, if the goals are too difficult, they can become
22
23 unattainable, thus causing discouragement and reduced motivation amongst entrepreneurs and in firm
24
25 performance. Baron et al. (2016) find that self-control, one important aspect of self-regulation, may
26
27 restrain this tendency and encourage entrepreneurs to set goals that, although difficult, are also
28
29 achievable. Their study also reveals a reversed-U link between goal difficulty and performance.
30
31
32
33

34
35 In times of crisis and great uncertainty, leaders' experience may not have much relevance
36
37 when adaptability and resilience are the main requirements. For instance, Williams et al. (2017) argue
38
39 that how individuals and organisations anticipate and respond to adversity depends on their
40
41 capabilities in the areas of durability, organising and adjusting, and responding to major disturbances.
42
43 Further, in times of crisis, a CEO's narcissism can lead to bad decisions and negative performance
44
45 (Al-Abrow et al. 2019). Fourth, success can also be due to serendipity. Johansson (2012) notes that
46
47 success can be born of serendipity, which involves luck or stumbling upon something unusual and
48
49 then having the foresight to capitalise on it (Boomer 2018). Whereas it is well-acknowledged that
50
51 success is likely to be positively affected by a formal, meticulous and well-planned strategic
52
53 approach, equally, in some instances, success can also depend on making a discovery by accident or
54
55 luck and capitalising on it (Serenko and Dumay 2017).
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Despite such theoretical developments, to the best of our knowledge, so far there has been no robust empirical study to evidence the effects of TMT multi-dimensionality on TMT-SC and firm performance. Our understanding of such relationships is limited by conceptual approaches, based on simple linear empirical explorations, which are unable to capture complex interdependencies (Hughes et al. 2018). Drawing on Kor and Mesko (2013), Teece (2007), Helfat and Peteraf (2009, 2015) and Hambrick and Mason (1984), we build our conceptual framework of TMT-SC as depicted in Figure 1: (i) TMT mental structures are shaped by industry- and firm-specific experience, and help to categorise information; (ii) TMT information structures shape TMT risk preference and innovativeness, and help TMTs to make sense of their thoughts; (iii) TMTs' education background serves as a knowledge repertoire that can be accessed in critical situations; (iv) TMT human capital with social capital implications (e.g. external networking) provides a conduit through which TMTs update their mental models and world views in solving complex organisational problems. These four strategic cognition elements are intertwined with TMT dynamic capabilities as the micro-foundations of TMT-SC and decision-making.

[INSERT FIGURE 1 ABOUT HERE]

TMT-SC is a process (Jenkins and Johnson 1997; Bundy et al. 2013) that explains the managerial world view of an entire business (Sparrow 1999) and resource allocation to maximise firm value (Molloy and Barney 2015; Kunc and Morecroft 2010; Barney 1991). The managerial cognition elements constitute the wheels upon which the managerial capabilities (Helfat and Camporembado 2016; Helfat and Peteraf 2015, 2016) of strategic decision-making rotate (Figure 1). TMT-SC is the cognitive 'horsepower' (Kor and Mesko 2013) that determines the speed of strategic change. Further, it helps to explain organisational inertia (Tripsas and Gavetti 2000); it goes beyond a demographics-based understanding of executives' human capital to a skill-based, experience-based, relationship-based, and cognition- and value-based understanding of executive team capital.

[INSERT FIGURE 2 ABOUT HERE]

1
2
3 Figure 2 depicts a linear association, suggesting that value creation is enhanced by TMT
4 cognitive abilities as the performance antecedents, assuming that TMT-SC increases firm value via
5 the improved financial health of firms. Such linear relationships are highlighted by scholars (De Fond
6 et al. 2005, Hamori and Koyuncu 2015; Kor 2003; Kunc and Morecroft 2010). Yet, as discussed in
7 Kaplan (2011) and the configuration theory (Hughes et al. 2018), we propose that TMT-SC influences
8 firm outcomes via random configurations and multiple combinations of overlaps of TMT-SC
9 elements in a dynamic framework.
10
11
12
13
14
15
16
17

18 In Figure 3, therefore, we illustrate the micro elements of the managerial cognition
19 infrastructure acknowledging the complex interactions. This setting follows the insights provided by:
20 (i) Hughes et al. (2018), who refer to the relationship webs among the entrepreneurial orientation,
21 exploration, exploitation and performance of family firms; (ii) Salas et al. (2010), who show in a
22 Venn diagram the overlap between intuition and expertise related to organisational practices and
23 effectiveness; and (iii) Finkelstein et al. (1996), who argue that executives make strategic decisions
24 based on their experience and imply that a causal link between TMT-SC and performance depends
25 on TMT cognition and mental models. Figure 3 shows that the TMT-SC dynamic process (Helfat and
26 Petaraf 2015; Kor and Mesko 2013; Nielsen 2009; Nielsen and Nielsen 2013) is shaped by different
27 configurations of cognitive elements including previous education, industry-specific and firm-
28 specific experience, TMT risk preferences and innovativeness, and human capital. We posit that such
29 configurations influence TMT decisions and firm value. In so doing, we draw on Huff (1982),
30 Prahalad and Bettis (1986), Kor and Mesko (2013) and Adner and Helfat (2003), who argue that TMT
31 cognition capabilities are formed by previous education, industry and firm experience and social
32 interactions, which are intertwined (Salas et al. 2010; Sparrow 1999). These interacting cognitive
33 elements (Walsh 1995) enable TMTs to navigate through a bewildering flow of information to make
34 strategic decisions.
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56

57 In cognitive psychology (see Salas et al. 2010; Carpenter et al. 2004) TMT education
58 background and industry-specific/professional experience are deemed key cognitive elements that
59
60

1
2 sharpen the dynamic capabilities of managers. Hence, TMT strategic cognitive lenses (the ability to
3 sense, seize and configure scarce resources) are affected by their industry-specific experience. Kor
4 and Mesko (2013) argue that TMT dynamic capabilities are governed by their cognition capabilities
5 together with their level of innovativeness and risk preferences.
6
7
8
9
10

11 [INSERT FIGURE 3 ABOUT HERE]
12
13
14

15 3. Hypothesis development

16 3.1. *TMT strategic cognition*

17 TMT-SC refers to the connections between cognitive structures and the pathways managers follow
18 during their decision-making process with reference to strategy formulation and implementation
19 (Porac and Thomas 2002). Factors such as biases, search patterns, available information, time
20 pressure, environment and the expertise of the decision-maker can influence the configuration of
21 TMT cognitive structures (Herrmann 2014; Nadkarni and Barr 2008; Narayanan et al. 2011).
22
23
24
25
26
27
28
29

30 Firms are regularly faced with complicated decision-making, which requires TMTs to have
31 complex thinking abilities. Such abilities affect the quality of strategic decisions that yield positive
32 corporate outcomes. Wernerfelt (1984) posits that firms can generate high returns if they are able -
33 through TMT-SC - to identify and acquire resources that are critical for the production of highly
34 demanded products. Similarly, Calabretta et al. (2017) and Jenkins and Johnson (1997) reveal that
35 TMT-SC is a key driver of performance. UET argues that the strategic choices, performance, health
36 and value of firms are partially influenced by TMT background and cognitive abilities (Hambrick
37 and Mason 1984). Levy (2005) supports the view that strategic choices are determined by cognitive
38 processes concerning the environment, and that managers' capabilities in dynamic environments are
39 strongly linked to organisational outcomes. Hence, firms can enhance their performance by higher
40 quality strategic orientation and cognitive ability of managers (Escribá-Esteve et al. 2009). Therefore,
41 we propose the following hypotheses:
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57

58 *Hypothesis 1a: There is a positive relationship between TMT strategic cognition and firm value.*
59
60

1
2
3 *Hypothesis 1b: There is a positive relationship between TMT strategic cognition and firm financial*
4 *health.*

6 7 **3.2. TMT education and experience**

8
9 Relevant education and experience provide TMTs with superior information qualifications that
10 influence TMT cognitive capabilities (Helfat and Campo-Rembado 2016; Helfat and Peteraf 2009)
11 and TMT work experience (Helfat and Peteraf 2015; Kor and Mesko 2013; Teece et al. 1997). Hughes
12 et al. (2018) state that the level of exploration and exploitation of family firms' managers is shaped
13 by their experience and expertise. General experience has to be explicit to be effectively exploited,
14 and general experience from previous firms may exhibit diminishing marginal returns when applied
15 to new firms during TMT-SC (Nonaka et al. 2000; Hoang and Rothaermel 2005). Yet, industry-
16 specific experience enables TMTs to acquire specialized knowledge and understanding about the
17 industry within which the firm operates. Kor and Mahoney (2005) argue that specific industry sectors
18 are accustomed to unique knowledge attributes including specific technologies, rules and regulations.
19 Hence, previous industry-specific experience can influence TMT-SC. Firm-specific experiences
20 involving tacit knowledge about a firm's operations and resource capabilities influence TMT resource
21 allocation decisions and strategic choices (Kor 2003). Managers with firm-specific experiences are
22 able to assess which environmental opportunities provide a better strategic fit for the firm (Barney
23 1991; Penrose 1959). Therefore, we posit:

24
25 *Hypothesis 2a: The positive effect of TMT-SC on firm value increases with relevant TMT experience.*

26
27 *Hypothesis 2b: The positive effect of TMT-SC on firm value increases with relevant TMT education.*

28
29 *Hypothesis 2c: The positive effect of TMT-SC on firm financial health increases with relevant TMT*
30 *experience.*

31
32 *Hypothesis 2d: The positive effect of TMT-SC on firm financial health increases with relevant TMT*
33 *education.*

34 35 **3.3. TMT risk-taking and innovativeness**

36
37 Strategic risk-taking has important implications for performance and value (Amore and Failla 2020;
38 Hoskisson et al. 2017; Sanders and Hambrick 2007). Previous studies have examined risk-taking in
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2 terms of performance feedback (Greve 2003), slack (Greve 2003; Li and Tang 2010), environmental
3 factors (Palmer and Wiseman 1999) and R&D (Li and Tang 2010). These studies suggest that high
4 managerial risk appetite is necessary to create wealth and performance. Some scholars refer to the
5 UET to investigate firm risk-taking behaviour. For example, Berger et al. (2014) argue that
6 background qualification, knowledge and experience of TMTs can influence the propensity of risk-
7 taking in organisations. TMTs with high education usually have a favourable predisposition towards
8 innovation (Hitt and Tyler 1991). TMT-SC is effective when TMT education and experience support
9 higher innovation. Superior information promoting innovation is shared during the TMT-SC process
10 in an atmosphere of trust, and investors perceive organisations with such TMTs as more committed
11 to innovation (Amore and Failla 2020). TMTs can use their knowledge structures based on experience
12 and education to make intelligent inferences via their cognitive frames about new strategic options
13 including innovation activities (Talke et al. 2010). Thus, we argue that TMTs will take higher risks
14 when their expertise levels in that venture are high and where there are significant returns prospects
15 (Gilley et al. 2002). Recently, Mazouz and Zhao (2019) argued that innovation is a mediating factor
16 for managerial incentives and corporate value. Hence, TMT-SC involving considerable risk-taking
17 and innovativeness will generate more favourable corporate outcomes. We thus posit that:

18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39 *Hypothesis 3a: The positive effect of TMT-SC on firm value increases with TMT risk-taking.*

40
41
42 *Hypothesis 3b: The positive effect of TMT-SC on firm value increases with TMT innovativeness.*

43
44
45 *Hypothesis 3c: The positive effect of TMT-SC on firm financial health increases with TMT risk-taking.*

46
47
48
49 *Hypothesis 3d: The positive effect of TMT-SC on firm financial health increases with TMT
50 innovativeness.*

51 **3.4. TMT human capital**

52
53
54
55
56
57
58
59
60
The human capital theory contends that individual CEOs' idiosyncratic skills are critical sources of economic productivity, and that such distinctive skills can be improved by training and education (see Miller et al. 2015). It is observed that the greater majority of Ivy league students will have proven

1
2 their unique talent even before arriving at university (Wai and Rindermann 2015). Miller et al. (2015)
3
4 report a significantly positive association between CEOs from Ivy league schools and firm
5
6 performance: CEOs graduating from these schools showed superior performance as a result of their
7
8 idiosyncratic human capital. Similarly, Wai and Rindermann (2015) argue that higher CEO education
9
10 and cognitive ability are associated with higher gross revenue and superior firm performance.
11
12 Michelman et al. (2021) argue that while high-status Harvard students from prestigious private high
13
14 schools perform worse academically than their peers, these students have access to exclusive elite
15
16 premium membership clubs that ‘leapfrog’ them into highly privileged positions in society, with
17
18 exclusive access to ‘causal channels’ for superior performance. These ‘causal channels’ constitute
19
20 superior human capital resources for rent extractions. Therefore, top firms tend to hire CEOs from
21
22 these elite clubs to enhance corporate performance via the unique human capital.
23
24
25
26

27
28 Institutional and social networks provide invaluable cognitive abilities and superior information
29
30 which influence TMT-SC (Gronum et al. 2012; Sheng et al. 2011; Williams and Filippakou 2010).
31
32 Oh and Barker (2018), for instance, show the relevance of social ties via CEOs outside directorship
33
34 to corporate R&D activities. Managerial human capital involves the ability of TMTs to tap into
35
36 strategic connections within a network (Molina-Morales and Martínez-Fernández 2010). Managerial
37
38 cognition interactions shaped by internal and external networks capture the mental models that TMTs
39
40 use in making decisions (Prahalad and Bettis 1986). Further, cognitive diversities reflecting
41
42 differences in experience and education, and cognitive conflicts stemming from different TMT views
43
44 can impair TMT-SC effectiveness and firm performance (Hambrick and Mason 1984; Costanzo and
45
46 Di Domenico 2015). However, this negativity can be mitigated via the presence of a relational-based
47
48 trust (Rodgers 2010; Schaubroeck et al. 2013). Managerial human capital resides in a network of
49
50 complex relationships in an organisation or sector. The transmission of trustworthy information
51
52 among managers within the network promotes knowledge sharing which can influence and improve
53
54 the cognitive perspective of TMTs (Nahapiet and Ghoshal 1998). Networking relationships (Acquaah
55
56 2012) with well-connected CEOs (Miller et al. 2015) have positive effects on performance. Overall,
57
58
59
60

we posit that networking and quality **human capital** with social capital implications, which can enhance the TMT-SC process, make additional positive contributions to corporate outcomes:

*Hypothesis 4a: The positive effect of TMT-SC on firm value increases with TMT **human** capital.*

*Hypothesis 4b: The positive effect of TMT-SC on firm financial health increases with TMT **human** capital.*

4. Methodology

4.1. Data and Sample

We gathered data on the FTSE 350 companies' TMTs during 2008-2016. We deleted firms with missing, inconsistent or extreme values. After the data filtering, we ended up with 311 firms and 2,799 firm-year observations in a balanced panel format. We handpicked data on the education and experience of over 14,175 TMT members from Bloomberg's executive profile and biography database. We define the TMT as individuals who meet the following criteria: founders of the company who are chief executives (Nielsen and Nielsen 2013) or individuals who take an active role in strategic decision-making, such as the chief executive officer (CEO), president, chairman of the board, chief operating officer (COO), managing director (MD) and chief finance officer (CFO) (Hambrick and Mason 1984; Hitt and Tyler 1991; Kor 2006; Nadkarni and Narayanan 2007). We used Bloomberg to collect other firm-level data.

4.2. Empirical Constructs

Corporate outcomes

We employed Altman's Z-score that measures corporate financial sustainability. Our value measure is Tobin's Q (Herrmann and Nadkarni 2014; Miller et al. 2015; Singh et al. 2018).

TMT strategic cognition

We identified TMT education and experience as key factors to measure TMT cognitive capabilities (Helfat and Peteraf 2015; Naranjo-Gil et al. 2008). Previous studies on TMT-SC used measures such as education and experience (Escribá-Esteve et al. 2009; Herrmann and Nadkarni 2014; Rajagopalan et al. 1997; Hitt and Tyler 1991; Simsek et al. 2005; Kor and Mesko 2013; Hamori and Koyuncu

2015) as proxies to measure TMT cognitive abilities. Clark and Maggitti (2012) relate TMT industry experience and education to TMT potency, which then influences TMT-SC which would be crucial during strategic decision-making. They measure potency based on the response they received from team members during interviews after asking a question about ‘perception of the team’s capability to perform tasks effectively and successfully’. Ashford et al. (2018)’s TMT potency measure is based on survey questionnaires. We argue that the TMT-SC process is influenced by its dominant logic shaped by TMT education, experience and networking ability. Our TMT-SC, for which there is no direct measure, is a latent construct based on education and experience; it represents a process, and a higher value implies better TMT cognitive abilities. Our approach is comparable to that of Escribá-Esteve et al. (2009), who measure the concept of TMT strategic orientation (see Footnote 4). We suggest that TMT-SC hinges upon four concepts (i.e. perception, information, judgement, decision) within our TPDMM setting in Figure 1. This shapes our PLS-SEM analysis.

TMT experience

We captured TMT experience using general supervisory experience and industry-specific experience (DeFond et al. 2005; Dokko et al. 2009; Nadkarni and Hermann 2010; Nielsen and Nielsen 2013). TMTs draw from their previous experience during strategic decision-making (Acquaah 2012; Hamori and Koyuncu 2015; Herrmann 2014; Kor and Misangyi 2008; Li 2010; Nadkarni and Hermann 2010). We use general supervisory, industry-specific and firm-specific experiences as reflective indicators to measure TMT experience.

TMT education

We captured TMT education using two variables including academic and professional qualifications (DeFond et al. 2005; Hitt et al. 2001). TMT education influences cognitive biases (Carpenter et al. 2004; DeFond et al. 2005; Hitt et al. 2001). Scholars of strategy cognition recognize the negative implications of personal biases and heuristics; hence most strategic cognitive researchers use TMT education as a proxy for cognition (Geletkanycz and Boyd 2011; Hitt and Tyler 1991).

TMT innovativeness

1
2 We measured TMT innovativeness by R&D expenses over sales (Kor 2003; Kor and Mesko 2013;
3 Kor and Misangyi 2008; Talke et al. 2010; Mazouz and Zhao 2019, although they use assets instead
4 of sales), noting that R&D activities are conditioned by TMT as firm-level risk-taking. TMTs with
5 specific industry experience contribute positively towards TMT innovativeness during TMT-SC,
6 which in turn improves performance (Daellenbach et al. 1999).
7
8
9
10
11
12

13 *TMT risk preferences*

14
15 TMT risk preferences might be influenced by changes in stock prices, usually accompanied by
16 changes in executive compensation (Chen et al. 2015) and stock options that shape managerial risk
17 perception (Sanders and Hambrick 2007). Wright et al. (2007) find that TMT option incentives are
18 positively linked to subsequent corporate risk-taking. Our proxy for TMT risk appetite is *Delta* (i.e.
19 change in option price over change in stock price). Positive changes in stock prices should increase
20 option prices and the value of TMT (executive) compensation including options and stocks. Higher
21 *Delta* can therefore suggest higher TMT risk appetite.
22
23
24
25
26
27
28
29
30
31

32 *TMT human capital*

33
34 Organisations are shaped by interactions in networks among employees and managers according to
35 their values and interests, and such networks constitute social power as **human capital** with varying
36 quality (Castells 2011). Directors, for instance, who graduated from top universities, or those with
37 well-recognised professional qualifications might have different aspirations compared with lower-
38 rated universities or less reputable professional qualifications. Boutinot et al. (2017) relate
39 professional networking and academic eliteness to reputation, which influences others' perceptions
40 about TMTs' capability to deliver. Some survey evidence suggests that obtaining a degree from the
41 Universities of Oxford or Cambridge (i.e. Oxbridge) can yield additional networking power, and that
42 Oxbridge graduates are more likely to be cultural leaders. Following a similar approach to that
43 adopted by Lee and Brinton (1996), we use the Times-Higher Education World University Ranking
44 to capture TMT networking capabilities originating from their academic background, and depending
45 on whether TMTs obtained their degrees from the top hundred universities worldwide.
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 According to a survey by executive search firm, Heidrick & Struggles, 24% of FTSE 100
4 CEOs were found to be educated at Oxbridge. In Kirby (2016), this proportion was 31% among the
5 UK-educated managers. This level of eliteness is comparable to the levels in other countries. In the
6
7 US, 37.5% to 41% of Fortune 500 CEOs were reported to have attended an elite school (Wai and
8
9 Rindermann 2015) and, again, in the Fortune 500, 23.4% to 33.1% of CEOs were from Ivy League
10
11 institutions (Miller et al. 2015), as average values considering multiple years. In France, the managers
12
13 of almost all of the largest and most powerful 100 firms had attended one or more elite schools (i.e.
14
15 Ecole Polytechnique, Institut d'Etudes Politiques de Paris, Ecole des Mines, and Ecole Nationale
16
17 d'Administration) (see Maclean et al. (2010) and references therein). Finally, Germany may not have
18
19 consistently obvious elite universities, yet 38% of DAX 30 and MDAX 50 CEOs are reported to have
20
21 a PhD degree (see the link in Footnote 2 which also states that in the top 100 companies in the US
22
23 Fortune 500, 28% of top managers were part of the Ivy League, and in France half of SF 120 CEOs
24
25 had attended one of four Grande Écoles).¹

26
27 Further, Davis (2018) provides an intriguing analysis of social circuits, social foundations of power,
28
29 networks of old boys' clubs and the relevance of having an elite education in the business world.
30
31 Another UK official document shows the dominant effects of FTSE 350 CEOs with Oxbridge
32
33 degrees.² Further, Miller et al. (2015) examine the relevance of Ivy League graduates to corporate
34
35 value creation, and argue that the rare and non-substitutable human capital is a strong source of value
36
37 enhancement. To assess these considerations in our analyses, we also constructed an indicator for
38
39 executives with an Oxbridge background. In addition to the academic aspect of human capital, we
40
41 propose another indicator showing whether executives have obtained professional qualifications from
42
43 highly reputable institutions (see Table 1 for details).

44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
¹ As mentioned in Table 1, we used the Times World University Ranking in 2016 as per the time period of our sample. However, we ought to note that this ranking (like other rankings) is not stable across time. For instance, in the Times Ranking in 2020, eight German universities appeared in the top 100 list.

² See Management Today, October 6th 2015, <https://www.managementtoday.co.uk/foreigners-oxbridge-grads-top-ftse-100-companies/article/1367322>. See also: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/347915/Elitist_Britain_-_Final.pdf.

Other considerations

Accounting information is used by TMTs to communicate their trust to investors. Financial ratios can provide assurance to stakeholders about the need to trust TMTs. We use profitability, liquidity, efficiency and solvency ratios as benchmarks to measure corporate financial health. Return on assets and return on equity are used to construct profitability; current ratio, cash ratio and quick ratio are used to construct liquidity; debt/equity and debt/assets are used to construct leverage; assets turnover and sales to assets are used to construct efficiency. *Firm age* is another consideration: as investors trust TMTs in older firms, this can have a positive effect on firm value and financial health (Li and Tsai 2009). Thus, as a control variable (Kor and Misangyi 2008; Hermann and Nadkarni 2014), firm age is also considered, although we do not report these results. Table 1 provides the definitions.

4.3. The method

Following Hair et al. (2017), we used the variance-based PLS-SEM specification due to the relatively complex nature of our multiple latent variables with multiple indicators (see e.g. Naranjo-Gil et al. 2008; Weber et al. 2017). This approach is more appropriate for obtaining optimal prediction for measuring unobservable latent constructs such as education, experience and cognition in our sample. PLS-SEM specifies how latent variables are measured and explores the overall relationships existing between indicators and latent construct as well as the links between exogenous and endogenous variables (Hair et al. 2017).

TMT-SC represents a complex integrated heuristic process of managerial strategic decision-making that draws from varied TMT cognitive micro-foundation elements that shape TMTs' problem framing and interpretations of reality from different strategic lenses. These complex interactions among micro-elements of the managerial cognition include the interactions of different TMTs' strategic viewpoints and logics (Nadkarni and Barr 2008; Miller et al. 2015). TMT-SC is shaped by intellectual capabilities such as education and experience (Kor and Mesko 2013), risk preferences, and innovativeness (Berger et al. 2014). Cognitive boundedness prohibits perfect rationality from a single

1
2 isolated micro-foundation cognitive element such as innovation or human capital. Also, Shiloh et al.
3
4 (2002) argue that the thinking process involves varied heuristic responses and framing effects
5
6 determined by individual knowledge, experience and rational thinking style. Hughes et al. (2018)
7
8 imply that, similar to entrepreneurial strategic orientations, TMT-SC involves the exploration,
9
10 exploitation and exploration of varied thinking processes from an overlapping viewpoints.
11

12
13
14 Clarke and Mackaness (2001) argue that the TMT cognitive map overlaps because during the
15
16 cognition process, managers find common ground on either agreement or disagreement. In instances
17
18 of disagreement, executives call for the need to negotiate for consensus and group decisions. During
19
20 TMT-SC processes, TMTs' views and critical perspectives on corporate strategies overlap as a result
21
22 of their divergent and conflicting knowledge base, differences in personal and firm-specific
23
24 experiences and in risk preferences. Therefore, negotiation strategies are the governance mechanisms
25
26 used by the board to iron out overlapping TMT conflicting views (Harvey et al. 2017). The overlaps
27
28 in the micro-elements of the managerial cognition infrastructure, therefore, capture conflicts in
29
30 viewpoints, (dis)agreements, and how strategic negotiations are transacted to reach consensus. The
31
32 nature of overlaps depends on the cognitive characteristics of the TMTs involved in the strategic
33
34 decision process.
35
36

37
38
39 TMT strategic decision-making is a collective thinking process that involves complex interactions of
40
41 varied managerial viewpoints influenced by the cognition micro-elements of TMT human capital
42
43 based on education and experience background, which aggregates to form our TMT-SC construct.
44
45 We used reflective measurement indicators to capture our constructs. Our reflective indicators capture
46
47 the micro-elements of managerial cognition in our lower component model (LCM). Reflective
48
49 indicators are viewed as the closest representation that defines or reflects the latent construct. For
50
51 example, in capturing our TMT experience, we used TMT supervisory experience, TMT industry-
52
53 specific experience, and TMT firm-specific experience. These experience-based measurement
54
55 indicators are similar and may have overlaps as input variables. However, our estimation method
56
57 eliminates the severity of any potential overlap before yielding constructs as outputs by using the
58
59
60

1
2 hierarchical component model (HCM). This is maintained, since our reflective measures consider that
3
4 all indicator items can be related to the similar constructs, and we may have a multicollinearity issue
5
6 (Hair et al. 2011). Our TMT-SC is a multi-dimensional construct that cannot be captured with one
7
8 simple latent construct. TMT-SC is a cognition process that involves the overlap of multi-dimensional
9
10 ideological stands and viewpoints. These varied viewpoints are influenced by a multiplicity of
11
12 complex micro-cognitive elements whose construction requires the use of HCM. HCM has a two-
13
14 stage order: the first order is the latent construct that captures the TMT-SC micro-elements, and the
15
16 second order aggregates the first order to capture the TMT-SC. These TMT-SC processes, therefore,
17
18 overlap because they are the composition of both the LCM which captures the micro-TMT cognition
19
20 elements and the HCM that provides explicit representations of multi-dimensional constructs.
21
22 Although in the LCM the first order component model uses formative and reflective measurement
23
24 indicators that tend to suffer from multicollinearity, HCM provides the second order to remedy the
25
26 multicollinearity and overlap problem (Ringle et al. 2012).
27
28
29
30
31
32

33 **4.4. The models and variables**

34
35 We analyse the following PLS setting in Figure 4 as a throughput model framework, also showing
36
37 the hypotheses. In this figure, *Tobin's Q* is our endogenous variable to represent firm value creation;
38
39 *Z-score* measures the financial health of a firm. *TMT education* is a latent construct based on
40
41 *Professional education* and *Academic education*; *TMT experience* is a latent construct based on *Firm-*
42
43 *specific experience*, *Industry-specific experience* and *Supervisory experience*; *TMT innovativeness*
44
45 and *TMT risk preference* are latent constructs based on one indicator only (i.e. *R&D to sales* and
46
47 *Delta*, respectively); *Profitability* is a latent construct based on *Return on assets* and *Return on equity*;
48
49 *Efficiency* is a latent construct based on *Assets turnover* and *Sales to assets*; *Leverage* is a latent
50
51 construct based on *Debt to equity* and *Debt to assets*; *Liquidity* is a latent construct based on *Current*
52
53 *ratio*, *Cash ratio* and *Quick ratio*. Table 1 provides the definitions. We use the latent construct *TMT*
54
55 *strategic cognition* as a proxy for overall TMT-SC which is the linear combination of the constructs
56
57
58
59
60

1
2
3 *TMT education* and *TMT experience* as formative indicators.³ An increase in this construct represents
4 a higher cognitive ability, i.e. the level of ability rather than the presence of ability.
5
6

7 **[INSERT FIGURE 4 ABOUT HERE]**
8
9

10 **5. Analyses and findings**

11 **5.1. Measurement validation**

12
13 We use Smart PLS 3 software (see Chatelain-Ponroy et al. 2017; Tippmann et al. 2017), employing
14
15 3,000 maximum iterations in the path analysis PLS algorithm to estimate each model. Model
16
17 estimations provide path loadings to measure the relationship between the indicators (measurement
18
19 models) and constructs (structural model). We used reflective measurement model because the nature
20
21 of our latent constructs reflects our measurement model (Hair et al. 2016, 2017).
22
23

24
25 We checked for the reliability of our measurement models by examining the indicators' outer loadings
26
27 to meet the threshold: all measurements have loadings above 0.70 and they are significant at the 0.001
28
29 level (one-tailed). In examining the internal consistency of our model, we examined the composite
30
31 reliability, Cronbach's alpha and the average variance extracted reports. The composite reliability
32
33 report examines the reliability and validity (internal consistency) of the latent constructs used in the
34
35 structural model. The composite reliability uses either the Cronbach's alpha or composite validity to
36
37 measure constructs validations. Composite reliability values below 0.6 indicate lack of consistency:
38
39 all our latent constructs show composite reliability above 0.7.
40
41
42
43
44

45 Further, we conducted bootstrapping based on 5000 random samples using bias-corrected and
46
47 accelerated bootstrap advanced settings with two-tailed tests. This specification is the most stable
48
49 method for checking the robustness of structural models (Hair et al. 2016). From our bootstrapping
50
51 results, we further examined the significance of the path coefficient, outer loading and composite
52
53
54
55
56

57
58 ³ For the PLS-SEM specification, which is robust to small sample bias and has no assumption about the scale of
59 measurement, the formal illustration for a latent construct (say, λ) can be shown as follows: $\lambda = \theta_1 x_1 + \theta_2 x_2 + \dots + \theta_n x_n + v$. In
60 this specification, x_n are observable indicators; θ_n represent the impact of the observable indicator on the latent construct;
 v is the error term with the properties of $\text{Cov}(x_n, v) = E(v) = 0$ to assume exogeneity of the indicators.

1
2 reliability, focusing on the difference of outer loadings of the indicators, average variance extracted,
3
4 and Heterotrait-Monotrait ratio (HTMT)⁴ for each model, as well as the internal consistency and
5
6 reliability of our model based on the inter-correlations of the indicators variables.
7
8

9
10 Average variance extracted (AVE) assesses the degree of variance between the latent
11
12 constructs. We used AVE to test the discriminant validity of our model (Chin et al. 2003; Rodgers et
13
14 al. 2013). $AVE > 0.50$ shows that the constructs explain more than half of the variance of the
15
16 indicators; $AVE < 0.50$ indicates that a significantly greater proportion of the variance is included in
17
18 the error terms than in the variance explained by the construct (Hair et al. 2016). Our AVE are all
19
20 greater than 0.60, confirming the uniqueness of our constructs in explaining the variance of the results,
21
22 and that our latent construct has the strongest correlation with its own indicators.
23
24

25
26 Convergent validity examines whether measurement indicators correlates positively with
27
28 similar indicators measuring the same construct. As indicators of reflective constructs are
29
30 interchangeable, we used the outer loading and AVE to examine the convergent validity of our
31
32 models. We measure the uniqueness of each latent construct by conducting discriminant validity test
33
34 which examines the extent to which a construct is truly distinct from the other latent constructs.
35
36 Recent research has criticised using cross-loadings and Fornell-Larcker criterion for testing
37
38 discriminant validity because of their inability to indicate discriminant validity, especially when two
39
40 constructs are perfectly correlated (Henseler et al. 2015). Rönkkö and Evermann (2013) further argue
41
42 that Fornell-Larcker's AVEs are inaccurate because they determine one overall AVE instead of two
43
44 separate values. As a remedy, Hair et al. (2016) recommend HTMT which measures the ratios
45
46 between trait correlation to the within-trait correlation and estimates the true correlation between two
47
48 latent constructs. Our models show significant discriminant validity because the values are positive
49
50
51
52
53
54
55
56

57
58 ⁴ HTMT measures the average of the heterotrait-heteromethod (i.e. the mean of all correlations of indicators across
59
60 constructs measuring different constructs) relative to the average of the monotrait-heterotrait correlations which is the
geometric mean of the average correlations of indicators measuring the same construct.

1
2 and lower than 0.90 (see Tables A1 and A2). All indicators are defined in Table 2 where we also
3
4 provide the descriptive statistics and correlation matrix.
5
6

7 Our empirical approach addresses the reverse causality and endogeneity problems by
8
9 addressing the issues related to measurement model that includes testing for convergent and
10
11 discriminant validity, internal consistency reliability, and HTMT and AVE figures.
12
13

14 **[INSERT TABLES 1-2 ABOUT HERE]**
15

16 17 **5.2. Results**

18
19 Table 3 reports the TPDMM PLS-SEM results. Model (1) considers the broad measures of experience
20
21 (*TMT experience*) and education (*TMT education*). This model indicates that *TMT strategic cognition*
22
23 does not exert any strong influence on these outcomes, noting that the p -values are 0.103 ($\beta = 0.08$)
24
25 and 0.101 ($\beta = 0.07$) for *Z-score* and *Tobin's Q*, respectively. Therefore, these marginal p -values may
26
27 lend some partial support to Hypotheses 1a and 1b. The coefficient of determination (R^2) is 0.41 and
28
29 0.64 for financial health and firm value, respectively. Regarding the other findings, financial health
30
31 improves market value and also companies with higher liquidity, higher profitability and lower
32
33 leverage have better financial health. Our discussion below focuses only on whether the empirical
34
35 testing supports our hypotheses.
36
37
38

39 We add *TMT innovativeness* to Model (1) and report the results in Model (2): *TMT strategic cognition*
40
41 in this case has a statistically very significant and positive impact on financial health ($\beta = 0.16$, $p <$
42
43 0.001) and value ($\beta = 0.18$, $p < 0.001$), which corroborates strongly Hypotheses 1a and 1b, and is in
44
45 line with Escribá-Esteve et al. (2009). Since this addition in Model (2) doubles the estimated value
46
47 of these coefficients in comparison with Model (1) results, we also support Hypotheses 3b and 3d
48
49 that TMT innovativeness enhances the positive effect of TMT-SC on value and health.
50
51
52

53 **[INSERT TABLE ABOUT 3 HERE]**
54

55
56 Model (3) considers TMT risk appetite additional to the education and innovativeness of TMT
57
58 members, excluding TMT general experience: again, *TMT strategic cognition* has a significant and
59
60

1
2
3 positive effect on financial health ($\beta = 0.29, p < 0.001$) and value ($\beta = 0.19, p = 0.002$). These effects
4
5 are stronger in magnitude when compared to the results in Models (1) and (2). Thus, the findings
6
7 clearly support Hypotheses 3a and 3c. The reasoning behind these stronger effects could be attributed
8
9 to the more effective role of TMT-SC when it is considered together with TMT innovativeness and
10
11 risk appetite, which confirms previous studies suggesting that greater education leads to greater
12
13 innovation because higher level of education improves the cognitive processing and problem-solving
14
15 ability of individuals (Hoskisson et al. 2017; Kimberly and Evanisko 1981). Managers who place
16
17 high bets in risky investment by spending more on R&D tend to improve corporate value, and TMTs
18
19 are prepared to consider more investment opportunities when the share price of their firm increases
20
21 (Sanders and Hambrick 2007). The throughput version of this model is reported in Figure A1.
22
23
24

25
26 Model (4) focuses on the effects of TMT industry-specific experience on value and financial
27
28 health (i.e. *TMT experience* is represented by *Industry-specific experience*). As the positive effects of
29
30 *TMT strategic cognition* on both financial health ($\beta = 0.29, p < 0.001$) and value ($\beta = 0.16, p = 0.002$)
31
32 continue to hold in this model, Hypotheses 1a and 1b are again supported. Moreover, when the size
33
34 of the coefficient estimates is examined in Models (1) and (4), the magnitudes more than double for
35
36 the latter. These findings confirm Hypotheses 2a and 2c since they highlight the ‘relevance’ of the
37
38 type of experience, which is consistent with the other studies arguing that industry-specific experience
39
40 is valuable human capital to firms because it can bring goodwill and ties with key industry players
41
42 and access to superior information (Kor and Misangyi 2008).⁵ The positive findings related to
43
44 corporate innovation activities in Model (4) support the view that the dominant R&D logic in most
45
46 firms is promoted through effective collaboration between TMTs with good education background
47
48 and industry-specific or firm-specific experience (Kor 2006).
49
50
51

52
53
54
55
56
57 ⁵ In unreported results (available on request), when we used the definition *Supervisory experience* in this model, the
58
59 incremental increase related to the positive impact of TMT-SC on value and health is insignificant when Models (1) and
60
60 (4) are compared. This implies that if even though supervisory experience is more effective than general experience, the
former is not as relevant as industry-specific experience.

1
2
3 Model (5) investigates the effects of TMT firm-specific experience on value and financial
4 health (i.e. *TMT experience* is represented by the ‘relevant’ *Firm-specific experience*). Hypotheses 1a
5 and 1b are supported once more due to the direct effects of *TMT strategic cognition* on financial
6 health ($\beta = 0.13, p = 0.005$) and value ($\beta = 0.30, p < 0.001$). Further, when the size of the coefficients
7 is scrutinized in Models (1) and (5), the magnitudes are noticeably higher for the latter, and for the
8 case of ‘firm value’ the size of the coefficient actually more than quadruples. Therefore, we reconfirm
9 Hypotheses 2a and 2c since again they emphasise the ‘relevance’ of the type of experience. These
10 findings are consistent with Kor and Misangyi (2008) that firm-specific experience improves TMT
11 innovativeness and firm value, and with Denicolai et al. (2014) that firms develop dynamic
12 managerial capabilities that allow managers to make better strategic resource allocations to achieve
13 competitive advantage.
14
15

16
17 To assess the relevance of education type, Model 6 uses *Professional education* to represent
18 TMT education:⁶ *TMT strategic cognition* in this case has a statistically significant and positive
19 impact on value ($\beta = 0.17, p = 0.002$), which is more favourable in terms of the significance level and
20 the coefficients’ size when compared to the results in Model (1). We therefore support Hypothesis
21 2b, as this finding stresses the relevance of professional qualifications in creating value. However,
22 the findings pertaining to financial health ($\beta = 0.06, p = 0.098$) are qualitatively the same when
23 compared with the corresponding results in Model (1), hence, Hypothesis 2d is not confirmed.
24
25

26
27 Models (7) to (9) examine whether networking and social connections can be considered as
28 TMT **human capital** improving cognitive abilities, which can help enhance financial health and value.
29 In these models, the proxy for *TMT experience* is *Firm-specific experience*. Model (7) considers
30 whether TMTs have any degrees from reputable universities (i.e. the indicator *Elite academic* that is
31 based on top 100 universities) and use this to represent TMT **human capital**. In Model (8), TMT **human**
32 **capital** is related to the presence of degrees from only Oxford and Cambridge universities to construct
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58

59
60

⁶ MBA degree and finance expertise as per the definition of Sarbanes-Oxley Act 2002 were also used to replace *TMT education*. The results, unreported but available on request, are qualitatively the same as the ones in Model (6).

our indicator *Oxbridge*. In Model (9), *TMT human capital* is based on a dummy variable that shows whether TMTs have degrees from top 100 universities and their professional qualifications are deemed as elite (i.e. the construct *Two elites*).

The effects of *TMT human capital* on firm outcomes appear very strong in Models (7) to (9): in all six cases we consistently report significant and positive association of *TMT human capital* with *Tobin's Q* and *Z-score* as all the *p*-values are 0.009 or lower. These results strongly support Hypotheses 4a and 4b when they are compared with the findings in Model (1). Also, when we examine the impact of *TMT experience* on value and financial health, the respective coefficients are invariably positive and statistically significant at least at the 1.6% level. These findings suggest that the effects of *TMT experience* on value and financial health, given the results in Models (1) to (6), turn out to be positive and stronger when *TMT human capital* is incorporated into the analyses. Similarly, the positive effects of *TMT strategic cognition* on both *Tobin's Q* and *Z-score* in Models (1) to (6) appear to be more salient in Models (7) to (9) as the *p*-values for the latter are lower than 0.001 in all six cases. These results imply that the components of *human capital* such as networking, strategic social relationships and connections seem to improve TMT-SC which would then have positive implications on firms' market value and financial robustness. In addition, when firm-specific experience and social networking capacity of TMT members are considered in the same model, Models (7) to (9) reveal that the effects of *TMT risk preference* and *TMT innovativeness* on value and financial health are clearly positive and significant in all twelve cases (the *p*-values are mostly lower than 0.001 and the highest *p*-value is 0.080). Overall, our results in models (7) to (9) are in line with previous research contending that *human capital* and networking are embedded with superior industry information that can provide firms with valuable results, including promoting innovativeness (Gronum et al. 2012; Watson 2007), and that managers seek economic resource from their 'peers' in the network as a means to fund new projects or start a new business (Chua and Pan 2008). The results also support previous studies arguing that the ties with professional networks offer managers unique economic benefits that can increase performance (see e.g., Chua and Pan 2008).

6. Discussion

This study departs from the extant literature on managerial cognition (see e.g. Nadkarni and Narayanan 2007; Talke et al. 2010) by providing both theoretical and empirical contributions to the theory of TMT-SC. Instead of employing a conceptual approach of managers' cognitive abilities or the traditional linear regression models to examine the effect of TMT-SC on performance (Cannella et al. 2008; Lee and Brinton 1996; Nadkarni and Narayanan 2007; Narayanan et al. 2011; Talke et al. 2010), we drew on, and extended the approach by Hughes et al. (2018), to address complex interdependencies amongst TMT education, industry and firm experience, risk & innovativeness and **human capital**. Our innovative interactive model of TMT-SC (Figures 1 and 3) extends the theory of TMT-SC by proposing and demonstrating that TMT-SC influences firm outcomes via random configurations and multiple combinations of overlaps of TMT-SC elements in a dynamic framework (Kaplan 2011; Hughes et al. 2018).

From an empirical perspective, we adopted the TPDMM PLS-SEM to provide a robust analysis demonstrating the complex association between TMT-SC, decision-making and firm outcomes. In so doing, we therefore contribute to the UET (Hambrick and Mason 1984) by highlighting the embeddedness of corporations and their managers in complex, heterogeneous and dynamic social structures, which have profound implications on TMT cognition abilities, decision-making and firm performance. Our interactive model shows that heterogeneity in TMT academic and professional qualifications and work experience alone cannot provide optimal benefits to organisations. Therefore, we extend the UET by providing a more comprehensive and dynamic notion of TMT heterogeneity (Hambrick et al. 1996) to reflect the multi-dimensional factors of TMT-SC and the interactions amongst these factors. In so doing, we also contribute to the strategic management literature by providing additional insights into why some firms perform better than their rivals. Our study focuses on the human capital, the strategists and their cognition, and argues that heterogeneity in the resource configurations of rival firms, which is critical to competitiveness (Molloy and Barney

1
2
3 2015; Wernerfelt 1984, 1995), emerges from different interactions between TMT-SC processes and
4
5 their cognitive dimensions (Figure 1).
6

7 Our study was motivated by Carpenter et al. (2004), Salas et al. (2010), Kaplan (2011),
8
9 Costanzo and Di Domenico (2015) and Shepherd et al. (2017), who highlighted the growing
10
11 importance of TMT-SC and called for a thorough analysis regarding the link between TMT-SC and
12
13 firm performance. Bromiley and Rau (2016) also called for more research on TMT and CEO, and
14
15 suggested simultaneous considerations of social and behavioural effects at multiple levels. In filling
16
17 this gap, our results suggest that strategic cognition that gives priority to TMT education background
18
19 alone does not provide significant contributions to corporate value or financial health. However, when
20
21 education is combined with industry or firm-specific experience, the strategic cognition of executives
22
23 can affect positively corporate financial health and value. The positive contribution of strategic
24
25 cognition is even more salient when TMT members increase their risk preferences by investing in
26
27 more innovative ideas that can be observed from R&D activities (i.e. high risk appetite and high
28
29 innovativeness). We noticed in our sample that most TMT members are partners to their professional
30
31 bodies. Furthermore, partners mostly maintain close contact with the top echelons of professional
32
33 bodies which give them access to extra cognitive skills that can be utilised during the TMT-SC
34
35 process in the boardroom. Our results suggest that networks are embedded with cognition-based trust
36
37 because members in the aforementioned elite networks benefit from superior knowledge resources
38
39 and expertise advice about the industry in which the firm operates, together with firm-specific
40
41 problem-solving recommendations (e.g. Gulati et al. 2000). Such trusted networks can strengthen the
42
43 positive association between TMT-SC and firm outcomes. They also strengthen the positive effects
44
45 of firm-specific experience that already provides better contributions than general experience. Hence,
46
47 the results show that the structure of elite networks can offer managers superior information that can
48
49 support TMT-SC to produce positive significant outcomes. This set of results complements findings
50
51 by Geletkanycz and Hambrick (1997), who state that strategic choices are influenced by the degree
52
53 of TMT external ties, and that external interactions would improve corporate performance by
54
55
56
57
58
59
60

1
2 supporting and updating informational requirements of a firm's strategy. Similarly, the risk
3 preference and innovativeness of TMTs show stronger effects on financial health and value when
4 professional and academic qualifications from reputable institutions are considered together.
5
6
7
8
9

10 **7. Conclusion**

11
12 This study provides the first empirical evidence that simultaneously links TMT-SC to corporate
13 performance and value by exploring in detail the cognitive elements of TMT members and how their
14 interactions impact corporate outcomes. We suggest that TMTs with relevant industry experience and
15 education should be rewarded adequately in order to retain them in the company, as not
16 acknowledging their credentials would reduce firm performance and innovation decisions (Amore
17 and Failla 2020; Dahya et al. 2002) that are critical to firms' competitiveness. This also implies that
18 companies should hire managers with high quality strategic orientation (Escribá-Esteve et al. 2009).
19
20
21
22
23
24
25
26
27
28

29 Second, our results address the question of how organisations respond to their environment
30 by adopting a managerial cognitive perspective. Our findings imply that the environment is not
31 completely exogenous, but the manner by which organisations respond to their environment is
32 influenced by TMT interpretations of that environment. Hence, we provide empirical evidence that
33 deepens policy makers' understanding of managerial decision-making and organisational behaviour
34 in general (Kor and Mesko 2013; Kunc and Morecroft 2010; Salas et al. 2010). Third, we provide a
35 framework (Figures 1 and 3) which captures different TMT cognitive pathways (i.e. TMT cognitive
36 frames shaping TMT sense-making and strategic choices) that policy makers can use to improve
37 decision-making outcomes. Also, our results imply that structural features do not determine
38 outcomes; rather, organisations 'act' through the cognitive lenses of their TMT (Kaplan 2011).
39
40
41
42
43
44
45
46
47
48
49
50
51

52 Fourth, practitioners may use our results to decide on executive remuneration and retention
53 schemes for TMTs who tend to be most skilled and experienced (Tröster et al. 2018). Kruger and
54 Dunning (1999) show that unskilled individuals suffer from cognitive biases and illusory superiority-
55 known as Dunning-Kruger effect- and argue that such people overestimate their abilities, cannot see
56
57
58
59
60

1
2 their inadequacies and underestimate the skills of others. They further argue that with the necessary
3 training, such cognitive biases can at least be mitigated. Considering also the limited rationality
4 perspective of the UET, our findings are crucial to the recruitment and selection of employees, as
5 well as the training and development arranged by human resources departments. Also, Kaplan and
6 Sorensen (2021) show that CEO-candidates with tangible general ability, interpersonal skills and
7 unique characteristics are more likely to be hired by the board of directors. They also note that
8 managers' personalities can be improved.

9
10 As for the limitations and future research, first, as we rely on secondary data (i.e. TMT characteristics)
11 to proxy for TMT-SC, a more direct measure of TMT-SC would be inappropriate in our study.
12 Previous studies have used TMT attributes such as education and experience to measure TMT
13 cognitive abilities. Although these attributes can reasonably be viewed as proxies for managers'
14 knowledge base and cognitive abilities, they cannot entirely capture the context-specific
15 interpretations of events. Second, concluding on the direction of causality between TMT-SC and
16 value, and TMT-SC and performance is challenging partly due to our indirect measure of TMT-SC
17 as a latent construct. Related to this point, Schuler and Cording (2006) posit that, to fully explain the
18 link between decision-making process and performance, all possible linkage effects should be
19 explored. Hence, future research could investigate whether current levels of strategic cognition,
20 innovativeness and risk preferences of TMT members are influenced by the preceding year's financial
21 health and firm value. Moreover, we do not explore the empirical relationship between TMT-SC and
22 social issues. Therefore, further studies could examine the association between TMT-SC and
23 corporate social and environmental performance.

24
25 Finally, future research could examine more methodically i) which mechanism having social
26 networking skills would help TMTs enhance performance, ii) why academic education and general
27 experience in isolation do not necessarily produce good corporate outcomes, iii) the association of
28 corporate outcomes with different managerial cognition styles such as analytical or intuitive styles,
29 and iv) the interaction between TMT-SC and corporate social responsibility (Gond et al. 2017).

References

- Acquaah, M., 2012. Social networking relationships, firm-specific managerial experience and firm performance in a transition economy: a comparative analysis of family owned and nonfamily firms. *Strategic Management Journal*, 33(10), 1215-1228.
- Adner, R. and Helfat, C.E., 2003. Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, 24(10), 1011-1025.
- Ahmed, H., Fairchild, R. and Guney, Y., 2020. Is corporate hedging always beneficial? A theoretical and empirical analysis. *European Journal of Finance*, 26(17), 1746-1780.
- Al-Abrow, H., Alnoor, A. and Abbas, S., 2019. The effect of organizational resilience and CEO's narcissism on project success: organizational risk as mediating variable. *Organization Management Journal*, 16(1), 1-13.
- Amore, M.D. and Failla, V., 2020. Pay dispersion and executive behaviour: evidence from innovation. *British Journal of Management*, 31(31), 487-504.
- Ashford, S.J., Wellman, N., Sully de Luque, M., De Stobbeleir, K.E. and Wollan, M., 2018. Two roads to effectiveness: CEO feedback seeking, vision articulation, and firm performance. *Journal of Organizational Behavior*, 39(1), 82-95.
- Ataullah, A., Vivian, A. and Xu, B., 2018. Time-varying managerial overconfidence and corporate debt maturity structure. *European Journal of Finance*, 24(2), 157-181.
- Auh, S. and Menguc, B., 2005. Top management team diversity and innovativeness: the moderating role of interfunctional coordination. *Industrial Marketing Management*, 34(3), 249-261.
- Baker, M. and Wurgler, J., 2011. Behavioral corporate finance: an updated survey. NBER Working Paper #17333.
- Barney, J., 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barney, J., Wright, M., Ketchen, D.J., 2001. The resource-based view of the firm: ten years after 1991. *Journal of Management*, 27(6), 625-641.
- Baron, R.A., Mueller, B.A. and Wolfe, M., 2016. Self-efficacy and entrepreneurs' adoption of unattainable goals: the restraining effects of self-control. *Journal of Business Venturing*, 31(1), 55-71.
- Bartunek, J.M., Gordon, J.R. and Weathersby, R.P., 1983. Developing "complicated" understanding in administrators. *Academy of Management Review*, 8(2), 273-284.
- Ben-David, I., Graham, J.R. and Harvey, C.R., 2010. Managerial miscalibration. NBER Working Paper.
- Berger, A.N., Kick, T. and Schaeck, K., 2014. Executive board composition and bank risk taking. *Journal of Corporate Finance*, 28, 48-65.
- Bertrand, M. and Schoar, A., 2003. Managing with style: the effect of managers on firm policies. *Quarterly Journal of Economics* 118(4), 1169-1208.
- Black, J., Kihwan, K., Shanggeun, R., Kai, W. and Sakchutchawan, S., 2019. Self-efficacy and emotional intelligence. *Team Performance Management*, 25(1/2), 100-119.
- Boomer, L.G., 2018. What's your innovation story? *Accounting Today*, 32(9), 1.
- Boutinot, A., Joly, I., Mangematin, V. and Ansari, S., 2017. Exploring the links between reputation and fame: evidence from French contemporary architecture. *Organization Studies*, 38(10), 1397-1420.
- Bromiley, P. and Rau, D., 2016. Social, behavioral, and cognitive influences on upper echelons during strategy process: a literature review. *Journal of Management*, 42(1), 174-202.
- Brown, R. and Sarma, N., 2007. CEO overconfidence, CEO dominance and corporate acquisitions. *Journal of Economics and Business*, 59(5), 358-379.
- Bundy, J., Shropshire, C. and Buchholtz, A.K., 2013. Strategic cognition and issue salience: toward an explanation of firm responsiveness to stakeholder concerns. *Academy of Management Review*, 38(3), 352-376.
- Busenitz, L. and Barney, J., 1997. Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision making. *Journal of Business Venturing*, 12(1), 9-30.
- Busenitz, L. and Lau, C., 1996. A cross-cultural cognitive model of new venture creation. *Entrepreneurs: Theory and Practice*, 20(4), 25-39.
- Buyl, T., Boone, C., Hendriks, W. and Matthyssens, P., 2011. Top management team functional diversity and firm performance: the moderating role of CEO characteristics. *Journal of Management Studies*, 48(1), 151-177.
- Calabretta, G., Gemser, G. and Wijnberg, N.M., 2017. The interplay between intuition and rationality in strategic decision making: a paradox perspective. *Organization Studies*, 38(3-4), 365-401.
- 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 collocation and environmental uncertainty. *Academy of Management Journal*, 51(4), 768-784.
- Carpenter, M.A., Geletkanycz, M.A. and Sanders, W.G., 2004. Upper echelons research revisited: antecedents, elements and consequences of top management team composition. *Journal of Management*, 30(6), 749-778.
- Castells, M., 2011. A network theory of power. *International Journal of Communication*, 5, 773-787.

- 1
2
3 Chatelain-Ponroy, S., Mignot-Gérard, S., Musselin, C. and Sponem, S., 2017. Is commitment to performance-based
4 management compatible with commitment to university “publicness”? Academics’ values in French universities.
5 *Organization Studies*, 39(10), 1377-1401.
- 6 Chatterjee, A. and Hambrick, D.C., 2007. It’s all about me: narcissistic chief executive officers and their effects on
7 company strategy and performance. *Administrative Science Quarterly* 52, 351-386.
- 8 Chen, Y., Gul, F.A., Veeraraghavan, M. and Zolotoy, L., 2015. Executive equity risk-taking incentives and audit
9 pricing. *Accounting Review*, 90(6), 2205-2234.
- 10 Chin, W.W., Marcolin, B.L. and Newsted, P.R., 2003. A partial least squares latent variable modeling approach for
11 measuring interaction effects: results from a Monte Carlo simulation study and an electronic-mail
12 emotion/adoption study. *Information Systems Research*, 14(2), 189-217.
- 13 Chua, A.L. and Pan, S.L., 2008. Knowledge transfer and organizational learning in IS offshore sourcing. *Omega*,
14 36(2), 267-281.
- 15 Clark, K.D. and Maggitti, P.G., 2012. TMT potency and strategic decision-making in high technology firms. *Journal*
16 *of Management Studies*, 49(7), 1168-1193.
- 17 Clarke, I. and Mackness, W., 2001. Management ‘intuition’: an interpretative account of structure and content of
18 decision schemas using cognitive maps. *Journal of Management Studies*, 38(2), 147-172.
- 19 Costanzo, L.A. and Di Domenico, M., 2015. A multi-level dialectical–paradox lens for top management team
20 strategic decision-making in a corporate venture. *British Journal of Management*, 26(3), 484-506.
- 21 Daellenbach, U.S., McCarthy, A.M. and Schoenecker, T.S., 1999. Commitment to innovation: the impact of top
22 management team characteristics. *R&D Management*, 29(3), 199-208.
- 23 Dahya, J., McConnell, J.J. and Travlos, N.G., 2002. The Cadbury committee, corporate performance, and top
24 management turnover. *Journal of Finance*, 57(1), 461-483.
- 25 Daniels, K., Johnson, G. and De Chernatony, L., 1994. Differences in managerial cognitions of competition. *British*
26 *Journal of Management*, 5, S21-S29.
- 27 Davis, A., 2018. *Reckless Opportunists: Elites at the End of the Establishment*. Manchester University Press.
- 28 DeFond, M.L., Hann, R.N. and Hu, X., 2005. Does the market value financial expertise on audit committees of
29 boards of directors? *Journal of Accounting Research*, 43(2), 153-193.
- 30 Denicolai, S., Zucchella, A. and Strange, R., 2014. Knowledge assets and firm international performance.
31 *International Business Review*, 23(1), 55-62.
- 32 Dokko, G., Wilk, S.L. and Rothbard, N.P., 2009. Unpacking prior experience: how career history affects job
33 performance. *Organization Science*, 20(1), 51-68.
- 34 Doukas, J.A. and Petmezas, D., 2007. Acquisitions, overconfident managers and self-attributions bias. *European*
35 *Financial Management*, 13(3), 531-577.
- 36 Ensley, M.D. and Pearce, C.L., 2001. Shared cognition in top management teams: implications for new venture
37 performance. *Journal of Organizational Behavior*, 22(2), 145-160.
- 38 Escribá-Esteve, A., Sánchez-Peinado, L. and Sánchez-Peinado, E., 2009. The influence of top management teams
39 in the strategic orientation and performance of small and medium-sized enterprises. *British Journal of*
40 *Management*, 20(4), 581-597.
- 41 Fairchild, R., 2009. Managerial overconfidence, moral hazard problems and excessive-life cycle debt sensitivity.
42 *Investment Management and Financial Innovations*, 2.
- 43 Fairchild, R., 2005a. Behavioral finance in a principal-agent model of capital budgeting. *Journal of Behavioral*
44 *Finance*, 2(1), 34-44.
- 45 Fairchild, R., 2005b. The effect of managerial overconfidence, asymmetric information, and moral hazard on capital
46 structure decisions. SSRN Working Paper.
- 47 Fairchild, R., 2005c. Overconfidence, fairness, and team performance. SSRN Working Paper.
- 48 Finkelstein, S., Hambrick, D.C. and Cannella, A.A., 1996. *Strategic Leadership*. St. Paul: West Educational.
- 49 Geletkanycz, M.A. and Boyd, B.K., 2011. CEO outside directorships and firm performance: a reconciliation of
50 agency and embeddedness views. *Academy of Management Journal*, 54(2), 335-352.
- 51 Geletkanycz, M.A. and Hambrick, D.C., 1997. The external ties of top executives: implications for strategic choice
52 and performance. *Administrative Science Quarterly*, 654-681.
- 53 Gervais, S., and Goldstein, I., 2003. Overconfidence and team coordination. SSRN Working Paper.
- 54 Gervais, S., Heaton, J.B. and Odean, T., 2003. The positive role of overconfidence and optimism in investment
55 policy. The Rodney L. White Centre for Financial Research Working Papers, University of Pennsylvania.
- 56 Gilley, K.M., Walters, B.A. and Olson, B.J., 2002. Top management team risk taking propensities and firm
57 performance: direct and moderating effects. *Journal of Business Strategies*, 19(2), 95-114.
- 58 Gider, J. and Hackbarth, D., 2010. Financing decisions. Chap. 21. In *Behavioral Finance*, edited by H. Kent Baker
59 and John Nofsinger, 393-412. Hoboken: Wiley.
- 60

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Goel, A.M. and Thakor, A. 2008. Overconfidence, CEO selection and corporate governance. *Journal of Finance*, 63(6), 2737-2784.
- Gond, J.P., El Akremi, A., Swaen, V. and Babu, N., 2017. The psychological microfoundations of corporate social responsibility: a person-centric systematic review. *Journal of Organizational Behavior*, 38(2), 225-246.
- Greve, H.R., 2003. *Organizational learning from performance feedback: a behavioral perspective on innovation and change*. Cambridge University Press.
- Gronov, S., Verreynne, M.L. and Kastle, T., 2012. The role of networks in small and medium-sized enterprise innovation and firm performance. *Journal of Small Business Management*, 50(2), 257-282.
- Grossman, S. and Hart, O., 1982. Corporate financial structure and managerial incentives. In *The Economics of Information and Uncertainty*, edited by J. McCall, 107-140. University of Chicago Press.
- Gulati, R., Nohria, N. and Zaheer, A., 2000. Strategic networks. *Strategic Management Journal*, 21(3), 203-215.
- Hackbarth, D., 2009. Determinants of corporate borrowing: a behavioral perspective. *Journal of Corporate Finance*, 15(4), 389-411.
- Hackbarth, D., 2008. Managerial traits and capital structure decisions. *Journal of Financial and Quantitative Analysis* 43, 843-881.
- Hair, J.F., Hult, G.T., Ringle, C.M. and Sarstedt, M., 2016. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications.
- Hair, J.F., Sarstedt, M., Ringle, C.M. and Gudergan, S.P., 2017. *Advanced Issues in Partial Least Squares Structural Equation Modeling*. SAGE Publications.
- Hair, J.F., Ringle, C.M. and Sarstedt, M., 2011. PLS-SEM: indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.
- Hambrick, D.C., 2007. Upper echelons theory: an update. *Academy of Management Review*, 32(2), 334-343.
- 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), 193-206.
- Hambrick, D.C., Humphrey, S.E. and Gupta, A., 2015. Structural interdependence within top management teams: a key moderator of upper echelons predictions. *Strategic Management Journal*, 36(3), 449-461.
- Hambrick, D.C. and Quigley, T.J., 2014. Toward more accurate contextualization of the CEO effect on firm performance. *Strategic Management Journal*, 35(4), 473-491.
- Hambrick, D.C., Cho, T.S. and Chen, M.J., 1996. The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly*, 41(4), 659-684.
- Hamori, M.K. and Koyuncu, B., 2015. Experience matters? The impact of prior CEO experience on firm performance. *Human Resource Management*, 54(1), 23-44.
- Harvey, S., Currall, S.C. and Helland Hammer, T., 2017. Decision diversion in diverse teams: findings from inside a corporate boardroom. *Academy of Management Discoveries*, 3(4), 358-381.
- Haynes, K., Campbell, J. and Hitt, M.A., 2017. When more is not enough: executive greed and its influence on shareholder wealth. *Journal of Management*, 43(2), 555-584.
- Haynes, K., 2015. The dark side of leadership: towards a mid-range theory of hubris and greed in entrepreneurial context. *Journal of Management Studies*, 52(4), 479-505.
- Hayward, M.L.A. and Hambrick, D.C., 1997. Explaining the premium paid for large acquisitions: evidence of CEO hubris. *Administrative Science Quarterly*, 42, 103-127.
- Heaton, J.B., 2002. Managerial optimism and corporate finance. *Financial Management*, 31, 33-45.
- Helfat, C.E. and Campo-Rembado, M.A., 2016. Integrative capabilities, vertical integration, and innovation over successive technology lifecycles. *Organization Science*, 27(2), 249-264.
- Helfat, C.E. and Peteraf, M.A., 2015. Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36(6), 831-850.
- Helfat, C.E. and Peteraf, M.A., 2009. Understanding dynamic capabilities: progress along a developmental path. *Strategic Organization*, 7(1), 91-102.
- Henseler, J., Ringle, C.M. and Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Herrmann, P. and Nadkarni, S., 2014. Managing strategic change: the duality of CEO personality. *Strategic Management Journal*, 35(9), 1318-1342.
- Hiller, N.J. and Hambrick, D.C., 2005. Conceptualizing executive hubris: the role of (hyper-) core self-evaluations in strategic decision-making. *Strategic Management Journal*, 26(4), 297-319.
- Hirshleifer, D., Low, A. and Teoh, S.H., 2012. Are overconfident CEOs better innovators? *Journal of Finance* 67, 1457-1498.
- 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), 13-28.

- 1
2
3 Hitt, M.A. and Tyler, B.B., 1991. Strategic decision models: integrating different perspectives. *Strategic Management Journal*, 12(5), 327-351.
- 4 Hoang, H. and Rothaermel, F.T., 2005. The effect of general and partner-specific alliance experience on joint R&D
5 project performance. *Academy of Management Journal*, 48(2), 332-345.
- 6 Hoskisson, R.E., Chirico, F., Zyung, J. and Gambeta, E., 2017. Managerial risk taking: a multitheoretical review
7 and future research agenda. *Journal of Management*, 43(1), 137-169
- 8 Huff, A.S., 1982. Industry influences on strategy reformulation. *Strategic Management Journal*, 3(2), 119-131.
- 9 Hughes, M., Filser, M., Harms, R., Kraus, S., Chang, M. and Cheng, C., 2018. Family firm configurations for high
10 performance: the role of entrepreneurship and ambidexterity. *British Journal of Management*, 29(4), 595-612.
- 11 Ibarra, H. and Andrews, S.B., 1993. Power, social influence, and sense making: effects of network centrality and
12 proximity on employee perceptions. *Administrative Science Quarterly*, 38(2), 277-303.
- 13 Jenkins, M. and Johnson, G., 1997. Linking managerial cognition and organizational performance: a preliminary
14 investigation using causal maps. *British Journal of Management*, 8, 77-90.
- 15 Jensen, M., 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*,
16 76, 323-339.
- 17 Jensen, M. and Meckling, W., 1976. The theory of the firm: managerial behavior, agency costs, and capital structure.
18 *Journal of Financial Economics*, 3, 305-360.
- 19 Jo, H., Kim, H. and Park, K., 2015. Corporate environmental responsibility and firm performance in the financial
20 services sector. *Journal of Business Ethics*, 131(2), 257-284.
- 21 Johansson, F., 2012. When success is born out of serendipity. *Harvard Business Review*, 1-4.
- 22 Kahneman, D. and Lovallo, D., 1993. Timid choice and bold forecasts: a cognitive perspective on risk-taking.
23 *Management Science*, 39(1), 17-31.
- 24 Kaplan, S. N. and Sorensen, M., 2021. Are CEOs Different? *Journal of Finance*, forthcoming.
- 25 Kaplan, S., 2011. Research in cognition and strategy: reflections on two decades of progress and a look to the future.
26 *Journal of Management Studies*, 48(3), 665-695.
- 27 Kilduff, M., Angelmar, R. and Mehra, A., 2000. Top management-team diversity and firm performance: examining
28 the role of cognitions. *Organization Science*, 11(1), 21-34.
- 29 Kimberly, J.R. and Evanisko, M.J., 1981. Organizational innovation: the influence of individual, organizational,
30 and contextual factors on hospital adoption of technological and administrative innovations. *Academy of*
31 *Management Journal*, 24(4), 689-713.
- 32 Kirby P., 2016. *Leading people: The educational backgrounds of the UK professional elite*. The Sutton Trust.
- 33 Kor, Y., 2006. Direct and interaction effects of top management team and board compositions on R&D investment
34 strategy. *Strategic Management Journal*, 27(11), 1081-1099.
- 35 Kor, Y., 2003. Experience-based top management team competence and sustained growth. *Organization Science*,
36 14(6), 707-719.
- 37 Kor, Y. and Mahoney, J.T., 2005. How dynamics, management, and governance of resource deployments influence
38 firm-level performance. *Strategic Management Journal*, 26(5), 489-496.
- 39 Kor, Y. and Mesko, A., 2013. Dynamic managerial capabilities: configuration and orchestration of top executives'
40 capabilities and the firm's dominant logic. *Strategic Management Journal*, 34(2), 233-244.
- 41 Kor, Y. and Misangyi, V.F., 2008. Outside directors' industry-specific experience and firms' liability of newness.
42 *Strategic Management Journal*, 29(12), 1345-1355.
- 43 Kruger, J. and Dunning, D., 1999. Unskilled and unaware of it: how difficulties in recognizing one's own
44 incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121-1134.
- 45 Kunc, M.H. and Morecroft, J.D., 2010. Managerial decision making and firm performance under a resource-based
46 paradigm. *Strategic Management Journal*, 31(11), 1164-1182.
- 47 Landier, A. and Thesmar, D., 2009. Financial contracting with optimistic entrepreneurs. *Review of Financial*
48 *Studies*, 22(1), 117-150.
- 49 Lee, S. and Brinton, M.C., 1996. Elite education and social capital: the case of South Korea. *Sociology of Education*,
50 177-192.
- 51 Leland, H.E. and Pyle, D.H., 1977. Informational asymmetries, financial structure, and financial intermediation.
52 *Journal of Finance* 32, 371-387.
- 53 Levy, O., 2005. The influence of top management team attention patterns on global strategic posture of firms.
54 *Journal of Organizational Behavior*, 26(7), 797-819.
- 55 Li, J. and Tang, Y., 2010. CEO hubris and firm risk taking in China: the moderating role of managerial discretion.
56 *Academy of Management Journal*, 53(1), 45-68.
- 57 Li, Q., Maggitti, P., Smith, K., Tesluk, P. and Katila, R., 2013. Top management attention to innovation: the role of
58 search selection and intensity in new product introductions. *Academy of Management Journal*, 56(3), 893-916.
- 59 Li, S. and Tsai, M., 2009. A dynamic taxonomy for managing knowledge assets. *Technovation*, 29(4), 284-298.
- 60

- 1
2
3 Maclean, M., Harvey, C. and Chia, R., 2010. Dominant corporate agents and the power elite in France and Britain. *Organization Studies*, 31(3), 327-348.
- 4 Malmendier, U. and Tate, G., 2005. CEO overconfidence and corporate investment. *Journal of Finance* 60(6), 2661-
5 2700.
- 6 Malmendier, U. Tate, G. and Yan, J., 2011. Overconfidence and early-life experiences: the effects of managerial
7 traits on corporate financial policies. *Journal of Finance*, 66, 1687-1733.
- 8 Mazouz, K. and Zhao, Y., 2019. CEO incentives, takeover protection and corporate innovation. *British Journal of*
9 *Management*, 30(2), 494-515.
- 10 McGuinness, P.B., 2019. Beyond the board realm: women in senior management and their impact on IPO capital
11 funding. *British Journal of Management*, 30(2), 389-414.
- 12 Meier S, Pierce L, Vaccaro A. and La Cara, B., 2016. Trust and in-group favoritism in a culture of crime. *Journal*
13 *of Economic Behavior & Organization*, 132, 78-92.
- 14 March, J. and Shapira, Z., 1987. Managerial perspectives on risk and risk taking. *Management Science*, 33(11),
15 1404-1418.
- 16 March, J. G. and Simon, H. A., 1958. *Organizations*. New York: Wiley.
- 17 Meissner, P., Schubert, M. and Wulf, T., 2018. Determinants of group-level overconfidence in teams: a quasi-
18 experimental investigation of diversity and tenure. *Long Range Planning*, 51(6), 927-936.
- 19 Michelman, V., Price, J. and Zimmerman, S.D., 2021. Old boys' clubs and upward mobility among the educational
20 elite. National Bureau of Economic Research, working paper # w28583.
- 21 Miller, D., Xu, X. and Mehrotra, V., 2015. When is human capital a valuable resource? The performance effects of
22 Ivy League selection among celebrated CEOs. *Strategic Management Journal*, 36(6), 930-944.
- 23 Mintzberg, H., Raisinghani, D. and Theoret, A., 1976. The structure of "unstructured" decision processes.
24 *Administrative Science Quarterly*, 246-275.
- 25 Modigliani, F. and Miller, M.H., 1958. The cost of capital, corporation finance and the theory of investment.
26 *American Economic Review*, 48, 261-297.
- 27 Molina-Morales, F.X. and Martínez-Fernández, M.T., 2010. Social networks: effects of social capital on firm
28 innovation. *Journal of Small Business Management*, 48(2), 258-279.
- 29 Molloy, J.C. and Barney, J.B., 2015. Who captures the value created with human capital? A market-based view.
30 *Academy of Management Perspectives*, 29(3), 309-325.
- 31 Myers, S., 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147-175.
- 32 Myers, S. and Majluf, N., 1984. Corporate financing and investment decisions when firms have information that
33 investors do not have. *Journal of Financial Economics*, 13, 187-221.
- 34 Nadkarni, S. and Barr, P.S., 2008. Environmental context, managerial cognition, and strategic action: an integrated
35 view. *Strategic Management Journal*, 29(13), 1395-1427.
- 36 Nadkarni, S. and Hermann, P., 2010. CEO personality, strategic flexibility, and firm performance: the case of the
37 Indian business process outsourcing industry. *Academy of Management Journal*, 53(5), 1050-1073.
- 38 Nadkarni, S. and Narayanan, V.K., 2007. Strategic schemas, strategic flexibility, and firm performance: the
39 moderating role of industry clockspeed. *Strategic Management Journal*, 28(3), 243-270.
- 40 Nahapiet, J. and Ghoshal, S., 1998. Social capital, intellectual capital, and the organizational advantage. *Academy*
41 *of Management Review*, 23(2), 242-266.
- 42 Naranjo-Gil, D., Hartmann, F. and Maas, V.S., 2008. Top management team heterogeneity, strategic change and
43 operational performance. *British Journal of Management*, 19(3), 222-234.
- 44 Narayanan, V.K., Zane, L.J. and Kemmerer, B., 2011. The cognitive perspective in strategy: an integrative review.
45 *Journal of Management*, 37(1), 305-351.
- 46 Ndofor, H.A., Sirmon, D.G. and He, X., 2015. Utilizing the firm's resources: how TMT heterogeneity and resulting
47 faultlines affect TMT tasks. *Strategic Management Journal*, 36(11), 1656-1674.
- 48 Nielsen, S., 2009. Why do top management teams look the way they do? A multilevel exploration of the antecedents
49 of TMT heterogeneity. *Strategic Organization*, 7(3), 277-305.
- 50 Nielsen, B.B. and Nielsen, S., 2013. Top management team nationality diversity and firm performance: a multilevel
51 study. *Strategic Management Journal*, 34(3), 373-382.
- 52 Nonaka, I., Toyama, R. and Nagata, A., 2000. A firm as a knowledge-creating entity: a new perspective on the
53 theory of the firm. *Industrial and Corporate Change*, 9(1), 1-20.
- 54 Oh, W.Y. and Barker V.L., 2018. Not all ties are equal: CEO outside directorships and strategic imitation in R&D
55 investment. *Journal of Management*, 44(4), 1312-1337.
- 56 Palich, L.E. and Bagby, D.R., 1995. Using cognitive theory to explain entrepreneurial risk-taking: challenging
57 conventional wisdom. *Journal of Business Venturing*, 10, 425-438.
- 58 Palmer, T.B. and Wiseman, R.M., 1999. Decoupling risk taking from income stream uncertainty: a holistic model
59 of risk. *Strategic Management Journal*, 20(11), 1037-1062.
- 60

- 1
2
3 Penrose, E., 1959. *The Theory of the Firm*. John Wiley & Sons, NY.
- 4 Porac, J.F. and Thomas, H., 2002. Managing cognition and strategy: issues, trends and future directions. *Handbook of Strategy and Management*, 165-181.
- 5 Posner, M.I., DiGirolamo, G.J. and Fernandez-Duque, D., 1997. Brain mechanisms of cognitive skills. *Consciousness and Cognition*, 6(2-3), 267-290.
- 6 Prahalad, C.K. and Bettis, R.A., 1986. The dominant logic: a new linkage between diversity and performance. *Strategic Management Journal*, 7(6), 485-501.
- 7 Pruitt, S.W. and Gitman, L.J., 1987. Capital budgeting forecast biases: evidence from Fortune 500. *Financial Management*, 16, 46-51.
- 8 Rajagopalan, N., Rasheed, A., Datta, D.K. and Spreitzer, G.M., 1997. A multi-theoretic model of strategic decision making processes. In *Strategic Decisions*, 229-249. Springer, Boston, MA.
- 9 Ringle, C.M., Sarstedt, M. and Straub, D.W., 2012. A critical look at the use of PLS-SEM in MIS Quarterly. *MIS Quarterly*, 36(1), iii-xiv.
- 10 Robert Jr, L.P., Dennis, A.R. and Ahuja, M.K., 2008. Social capital and knowledge integration in digitally enabled teams. *Information Systems Research*, 19(3), 314-334.
- 11 Rodgers, W., 2010. Three primary trust pathways underlying ethical considerations. *Journal of Business Ethics*, 91(1), 83-93.
- 12 Rodgers, W., Choy, H.L. and Guiral, A., 2013. Do investors value a firm's commitment to social activities? *Journal of Business Ethics*, 114(4), 607-623.
- 13 Rodgers, W., Mubako, G.N. and Hall, L., 2017. Knowledge management: the effect of knowledge transfer on professional skepticism in audit engagement planning. *Computers in Human Behavior*, 70, 564-574.
- 14 Rönkkö, M. and Evermann, J., 2013. A critical examination of common beliefs about partial least squares path modeling. *Organizational Research Methods*, 16(3), 425-448.
- 15 Rosenzweig, P., 2013. What makes strategic decisions different. *Harvard Business Review*, 91(11), 88.
- 16 Ross, S.A., 1977. The determination of financial structure: the incentive signaling approach. *Bell Journal of Economics*, 8, 23-40.
- 17 Salas, E., Rosen, M.A. and DiazGranados, D., 2010. Expertise-based intuition and decision making in organizations. *Journal of Management*, 36(4), 941-973.
- 18 Sajko, M., Boone, C. and Buyl, T., 2021. CEO greed, corporate social responsibility, and organizational resilience to systemic shocks. *Journal of Management*, 47(4), 957-992.
- 19 Sanders, W.G. and Hambrick, D.C., 2007. Swinging for the fences: the effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50(5), 1055-1078
- 20 Schaubroeck, J.M., Peng, A.C. and Hannah, S.T., 2013. Developing trust with peers and leaders: impacts on organizational identification and performance during entry. *Academy of Management Journal*, 56(4), 1148-1168.
- 21 Schuler, D.A. and Cording, M., 2006. A corporate social performance–corporate financial performance behavioral model for consumers. *Academy of Management Review*, 31(3), 540-558.
- 22 Scott, W.R., 2013. *Institutions and Organizations: Ideas, interests, and identities*. Sage Publications.
- 23 Serenko, A. and Dumay, J., 2017. Citation classics published in knowledge management journals. Part III: author survey. *Journal of Knowledge Management*, 21(2), 330-354.
- 24 Shefrin, H., 2001. Behavioral corporate finance. *Journal of Applied Corporate Finance*, 14(3) 1-17.
- 25 Sheng, S., Zhou, K.Z. and Li, J.J., 2011. The effects of business and political ties on firm performance: evidence from China. *Journal of Marketing*, 75(1), 1-15.
- 26 Shepherd, D.A., McMullen, J.S. and Ocasio, W., 2017. Is that an opportunity? An attention model of top managers' opportunity beliefs for strategic action. *Strategic Management Journal*, 38(3), 626-644.
- 27 Shiloh, S., Salton, E. and Sharabi, D., 2002. Individual differences in rational and intuitive thinking styles as predictors of heuristic responses and framing effects. *Personality and Individual Differences*, 32(3), 415-429.
- 28 Simsek, Z., Veiga, J.F., Lubatkin, M.H. and Dino, R.N., 2005. Modeling the multilevel determinants of top management team behavioral integration. *Academy of Management Journal*, 48(1), 69-84.
- 29 Singh, S., Tabassum, N., Darwish, T.K. and Batsakis, G., 2018. Corporate governance and Tobin's Q as a measure of organizational performance. *British Journal of Management*, 29(1), 171-190.
- 30 Smith, W.K. and Tushman, M.L., 2005. Managing strategic contradictions: a top management model for managing innovation streams. *Organization Science*, 16(5), 522-536.
- 31 Smith, W.K., Binns, A. and Tushman, M.L., 2010. Complex business models: managing strategic paradoxes simultaneously. *Long Range Planning*, 43(2-3), 448-461.
- 32 Sparrow, P., 1999. Strategy and cognition: understanding the role of management knowledge structures, organizational memory and information overload. *Creativity and Innovation Management*, 8(2), 140-148.
- 33 Statman, M. and Caldwell, D. 1987. Applying behavioral finance to capital budgeting: project terminations. *Financial Management*, 16(4), 7-15.

- 1
2
3 Statman, M. and Tyebjee, T.T., 1985. Optimistic capital budgeting forecasts: an experiment. *Financial Management*, 14(3), 27-33.
- 4
5 Talke, K., Salomo, S. and Kock, A., 2011. Top management team diversity and strategic innovation orientation: the
6 relationship and consequences for innovativeness and performance. *Journal of Product Innovation Management*,
7 28(6), 819-832.
- 8 Talke, K., Salomo, S. and Rost, K., 2010. How top management team diversity affects innovativeness and
9 performance via the strategic choice to focus on innovation fields. *Research Policy*, 39(7), 907-918.
- 10 Teece, D.J., 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise
11 performance. *Strategic Management Journal*, 28(13), 1319-1350.
- 12 Teece, D.J., Pisano, G. and Shuen, A., 1997. Dynamic capabilities and strategic management. *Strategic
13 Management Journal*, 18(7), 509-533.
- 14 Tippmann, E., Sharkey Scott, P. and Parker, A., 2017. Boundary capabilities in MNCs: knowledge transformation
15 for creative solution development. *Journal of Management Studies*, 54(4), 455-482.
- 16 Tischer, S. and Lutz, H., 2014. Linking corporate reputation and shareholder value using the publication of
17 reputation rankings. *Journal of Business Research*, 67(5), 1007-1017.
- 18 Tripsas, M. and Gavetti, G., 2000. Capabilities, cognition, and inertia: evidence from digital imaging. *Strategic
19 Management Journal*, 21(10-11), 1147-1161.
- 20 Tröster, C., Van Quaquebeke, N. and Aquino, K., 2018. Worse than others but better than before: integrating social
21 and temporal comparison perspectives to explain executive turnover via pay standing and pay growth. *Human
22 Resource Management*, 57(2), 471-481.
- 23 van der Maas, H.L., Molenaar, D., Maris, G., Kievit, R.A. and Borsboom, D., 2011. Cognitive psychology meets
24 psychometric theory: on the relation between process models for decision making and latent variable models for
25 individual differences. *Psychological Review*, 118(2), 339-356.
- 26 Wai, J. and Rindermann, H., 2015. The path and performance of a company leader: a historical examination of the
27 education and cognitive ability of Fortune 500 CEOs. *Intelligence*, 53, 102-107.
- 28 Walsh, J.P., 1995. Managerial and organizational cognition: notes from a trip down memory lane. *Organization
29 Science*, 6(3), 280-321.
- 30 Wang, G., Holmes Jr, R., Oh, I. and Zhu, W., 2016. Do CEOs matter to firm strategic actions and firm performance?
31 A meta-analytic investigation based on upper echelons theory. *Personnel Psychology*, 69(4), 775-862.
- 32 Watson J., 2007. Modeling the relationship between networking and firm performance. *Journal of Business
33 Venturing*, 22(6), 852-874.
- 34 Weber, C., Weidner, K., Kroeger, A. and Wallace, J., 2017. Social value creation in inter-organizational
35 collaborations in the not-for-profit sector—give and take from a dyadic perspective. *Journal of Management
36 Studies*, 54(6), 929-956.
- 37 Weinstein, N., 1980. Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*
38 39, 806-820.
- 39 Wernerfelt, B., 1984. A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- 40 Wernerfelt, B., 1995. The resource-based view of the firm: ten years after. *Strategic Management Journal*, 16(3),
41 171-174.
- 42 Wiersema, M.F. and Bantel, K.A., 1992. Top management team demography and corporate strategic change.
43 *Academy of Management Journal*, 35(1), 91-121.
- 44 Williams, T., Gruber, D., Sutcliffe, K., Shepherd, D. and Zhao, E., 2017. Organizational response to adversity:
45 fusing crisis management and resilience research streams. *Academy of Management Annals*, 11(2), 733-769.
- 46 Williams, G. and Filippakou, O., 2010. Higher education and UK elite formation in the twentieth century. *Higher
47 Education*, 59(1), 1-20.
- 48 Wright, P., Kroll, M., Krug, J.A. and Pettus, M., 2007. Influences of top management team incentives on firm risk
49 taking. *Strategic Management Journal*, 28(1): 81-89.
- 50 Wu, B., Ego Makes Entrepreneurs? *Business Week Online*, 2 February 2005.
- 51 Xia, X.P. and Pan, H.B., 2006. The dynamics of corporate takeovers based on managerial overconfidence. *Journal
52 of American Academy of Business*, 10(1), 378-387.
- 53 Zacharakis, A. and Shepherd, D., 2001. The nature of information and overconfidence on venture capitalists'
54 decision making. *Journal of Business Venturing*, 16(4), 311-332.
- 55 Zhang, Y. and Rajagopalan, N., 2010. Once an outsider, always an outsider? CEO origin, strategic change, and firm
56 performance. *Strategic Management Journal*, 31(3), 334-346.
- 57
58
59
60

Appendix

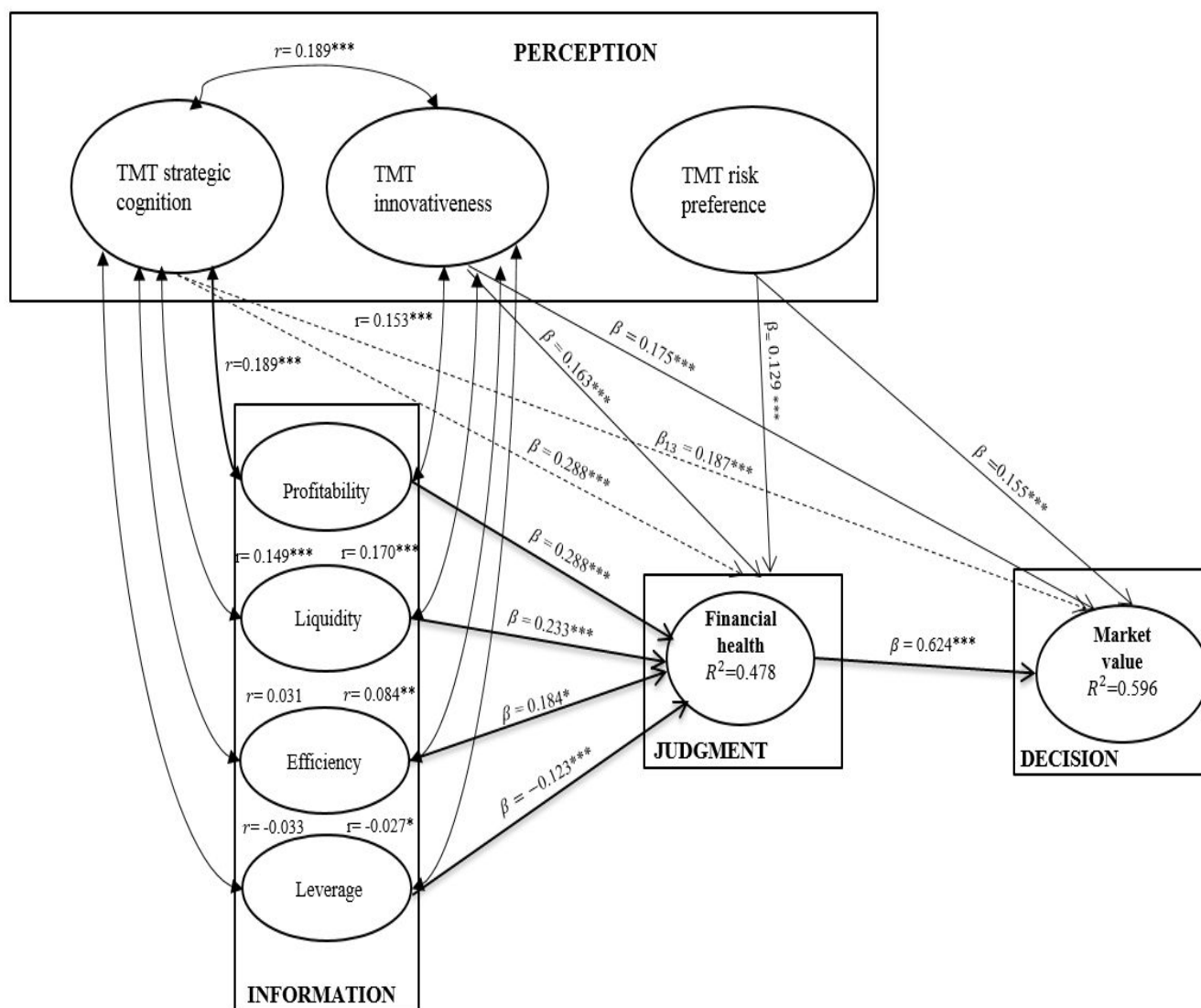


Figure A1. PLS results for a selected model

Note: These results are only for the modified version of Model (3) in Table 3 about PLS results. The results for the other models are available on request. The letter ‘r’ represents the correlations between the constructs and β represents the PLS path coefficients.

Table A1. Assessment of the indicators: validity and construct reliability tests

Latent Construct	Indicators	Convergent Validity			Internal Consistency Reliability		
		Loadings >0.70	t-value for loadings	Indicator reliability >0.50	AVE >0.50	Composite reliability [0.60 - 0.90]	Cronbach Alpha [0.60 - 0.90]
TMT education	Academic education	0.75	6.13	Yes	0.64	0.82	0.76
	Professional education	0.84	13.05	Yes			
TMT experience	Supervisory experience	0.80	12.67	Yes	0.67	0.83	0.79
	Industry-specific experience	0.88	15.23	Yes			
	Firm-specific experience	0.90	16.32	Yes			
TMT risk preference	Delta	0.89	15.99	Yes	0.71	0.87	0.83
TMT innovativeness	R&D to sales	0.88	15.35	Yes	0.69	0.80	0.77
TMT strategic cognition	TMT education & TMT experience	0.90	16.32	Yes	0.70	0.84	0.78
Profitability	Return on equity	0.89	16.20	Yes	0.70	0.87	0.82
	Return on assets	0.90	16.32	Yes			
Liquidity	Current ratio	0.88	15.63	Yes	0.67	0.83	0.79
	Cash ratio	0.85	14.21	Yes			
	Quick ratio	0.87	15.12	Yes			
Leverage	Debt to equity	0.90	17.23	Yes	0.71	0.88	0.84
	Debt to assets	0.85	14.65	Yes			
Efficiency	Assets turnover	0.90	17.10	Yes	0.73	0.89	0.86
	Sales to assets	0.91	19.15	Yes			

Note: *TMT strategic cognition* is the linear combination of five indicators based on the constituents of *TMT experience* and *TMT education*. AVE stands for average variance extracted. These results are only for Model 3 in Table 3 about PLS results. The results for the other models are available on request.

Table A2. Heterotrait-monotrait (HTMT) results: discriminant validity tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TMT education>Tobin's Q	0.28	0.20	0.15	0.17	0.19	0.28	-	-	-
	[0.015]	[0.094]	[0.014]	[0.000]	[0.007]	[0.049]			
TMT education> Z-score	0.25	0.20	0.14	0.13	0.15	0.25	-	-	-
	[0.024]	[0.102]	[0.006]	[0.002]	[0.006]	[0.035]			
TMT experience>Tobin's Q	0.58	0.52	-	0.49	0.18	-	0.09	0.16	0.21
	[0.031]	[0.000]		[0.000]	[0.001]		[0.025]	[0.006]	[0.000]
TMT experience> Z-score	0.20	0.53	-	0.11	0.10	-	0.08	0.24	0.25
	[0.001]	[0.000]		[0.000]	[0.000]		[0.004]	[0.001]	[0.000]
TMT strategic cognition>Z-score	0.08	0.12	0.23	0.12	0.12	0.12	0.10	0.09	0.09
	[0.086]	[0.061]	[0.058]	[0.000]	[0.000]	[0.088]	[0.003]	[0.028]	[0.008]
TMT strategic cognition>Tobin's Q	0.20	0.19	0.17	0.37	0.37	0.66	0.14	0.15	0.17
	[0.016]	[0.004]	[0.000]	[0.000]	[0.000]	[0.000]	[0.018]	[0.002]	[0.001]
TMT innovativeness >Tobin's Q	-	0.17	0.17	0.08	0.11	0.66	0.17	0.31	0.24
		[0.005]	[0.009]	[0.004]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
TMT innovativeness >Z-score	-	0.34	0.23	0.13	0.18	0.60	0.14	0.22	0.13
		[0.001]	[0.000]	[0.118]	[0.004]	[0.000]	[0.009]	[0.000]	[0.004]
TMT risk preference> Tobin's Q	-	-	0.14	-	-	0.21	0.26	0.25	0.29
			[0.000]			[0.001]	[0.001]	[0.002]	[0.000]
TMT risk preference> Z-score	-	-	0.07	-	-	0.11	0.30	0.27	0.32
			[0.019]			[0.062]	[0.000]	[0.000]	[0.000]
TMT human capital >Tobin's Q	-	-	-	-	-	-	0.22	0.20	0.21
							[0.003]	[0.010]	[0.007]
TMT human capital >Z-score	-	-	-	-	-	-	0.20	0.18	0.20
							[0.009]	[0.010]	[0.000]
Efficiency > Z-score	0.57	0.12	0.02	0.15	0.15	0.22	0.26	0.21	0.23
	[0.046]	[0.024]	[0.039]	[0.000]	[0.000]	[0.049]	[0.000]	[0.003]	[0.000]
Leverage>Z-score	0.30	0.29	0.18	0.15	0.13	0.30	0.15	0.29	0.26
	[0.000]	[0.000]	[0.000]	[0.006]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Liquidity> Z-score	0.50	0.49	0.27	0.24	0.24	0.46	0.07	0.31	0.39
	[0.024]	[0.009]	[0.005]	[0.006]	[0.006]	[0.000]	[0.037]	[0.000]	[0.000]
Profitability> Z-score	0.27	0.29	0.28	0.34	0.34	0.27	0.27	0.30	0.27
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.009]	[0.000]	[0.002]
Z-score>Tobin's Q	0.79	0.80	0.65	0.59	0.60	0.79	0.65	0.65	0.67
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Note: This tables reports the HTMT criteria that measure the correlations among constructs or indicators. The figures in the brackets are the *p*-values showing the statistical significance of the correlations. See Table 1 for the definition of the variables.

Table 1. Definitions of the variables

Indicators and constructs	Definition
TMT risk preference	<i>Delta</i> : the ratio of the change in price of an option to the percentage change in the price of the underlying asset, i.e., the first derivative with respect to the change in the stock price. (Source: Bloomberg)
TMT innovativeness	R&D intensity, <i>R&D to sales</i> , which is the ratio of R&D expenditure to total sales. (Source: Bloomberg)
Professional education	Categorical variable: 2, if TMTs have received professional training for 3 years or more; 1, if TMTs have received professional training between 1 and 2 years; 0, otherwise. The professional qualifications that we considered in our sample include this non-exhaustive list: Fellowship of the Royal Colleges of Surgeons (FRCS), Association of Chartered Accountants (see Meier et al. 2016), Chartered Institute of Management Accountants (CIMA), Chartered Financial Analyst (CFA), Chartered Institute of Marketing (CIM), Chartered Institute of Bankers (CIB), Chartered Engineers (CEng), Chartered surveyors (RICS), Chartered Institute of Actuaries (CIA), and lawyers, solicitors and barristers with legal practice course (LPC) qualification (Source: authors' own construction)
Elite professional	Dummy variable: 1, if TMTs have professional qualifications from the institutions ACCA, CIMA, CFA, FRCS, CEng or with LPC qualification; 0, otherwise. (Source: authors' own construction)
Academic education	Categorical variable: 1 if TMTs have graduate degrees; 2 if postgraduate degrees; 3 if PhD degrees; 0, otherwise.
TMT education	Proxy for TMT education as a latent construct, which is the linear combination of the indicators <i>Professional education</i> and <i>Academic education</i> . (Source: authors' own construction)
Elite academic	Dummy variable: 1, if TMT graduated from the top 100 higher education institutions according to the ranking provided by The Times Higher Education in 2016; 0, otherwise]. (Source: authors' own construction)
Oxbridge	Dummy variable: 1, if TMTs have degrees from the University of Oxford or University of Cambridge; 0, otherwise. (Source: authors' own construction)
Two elites	Dummy variable: 1, if both <i>Elite professional</i> and <i>Elite academic</i> dummy variables take the value of 1; 0, otherwise. (Source: authors' own construction)
TMT human capital	It is based on either of <i>Elite academic</i>, <i>Oxbridge</i> or <i>Two elites</i>. (Source: authors' own construction)
Firm-specific experience	Dummy variable: 1, if TMTs have the specific expertise related to the core operations of the firm or if they have worked in the same firm for at least one year; 0, otherwise. (Source: authors' own construction).
Industry-specific experience	Dummy variable: 1, if TMTs have expertise in the industry that their firm is operating in; 0, otherwise. (Source: authors' own construction)
Supervisory experience	Dummy variable: 1, if TMTs have previous experience as chief executive officer (CEO), chief finance officer (CFO), chief operating officer (COO), vice president, managing director or chairman; 0, otherwise. (Source: authors' own construction)
TMT experience	Proxy for TMT experience as a latent construct, which is the linear combination of the indicators <i>Firm-specific experience</i> , <i>Industry-specific experience</i> and <i>Supervisory experience</i> . (Source: authors' own construction)
TMT strategic cognition	Proxy for overall TMT strategic cognition as a latent construct, which is the linear combination of the constructs <i>TMT Education</i> and <i>TMT Experience</i> . (Source: authors' own construction)
Firm age	The number of years since the inception of the firm as of the corresponding year in the panel. (Source: Bloomberg)
Return on assets	ROA. Net income over total assets. (Source: Bloomberg)
Return on equity	ROE. Net income over equity capital. (Source: Bloomberg)
Profitability	Proxy for corporate profitability as a latent construct, which is the linear combination of ROA and ROE.
Current ratio	The ratio of current assets to current liabilities. (Source: Bloomberg)
Cash ratio	The ratio of cash and near cash items plus marketable securities & other short term investments to current liabilities. (Source: Bloomberg)
Quick ratio	The ratio of current assets less inventories to current liabilities. (Source: Bloomberg)
Liquidity	Proxy for corporate liquidity as a latent construct, which is the linear combination of <i>Current ratio</i> , <i>Cash ratio</i> and <i>Quick ratio</i> .
Debt to equity	The ratio of total debt to total book value of equity. (Source: Bloomberg)
Debt to assets	The ratio of total debt to total assets. (Source: Bloomberg)
Leverage	Proxy for corporate indebtedness as a latent construct, which is the linear combination of <i>Debt to equity</i> and <i>Debt to assets</i> .
Assets turnover	Total sales revenues divided by total assets. (Source: Bloomberg)
Sales to assets	Total sales revenues divided by net assets. (Source: Bloomberg)
Efficiency	Proxy for efficiency of corporate operations as a latent construct, which is the linear combination of <i>Assets turnover</i> and <i>Sales to assets</i> .
Tobin's Q	The ratio of the market value of firm to the replacement value of the firm's assets. (Source: Bloomberg)
Z-score	Proxy for financial health. Altman's Z-score is calculated as follows: [Z= 3.3*(EBIT/Tangible assets) +0.6*(Market value of equity/total liabilities) +1*(Sales/tangible assets) +1.2*(Working capital/tangible assets) +1.4*(retained earnings/tangible assets)]. (Source: Bloomberg)

Table 2. Descriptive statistics and correlation matrix

Indicator	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	0.13	0.49														
(2)	0.06	0.79	0.33**													
(3)	0.80	0.55	-0.05	-0.06												
(4)	1.68	0.48	0.10	0.07	-0.07											
(5)	0.64	0.75	0.03	-0.01	0.18	0.04										
(6)	0.26	0.39	0.14	0.19	-0.44**	0.63**	0.36**									
(7)	0.46	0.19	0.24*	0.04	-0.09	0.75**	0.37**	0.39**								
(8)	0.31	0.25	0.26*	0.14	-0.09	0.53**	0.35**	0.11	0.59**							
(9)	0.51	0.56	0.18	-0.08	0.44**	0.03	-0.18	-0.09	0.12	0.12						
(10)	1.67	0.57	0.04	0.22*	0.25*	0.18*	0.63**	0.18	0.63**	0.43**	-0.16					
(11)	0.27	0.44	0.13	0.05	0.57**	0.40**	0.19	-0.38**	0.26*	0.24*	0.22*	0.46**				
(12)	1.00	0.74	0.18	0.30**	0.10	0.06	0.05	0.14	-0.05	-0.07	-0.13	0.67**	0.35**			
(13)	1.53	0.30	0.13	0.41**	-0.04	0.02	0.01	0.25*	0.21*	0.24*	0.32**	0.14	0.06	0.36**		
(14)	26.88	16.13	-0.20	-0.16	0.10	-0.08	0.42**	-0.04	-0.12	-0.13	-0.17	0.42**	-0.32**	-0.14	0.05	
(15)	0.06	0.12	0.30*	0.31**	-0.07	-0.16	0.06	0.35**	0.35**	0.21*	0.24*	0.02	-0.13	0.26*	0.18**	0.26*
(16)	0.18	0.72	0.13	0.43**	0.03	-0.05	0.01	0.31**	0.33**	0.31*	0.36**	0.12	0.08	0.35**	0.27*	0.22*
(17)	1.88	3.41	0.07	0.28*	-0.09	0.06	-0.07	-0.07	-0.04	-0.05	-0.02	-0.07	-0.04	0.03	-0.08	-0.17
(18)	0.78	3.26	0.08	0.30*	-0.05	0.07	-0.14	-0.04	-0.04	-0.04	0.04	-0.07	0.02	0.08	-0.06	-0.19
(19)	1.17	3.18	0.08	0.31*	-0.05	0.06	-0.11	-0.05	-0.04	-0.05	0.02	-0.07	0.01	0.07	-0.07	-0.18
(20)	1.08	3.39	-0.16	0.35**	0.31*	0.02	-0.07	-0.27*	-0.38**	-0.33**	-0.01	0.06	0.37**	0.23*	0.61**	0.27*
(21)	0.22	0.20	-0.18	0.03	0.36**	0.03	-0.03	-0.22*	-0.36**	-0.33**	0.09	-0.14	0.25*	-0.11	0.24*	0.23*
(22)	0.88	0.76	-0.12	-0.32**	0.15	-0.25*	0.28*	-0.16	-0.25*	-0.24*	0.04	0.20	0.19	0.01	0.18*	0.14
(23)	0.77	0.73	-0.11	-0.31*	0.12	-0.24	0.26*	-0.15	-0.25*	-0.25*	0.03	0.22*	0.18	0.05	0.16*	0.13
(24)	1.93	2.95	0.36**	0.56**	-0.31**	0.05	0.07	0.54**	0.43**	0.52**	0.54**	0.54**	0.54**	0.34**	0.33**	0.34**
(25)	5.17	3.53	0.48**	0.53**	-0.32**	0.04	-0.16	0.66**	0.37**	0.42**	0.36**	0.26**	0.26**	0.36**	0.02	0.33**
			(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)				
			(16)													
			(17)	0.75**												
			(18)	0.11	-0.06											
			(19)	0.12	-0.04	0.99**										
			(20)	0.12	-0.04	0.99**	0.99**									
			(21)	0.11	0.46**	-0.20	-0.16	-0.17								
			(22)	0.03	0.21*	-0.24*	-0.23*	-0.22*	0.75**							
			(23)	0.04	-0.06	-0.35**	-0.33**	-0.32**	-0.08	-0.01						
			(24)	0.03	-0.07	-0.34**	-0.32**	-0.32**	-0.09	-0.04	0.99**					
			(25)	0.56**	0.35**	0.09	0.05	0.06	0.05	-0.02	-0.24*	-0.24*				
			(25)	0.39**	0.31**	0.55**	0.57**	0.57**	-0.29*	-0.36**	0.23*	0.22*	0.63**			

Note. TMT risk preference (1); TMT innovativeness (2); Professional education (3); Academic education (4); TMT education (5); Oxbridge (6); Elite academic (7); Elite professional (8); Firm-specific experience (9); Industry-specific experience (10); TMT experience (11); Supervisory experience (12); TMT strategic cognition (13); Firm age (14); Return on assets (15); Return on equity (16); Current ratio (17); Cash ratio (18); Quick ratio (19); Debt to equity (20); Debt to assets (21); Assets turnover (22); Sales to assets (23); Tobin's Q (24); Z-score (25). The asterisk * (**) shows that the Pearson coefficient is significant at the 5% (1%) level (two-tailed). See Table 1 for the definition of the variables.

Table 3. PLS-SEM results for financial health and firm value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TMT education >Tobin's Q	-0.01 [0.923]	-0.07 [0.309]	-0.03 [0.339]	0.01 [0.345]	-0.04 [0.234]	-0.05 [0.452]	-	-	-
TMT education >Z-score	-0.16 [0.038]	-0.16 [0.098]	-0.04 [0.204]	-0.05 [0.321]	-0.05 [0.395]	-0.23 [0.000]	-	-	-
TMT experience >Tobin's Q	-0.05 [0.495]	-0.03 [0.681]	-	0.06 [0.049]	0.07 [0.003]	-	0.07 [0.007]	0.08 [0.003]	0.10 [0.001]
TMT experience >Z-score	-0.20 [0.001]	-0.18 [0.003]	-	-0.11 [0.000]	0.05 [0.051]	-	0.06 [0.016]	0.07 [0.012]	0.10 [0.000]
TMT strategic cognition >Tobin's Q	0.07 [0.103]	0.18 [0.000]	0.19 [0.002]	0.16 [0.002]	0.30 [0.000]	0.17 [0.002]	0.08 [0.009]	0.09 [0.007]	0.11 [0.000]
TMT strategic cognition >Z-score	0.08 [0.101]	0.16 [0.000]	0.29 [0.000]	0.29 [0.000]	0.13 [0.005]	0.06 [0.098]	0.18 [0.009]	0.20 [0.000]	0.22 [0.000]
TMT risk preference >Tobin's Q	-	-	0.16 [0.003]	-	-	0.18 [0.102]	0.13 [0.000]	0.14 [0.001]	0.13 [0.005]
TMT risk preference >Z-score	-	-	0.13 [0.004]	-	-	0.08 [0.346]	0.07 [0.080]	0.10 [0.070]	0.08 [0.076]
TMT innovativeness >Tobin's Q	-	0.11 [0.003]	0.18 [0.001]	0.07 [0.008]	0.10 [0.007]	0.04 [0.102]	0.13 [0.004]	0.17 [0.001]	0.16 [0.002]
TMT innovativeness >Z-score	-	0.234 [0.000]	0.163 [0.000]	0.024 [0.185]	0.067 [0.054]	0.042 [0.365]	0.219 [0.001]	0.244 [0.000]	0.197 [0.005]
TMT human capital >Tobin's Q	-	-	-	-	-	-	0.14 [0.004]	0.15 [0.001]	0.11 [0.008]
TMT human capital >Z-score	-	-	-	-	-	-	0.29 [0.004]	0.39 [0.002]	0.22 [0.009]
Efficiency >Z-score	0.04 [0.665]	0.10 [0.103]	0.18 [0.051]	0.21 [0.007]	0.11 [0.003]	0.11 [0.345]	0.13 [0.007]	0.16 [0.005]	0.16 [0.004]
Leverage >Z-score	-0.22 [0.001]	-0.20 [0.000]	-0.12 [0.006]	-0.11 [0.000]	-0.13 [0.000]	-0.18 [0.000]	-0.14 [0.007]	-0.21 [0.003]	-0.25 [0.000]
Liquidity >Z-score	0.46 [0.002]	0.41 [0.032]	0.23 [0.005]	0.37 [0.001]	0.23 [0.002]	0.46 [0.000]	0.33 [0.000]	0.46 [0.000]	0.35 [0.000]
Profitability >Z-score	0.25 [0.000]	0.30 [0.000]	0.29 [0.000]	0.34 [0.005]	0.33 [0.005]	0.24 [0.009]	0.31 [0.000]	0.30 [0.000]	0.40 [0.000]
Z-score >Tobin's Q	0.77 [0.000]	0.74 [0.000]	0.62 [0.000]	0.63 [0.002]	0.55 [0.001]	0.77 [0.000]	0.63 [0.000]	0.62 [0.000]	0.70 [0.000]
Adjusted R ² :									
Z-score	.41	.50	.48	.36	.41	.40	.70	.73	.71
Tobin's Q	.64	.67	.60	.55	.54	.65	.60	.69	.70

Note: The figures in the brackets are the *p*-values. Model (1) considers the general definitions *TMT education* and *TMT experience*. Model (2) adds *TMT innovativeness* to model (1). Model (3) excludes *TMT experience* but includes *TMT risk preference*. Model (4) uses *Industry-specific experience* to proxy for *TMT experience*. Model (5) uses *Firm-specific experience* to proxy for *TMT experience*. Model (6) uses *Professional education* to proxy for *TMT education*. Model (7) (8) (9) uses *Elite academic (Oxbridge) (Two elites)* to proxy for *TMT human capital*, respectively. In models (7) to (9), *Firm-specific experience* is used to proxy for *TMT experience*. See Table 1 for the variables' definitions. The HTMT criteria are reported in the Appendix.

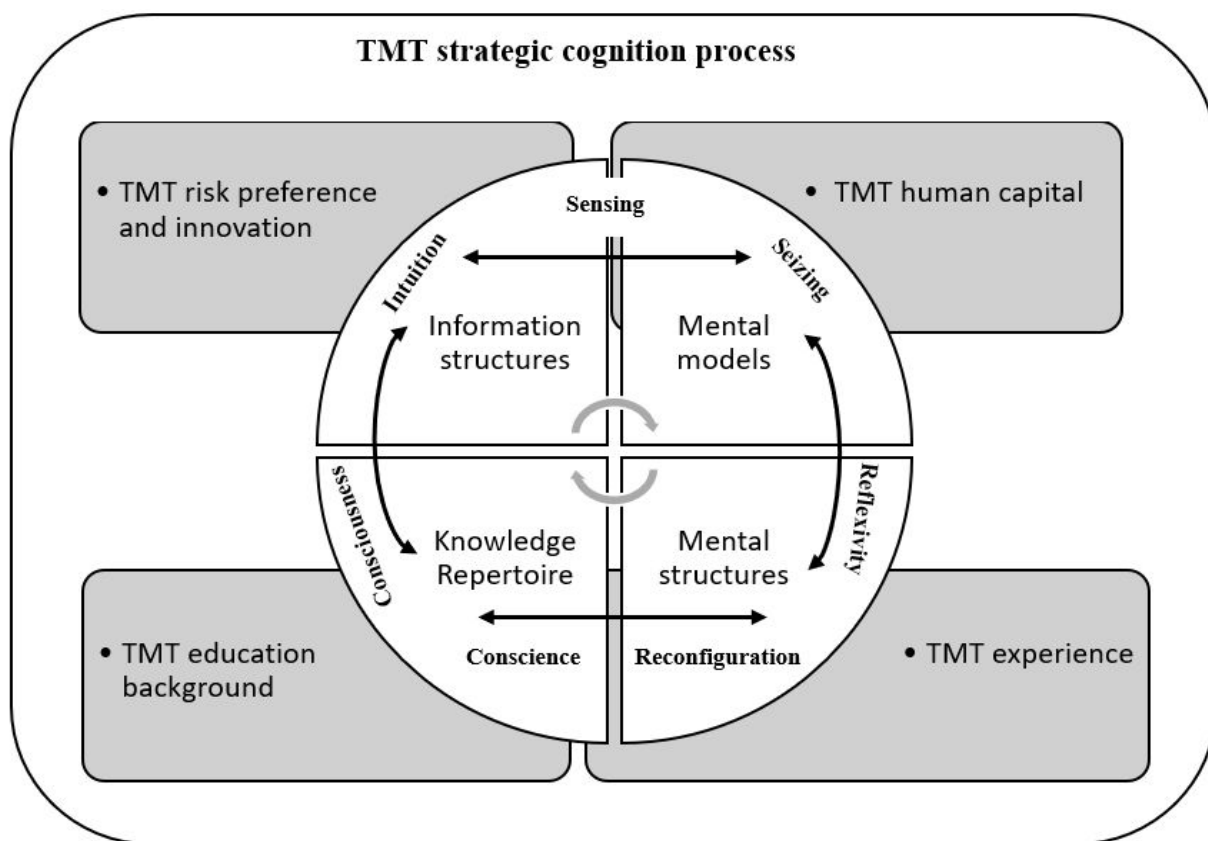


Figure 1. The decomposition of TMT strategic cognition process

Note: Source: authors' own construct, adapted from Kor and Mesko (2013), Teece (2007), Helfat and Peteraf (2009, 2015) and Hambrick and Mason (1984).



Figure 2. Modelling TMT strategic cognition and firm outcomes: simplified linear framework

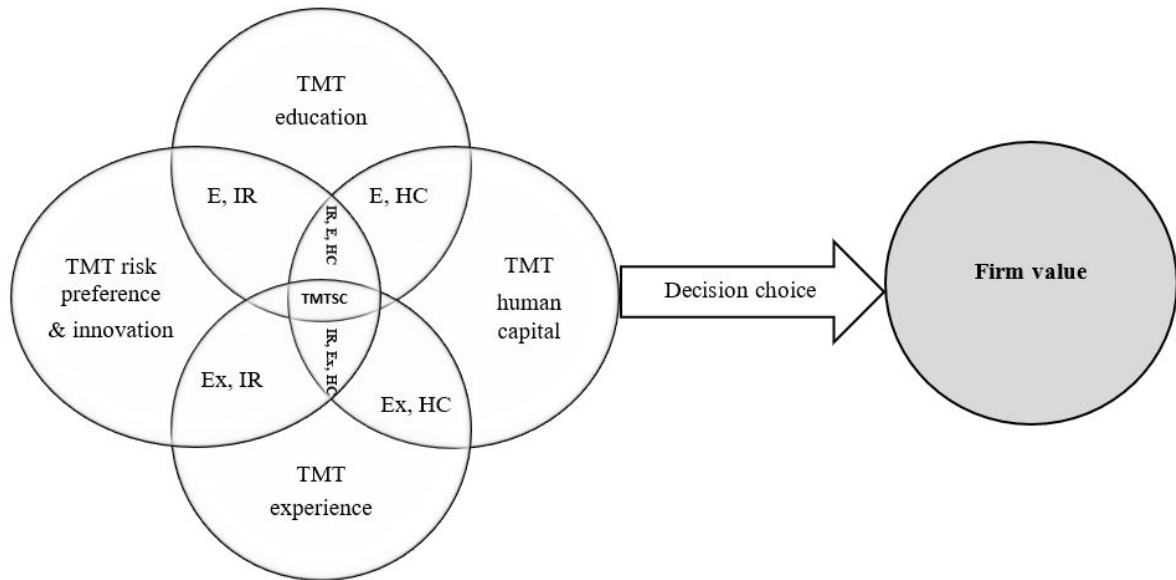


Figure 3. Modelling TMT strategic cognition and firm outcomes: complex framework

Note: E= education, Ex= experience, IR= innovation & risk, HC= TMT human capital, TMTSC = top management team strategic cognition.

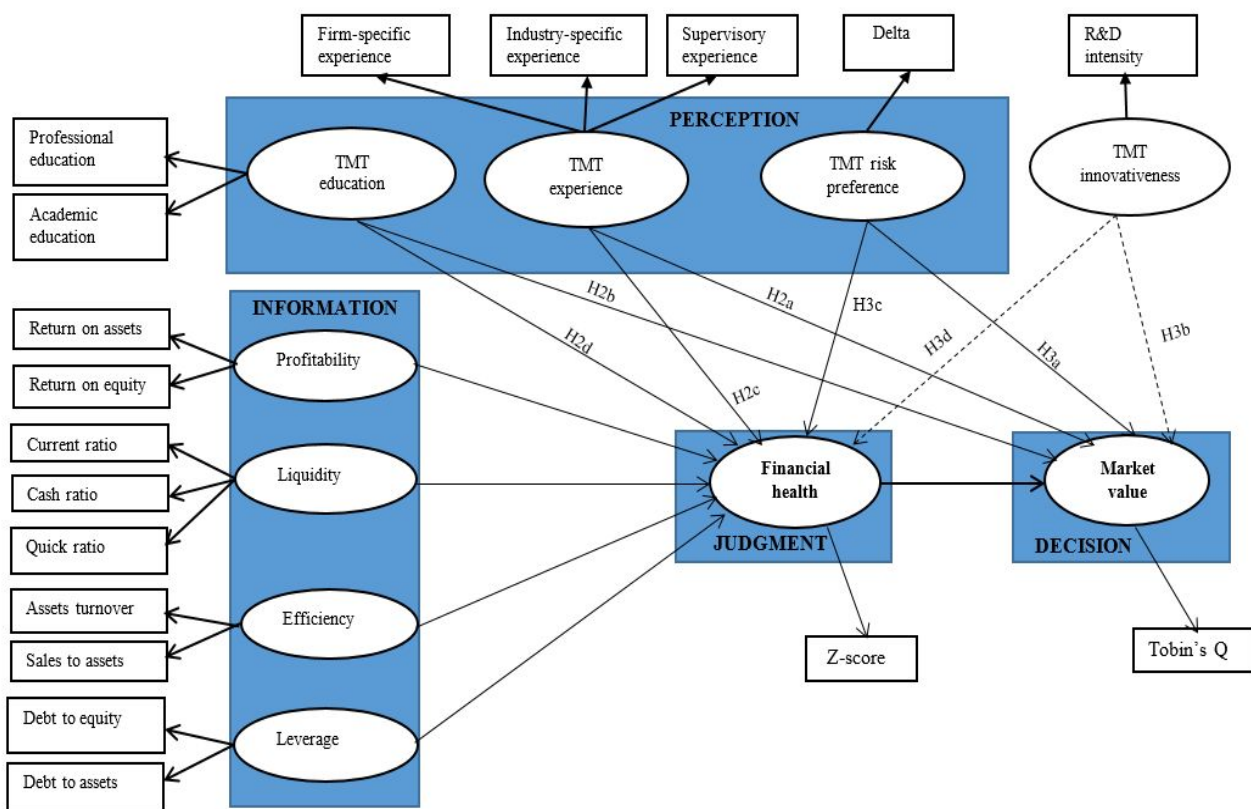
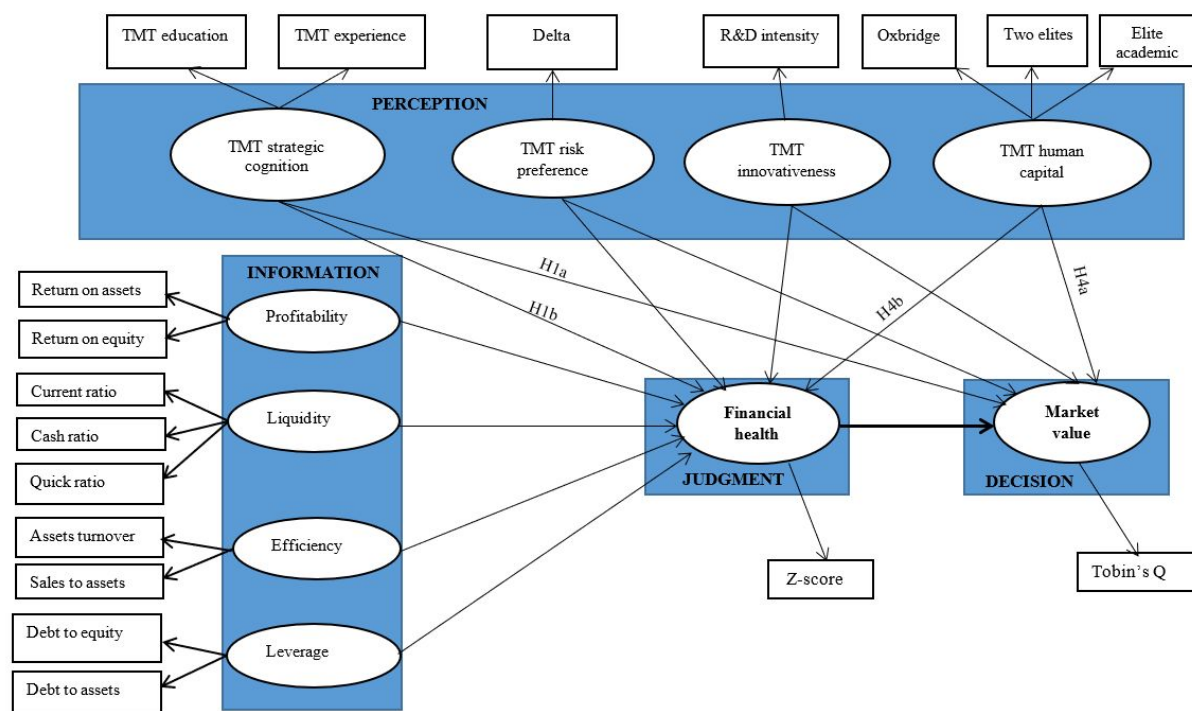


Figure 4. TMT attributes and firm outcomes: the illustration of hypotheses

Note. See Table 1 for the definition of constructs.