Competitive moves in new high-tech firms: The role of board heterogeneity and family ties

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ABSTRACT

Drawing on the entrepreneurial theory of the firm with dispersed knowledge, together with fundamental uncertainty, we examine what we label as heterogenous expectations through board members' imaginative faculties. Specifically, we unpack how outside board members construct heterogeneity, and how heterogenous expectations affect the level of competitive moves in new high-tech firms. We hypothesize and find that family funding *positively moderates* the relationship between board heterogeneity and competitive moves, although family sponsorship in the form of funding has a *direct negative* effect. Implications for the entrepreneurial theory of the firm and its relevance to practice are discussed.

1. Introduction

Hambrick and Mason (1984) assert that the actions new firms take to challenge their competitors should be viewed as an exercise of strategic choice. In the current study, we look into the relationship between heterogenous boards and the venturing firm's ability to swiftly respond to various windows of opportunity. In doing so, we ground the current study in the 'Austrian' frame of understanding entrepreneurship. What is central to emerging new firms in our context is that they act on opportunities, irrespective of whether these opportunities are discovered or created (Alvarez & Barney, 2007), or actualized (Ramoglou & Tsang, 2016). Opportunities can be *independent* of other actions, or they can be *interdependent* of such actions. For instance, Katila, Chen, and Piezunka (2012) show that not only competitive actions but also the timing, sequencing and linkages of such actions and moves, are important for new ventures. They find that some entrepreneurial firms stay below the radar in established markets, and use a combination of selective, invisible, and asynchronous strategies.

Unlike the venture governance studies conducted by Knockaert, Bjornali, and Erikson (2015), and Bjornali, Knockaert, and Erikson (2016), we address new firms' competitive moves, and scrutinize the interface between board heterogeneity and its effects on such moves. Specifically, we ask if family-funded new firms will perform better than their counterparts, a question not so different from those addressed by Garcés-Galdeano and García-Olaverri (2020) who assessed differential performance between family and non-family-led firms. In the current study, we address a different yet related question: *How well are family-funded new high-tech firms competing vis a vis those not family-funded, and what role does board heterogeneity play?* We then contribute to an entrepreneurial theory of the firm that draws on the dispersion of knowledge, an emergent entrepreneurial theory that rests on the following building blocks:

> *"The first is that the dispersion of knowledge gives rise to genuine uncertainty, which necessitates the contractual structure that we recognize as a firm. The second is that dispersion of knowledge and genuine uncertainty contribute to the heterogeneity of expectations that must exist in order for one or more individuals to exploit the potential of the contractual structure of the firm. The third is that dispersion of knowledge, genuine uncertainty, and heterogeneous expectations give rise to the nexus of the enterprising individual and the opportunity to discover, create, and exploit new markets. These three elements together explain why particular new firms are created."* (Dew, Velamuri, & Venkataraman, 2004, p. 661).

We argue that the heterogeneity in expectations among external board members will contribute to drive the amount of competitive moves, and that those expectations derive from imaginations created from idiosyncratic knowledge. Drawing on insights from Shackle (1952, 1972), and Lachmann (1976, 1977), McMullen (2010) highlights that the exercise of choice is a subjective phenomenon that varies among individuals due to different imagination, expectations, and interpretations even if the beholder shares the same data and preferences.

The paper is structured as follows: we elaborate on the nature of these dynamics to underpin hypotheses regarding board heterogeneity and competitive moves. Then we explain our research design, and the data set, followed by a presentation and discussion of the results before we elaborate on the implications and limitations of our study.

2. Theory and hypotheses development

The Austrian School of Economics portrays the business environment as a continuous process of emergent opportunities, where various types of opportunities constantly open and close. They close when there are enough actors to arbitrage away all the super-profits in that specific market (Jacobson, 1992). Jacobson (1992, p. 802) lists some noteworthy examples of contributions to this school of thought, Rumelt (1984) and Levitt (1986) work on entrepreneurial activities, and Peters' (1987) and Bhide (1986) work on market dynamics and disequilibrium. What is interesting is that the Austrian school basically explains the underlying factors that bring the markets *towards their equilibriums* whereas Schumpeterian entrepreneurship discusses what takes markets *out of their equilibriums* (Cheah, 1990).

Our underlying conjecture is that start-up teams are able to actively address these states of disequilibria. They not only respond to them, but also create them through their actions in the form of competitive moves. That is, the venturing team's ability to respond to a new opportunity – when the situation requires it – is central to the firm's creation of temporal competitive advantage. In other words, their temporal competitive advantage is created by the firm's ability to move when attractive new windows of opportunities arise, and it is not given *ex ante* what moves will succeed. Accordingly, the mere act of competitive moves is vital.

Prior research into the competitive behaviour of firms has almost exclusively looked into environmental and organisational explanations (Hambrick, 1995). However, since the introduction of Upper Echeleon Theory (Hambrick & Mason, 1984), the focus has expanded to include the demographic "DNA" of the TMT: the members' demographic characteristics, as well as the structural and compositional dimensions of the TMT. Many analyses of these characteristics have been unidimensional, not multidimensional in nature (Harrison & Klein, 2007). Relatively little effort has been invested into the processual nature of the behavioural dynamics. With some exceptions (Amason & Sapienza, 1997; Bjornali et al., 2016; Bjornali, Knockaert, Foss, Leunbach, & Erikson, 2017; Ensley, Pearson, & Amason, 2002; Erikson, Coleridge, & Bjornali, 2022 and Knockaert et al., 2015), little attention has been devoted to entrepreneurial endeavours between the upper echelons, and the board – the TMT-governance interface in high-tech new firms, and not least, high-tech new firms with what Gómez-Mejía, Nunez-Nickel, and Gutierrez (2001) would label 'family ties'.

2.1. Board heterogeneity and the relationship to competitive moves

Dew et al. (2004) conjectured that dispersed knowledge generates heterogenous expectations that together with the opportunity/individual nexus explain the emergence of new firms. Building on Hayek's (1945) 'grand' theory, their theorizing around an entrepreneurial theory of the firm grounded in the dispersion of knowledge appears not only to have achieved some traction conceptually, but also seems to align well with reality. Hayek's (1945) seminal work on the dispersion of knowledge between people, at different places, and at different points in time is indeed noteworthy. These dispersions of implicit and explicit knowledge, together with bounded rationality, create what Alvarez and Porac (2020) label 'fundamental' uncertainty, or what Knight (1921) labelled 'true' uncertainty (Phan & Wood, 2020), and it is also these types of uncertainties that together with individuals' imaginative faculties that facilitate and create the heterogeneity of expectations that with a general propensity to act drives those entrepreneurial actions in the form of competitive moves.

Notably, Phan and Wood (2020) unpacked the various forms of uncertainties. They relabelled Knightian risks as the "known-unknowns" and Knightian uncertainty as the "unknown-knowns" where the "known-knowns" and "unknown-unknowns" are the two remaining contrasting categories. In our study of high-tech new firms, we deal with not only the "known-unknowns" and "unknown-knowns", but also the more rarely studied "unknown-unknowns". It is these unknowns, together with the knowns and the imaginary capacities that creates the heterogeneous expectations that facilitate the board members to imagine and create options for ways to move forward. An analysis of potential gaps between the different types of knowns, leads to calls for "alertness", which is central to *the discovery theory of entrepreneurship*. By contrast, another fruitful way forward is the action approach, conceived of as competitive moves, proposing that experimentation is the best way forward. This reflects *the creation theory of entrepreneurship* (Alvarez & Barney, 2007). As can be understood from these insights, competitive moves cannot be analyzed purely by considering the "known-knowns" category. Experiments, or what we know as competitive moves by "trial and error" are an essential component of this process. For

entrepreneurial actions in the form of competitive moves to take place, we need individuals with a general propensity to act in uncertain terrains (that is, under conditions near fundamental or true uncertainty). Kier and McMullen (2018) point towards imagination as a source for value creation, and they deal not only with creative and practical imagination but also social imagination. To our knowledge, little research effort has been expended trying to link the dispersion of knowledge and fundamental uncertainty with such imaginations. Notably, imagination plays a central role as it fills in the voids in knowledge (i.e., the unknown and the unknowable), allowing purposeful action to take place, and the volitional aspect of actions is also vital as it captures the propensity to act. These matters also relate to what Shackle (1952, p.2) so clearly describes: "By *expectation*, I mean the act of creating imaginary situations". As such, board members' creative imaginations contribute to forming these competitive moves. In the current context, as we see it, the higher the proportion of outside board members (individuals from various places, and with idiosyncratic experiences collected over time (i.e. more life experience)), the more diverse the expectations. It follows that the more diverse the expectations, the more competitive moves we will see from the new firm if it is to survive. Accordingly, we have the following hypothesis:

Hypothesis 1. *Board heterogeneity will relate positively to new firms' competitive moves.*

2.2. The moderating role of family funding on the conjectured relationship

In their study of informal investors' role in entrepreneurship, Erikson, Sørheim, and Reitan (2003) found that family involvement in the form of funding represented a unique source of risk capital for new private ventures. Le Breton-Miller and Miller (2013) capture that point elegantly: "Some such resources may be provided by family members who bring forth their talents economically" (p. 1394). Typically, with this type of funding, these 'informal' investors also bring in their competence and network, and simultaneously provide advice and counsel. What has not yet been addressed in prior studies, is under what conditions early-stage funding is beneficial to high-tech new firms. A general saying, based on accumulated experience, is that early-stage support from 'family and friends' could, in fact, hamper the venturing process, as the new venture would not be challenged in the same way as if others, assumingly more competent investors, were allowed to enter the scene. Although this insight may carry some weight, it may be that when such support is complemented with outside board members, these board members may contribute to sharpening the expectations, thus enhancing entrepreneurial efforts. Such funding could also contribute to "jump-start" the new venture, and could be seen as a *diversification* from an existing family business, or as an interesting *innovation* (Gómez-Mejía & Herrero, 2022), as part of family business renewal. Indeed, Erikson et al. (2003, p. 167) find that family funding is common in the earlier stages of new firm development. Henceforth, we make the conjecture that family sponsorship in the form of early-stage financial funding, when combined with an increase in outside board members, will contribute to sharpen the firm's competitive moves. Accordingly, we delineate the following hypothesis with regard to family funding and competitive moves in new high-tech firms:

Hypothesis 2. *Family sponsorship in the form of family funding will positively moderate the relationship between board heterogeneity and the amount of new firms' competitive moves.*

3. Methods

3.1. Research design

Norway has an open economy, and the country is fully integrated with the wider European Economic Area (EEA), but not politically with the European Union (EU). The country is a NATO allied and has therefore access to, produces, and employs, rather advanced technologies in many respects. Despite its geographic topography in Northern Europe, it is among the 10 most productive countries in the world, and according to the Digital Platform Economy Index, the country is also ranked among the most digitalized countries globally (ranked as the 7th country, and with its high GDP per capita, it is ranked top (Acs, 2022)).

The data are all hand-collected and were collected between 2015 and 2018. The survey was addressed to the CEOs of these firms, and a total of 761 firms were contacted, of which 149 firms completed the survey (an overall response rate of 20%). The study sample reflects high-tech start-ups satisfying high-tech NACE categories.

The selection criteria were that the firms had to fit two main NACE categories 'high-tech knowledge-intensive service' and 'high-technology'. For the current study, we only have complete datasets from 70 firms; 22 of these firms were in the development stage, 20 were in the introduction stage, 23 were in the growth stage, and the remaining handful was in the mature stage.

We corroborated the data on a subset of these firms, cross-checked with available archival data, and tested for differences between responding and non-responding firms, as we were able to collect information on the 46 firms that declined to participate, and we ran a number of *t*-tests which did not indicate statistically significant differences in mean values except for firm age, which suggests that our results apply to younger high-tech firms.

Although we in this study rely on survey data, we do not have any serious concerns with regard to the possibility of common methods bias (CMB), as the survey study was carefully designed, and pretested on a high number of CEOs, and we followed Podsakoff, MacKenzie, Lee, and Podsakoff (2003) suggestions of how to prevent CMB *ex ante*. Building on Evans (1985), Siemsen, Roth, and Oliveira (2010, p. 470) assert that "empirical researchers should not be criticized for CMV if the main purpose of their study is to establish interaction effects. On the contrary, finding significant interaction effects despite the influence of CMV in the data set should be taken as strong evidence that an interaction effect exists". Notably, they also show that CMV is of less concern in ordinary least squares models in situations when control variables are slightly correlated. Finally, we do not have any reason to believe that any unobserved variables would significantly influence these relationships.

3.2. Measurements

We draw on previous research in operationalizing our constructs, and we describe them here.

The dependent variable, Competitive moves, is operationalized with Chen, Lin, and Michel (2010) measure. These items address the most frequently launched moves including market expansion, new product introductions, and new service offerings, and stem from Smith, Ferrier, and Ndofor (2001), and Ferrier, Smith, and Grimm (1999), and read as the following: "My company initiates a far greater number of actions than direct competitors concerning: 1) market expansion, 2) new product introductions, and 3) new service offerings." These three items had the following response categories ranging from "1″ (Far fewer actions) to "7″ (Far more actions). The Cronbach's alpha for this scale is 0.849, and the average variance extracted (AVE), and the composite reliability (CR), are both 0.769. All these three indices are well above their threshold limits.

The independent variable, Board heterogeneity can be operationalized in a variety of ways, but we conceive of it in terms of heterogenous expectations derived from idiosyncratic imaginations from the unique life experiences among board directors. Quantifying life experiences in a meaningful way is next to impossible, so the more outside directors, the more heterogenous the board. Thus, the main independent variable in this study is, therefore, the proportion of outside directors; in other words, the number of outside directors divided by the total number of board members. The institutional context in Norway is that these board members are typically non-executives, except for the dual CEO who may have two roles - 'the one person two roles' situation where the CEO is also the chairperson.

The moderating variable, Family funding was dummy coded as "1", otherwise "0" (where family relates to the responding founding CEO). Building on the work of Erikson et al. (2003), family funding does not only mean capital, but what typically follows is not only competence and advice but also relational and network ties, not different from what Berrone, Cruz, and Gómez Mejía (2012) label 'affective endowment'. Receiving family funding captures facets of what has been labelled FIBER (that is, such an investment may be seen as options on Family control and Influence; Binding social ties; Emotional attachment; and securing Renewal of family bonds through dynastic succession).

The control variables. In this study, we control for time since inception in years, the leadership structure of the board (CEO duality = 1), to what extent a patent is filed (Patent = 1), as well as the size of the venturing team. These variables were included as controls, as they are relevant resources that may affect the dependent variable in various, but specific, ways.

4. Analysis and results

Just a few of the variables have significant correlates prior to the regression analysis. We can from Table 1 see the basic statistics and that the independent variable 'Outside directors' does not correlate with the dependent variable, competitive actions. Table 1 further shows that only patents correlate with the proportion of outside directors ($r = 0.368, p < .01$), and we see that Dual CEO relates negatively to the proportion of outside directors ($r = -0.223, p < .1$), meaning that the number of outsiders is positively correlated to a chairman that is not also the CEO, but this is at the 0.1 significant level. We also see that family funding is positively related to the dual leadership structure (CEO duality) but that is also at the 0.1 significant level ($r = 0.198, p < .1$).

We can also see that the *mean* average proportion of outside directors is 50% (not shown in the table, but the *median* is 50% and the *mode* is 0%, meaning that the most frequent situation is a high-tech board without board outsiders). That is, exactly 16 firms had no outside board members, while 7 had 33%, 10 had 50%, 5 had 67%, and 14 firms had 100% (the second highest mode), and all the remaining in between these. The *mean* average firm age is 7,79 years (with a *median* of eight years, and a *mode* of five).

Table 2 shows that the moderation effect is significant and positive (Beta = 0.435, $p < .05$). The explained variance increases with 0.055 due to the interaction. The model is significant at the 0.05 level and explains in total more than 21% of the variance of the actions.

We can see that the direct effect of family funding is negative (Beta = −0.561, $p < .01$), and that the proportion of outsiders *does not* relate directly to the level of competitive actions (Beta = 0.167, $p > .05$). However, in Model 1, we see that the proportion of outsiders is positive (Beta = 0.298, $p < .05$), and significant, in support for Hypothesis 1.

From Model 2, we see that we have support for Hypothesis 2 regarding the moderation effect, although the direct effect is negative. The highest Variance Inflation Factor (VIF) is 3.436, and is well within the acceptable range limits, so multicollinearity is not an issue.

The control variables, new venture team size, the dual leadership structure, and having (filed) a patent are all three significant at the 0.1 level, the latter with a negative sign. Although these relationships are weak, the findings regarding the hypothesized

Table 1
Descriptive statistics and correlations.

Variables in the model:	Mean	SD	1.	2.	3.	4.	5.	6.
1. Competitive moves	0.00	1.00						
2. Outside directors (%)	50.0	34.70	0.157					
3. Family funding	0.19	0.39	−0.158	0.016				
4. Dual CEO	0.16	0.37	0.079	−0.223[+]	0.198[+]			
5. NVT size	3.49	1.43	0.164	0.100	−0.111	−0.037		
6. Firm age	7.80	3.36	−0.125	0.147	−0.026	−0.161	0.041	
7. Patent	0.56	0.50	−0.071	0.368**	−0.166	0.069	0.183	0.093

*Significance levels: [+]$p < .1$, *$p < .05$, **$p < .01$. N = 70.*

Table 2
Ordinary least squares regression on the relative number of competitive moves.

	Control model	Model 1	Model 2
NVT Size	0.190	0.168	0.208[+]
Dual CEO	0.075	0.193	0.232[+]
Firm age	−0.111	−0.127	−0.140
Patent/patent filed	−0.100	−0.250[+]	−0.232[+]
Proportion of outsiders	H1:	**0.298***	0.167
Family funding		−0.227[+]	−0.561**
Proportion of outsiders x Family funding		H2:	**0.435***
F-value	1.005	1.829[+]	2.410*
R^2	0.058	0.159	0.214
Adjusted R^2	0.000	0.079	0.125

Significance level: $^+p < .10$, $^*p < .05$, $^{**}p < .01$, N = 70.

relationships are strong.

We robustness-checked all the results by replacing missing values with the mean, which gave the same results, with 77 cases. We also tried a somewhat different dependent variable, omitting the market expansion item, including only the new product introduction, and new service offering items. Moreover, we bootstrapped the results with ten thousand re-samples, and the results hold with a 95% confidence level for the moderating variable, and the interaction term, but not for the separate outside board measure, as zero is between that confidence interval. In fact, the robustness checks corroborate what is exhibited in Model 2, in Table 2.

Fig. 1 illustrates the interaction effects in this study. We can from Fig. 1 see that competitive actions are at their peak when there is a high proportion of outside board directors, or in other words a high degree of heterogeneity, and with family funding. In contrast, family funding without a high degree of board heterogeneity is not very good for the level of competitive actions in new high-tech firms. Receiving family funding with a low proportion of outside directors is apparently disadvantageous for competitive moves, and thus the likelihood to succeed.

The negative range of competitive actions shown in Fig. 1 indicates that most early-stage high-tech firms experience hardship in one way or another. We probably here see the results of difficulties typically affiliated with the launch of technologically advanced new firms. Many of the difficulties associated with such an early-stage regard funding, market access, and the like. We also make the interpretation that heterogeneity per se does not contribute, it must interact. In this case, it needs to interact with family funding, which is not only funding per se but also what is typically embedded with that kind of family support.
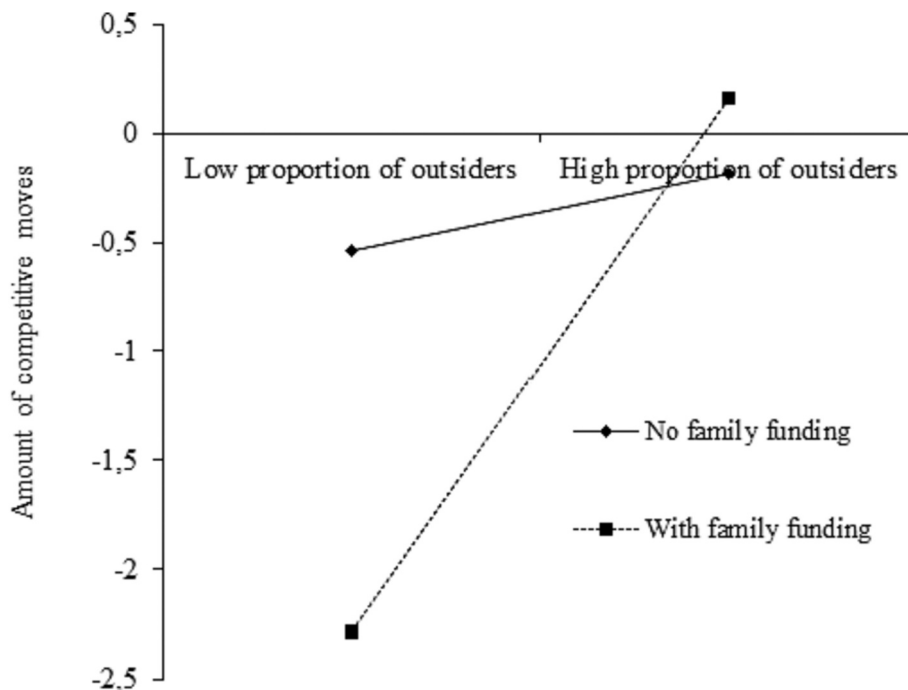

Fig. 1. Interaction effects between the proportion of outside directors and family ties.

5. Discussion

5.1. Implications for theory and practice

Dew et al. (2004) proposed an entrepreneurial theory of the firm rooted in the notion of dispersion of knowledge. They basically said that dispersed knowledge generates heterogenous expectations that together with the opportunity/individual nexus explain the emergence of new firms. Although Dew et al. (2004) used the dispersion of knowledge and human agency to explain why firms exist, we drew on these insights from Hayek (1945) that the dispersion of people, at different places, at different points in time, together with bounded rationality, also creates what has been labelled 'fundamental' uncertainty (Alvarez & Porac, 2020) or 'true' uncertainty (Phan & Wood, 2020; Knight, 1921), and it is also these types of uncertainties together with individuals' imaginative capacities that create heterogenous expectations, even among otherwise equal trained individuals, as they have idiosyncratic experiences and unique imaginative faculties. In this study, it was these heterogeneous expectations with some propensity to act that fostered the competitive moves.

The results from this study illustrate that family funding moderates the relationship between outside board directors and the amount of entrepreneurial action in the form of competitive moves in early-stage new high-tech firms. In other words, we found that the more heterogenous the board, the higher the frequency of entrepreneurial actions in the form of competitive moves. The implications are to assure enough heterogeneity at the board level, so that such moves can be initiated during a critical development stage of new firm emergence.

The practical implications are that family firms investing in knowledge-intensive new firms at the earlier stages ought to appoint external board members related to that initiative. It is the CEO expectations from the external board members together with the development capital and knowledge and networks inherent in the family ties that contribute to the firm's survival.

In the current study, we have also contributed to an *extended* socioemotional wealth perspective, as initially coined by Gómez-Mejía, Haynes, Nuñez-Nickel, Jacobson, and Moyano-Fuentes (2007) and delineated by Miller and Le Breton-Miller (2014), by applying ideas from an entrepreneurial theory of the firm departing from the dispersion of knowledge, as delineated by Dew et al. (2004), then building on the work of Hayek (1945).

Taken together, these efforts also reflect what Miller, Le Breton-Miller, and Scholnick (2008) label stewardship, as they not only contribute to building a strong and trusting relationship with outside stakeholders, which also resonates rather well with the *extended* socioemotional wealth perspective, as delineated by Miller and Le Breton-Miller (2014), but also contribute to a compositional governance balance through reinvesting in business renewal, here in the form of *external* business venturing (Covin & Miles, 2007). Such support may be seen as a generous investment in potential new products and services, and may also be seen in the light of potential business renewal. Such support may also contribute to securing *continuity* in a world where not only known but also unknown and unknowable uncertainty exists.

5.2. Limitations and future research

The current study has its limitations, and must therefore be regarded as tentative, as most other work containing theorizing (Weick, 1995). The representative check showed that we have a dataset with younger firms, and the study is based on a small data set from a small country, although it is part of a larger open economy (the European Economic Area). The study is also based on a survey methodology that is increasingly difficult to conduct properly due to the overload of digital information, and under the new General Data Protection Regulation (GDPR) regime following the new European Privacy Act. Furthermore, the study is based on cross-sectional survey data, although self-collected, the main weaknesses may be the potential for common methods biases, although we sought to minimize these *ex ante* and *ex post*, as described in the Methods section, under Research design. Another shortcoming is the perceptual measurements, although the objective measures were largely verified, competitive moves were based on a subjective construct, but conversations at the most recent competitive dynamics conferences point towards the perceptual, not necessarily to what is ontological objective, but what is epistemological objective. In other words, how do we measure imaginations (that are both ontological and epistemological subjective) and a multitude of expectations (which are ontological subjective, but epistemological objective), for instance? How do we operationalize lived experience that influences our imaginations? And how do we measure competitive rivalry? For instance, Kilduff, Elfenbein, and Staw (2010) explored the psychology of rivalry and basically say that competition is inherently relational, and relational rivalry must then necessarily be a perceptual construct. This takes us to the fundamentals of Austrian economics that point towards heterogeneity in *preferences* (Mises, 1949), and heterogeneity in *data* (Hayek, 1937). According to McMullen (2010), it is the radical subjectivists that introduced heterogeneity in *expectations* (Shackle, 1952, 1972), and heterogeneity in *interpretations* (Lachmann, 1976, 1977) which certainly introduce challenges in measurement, as many of these concepts and constructs are indeed unobservable.

Future research may therefore seek to creatively operationalize heterogeneity along these lines, or use proxies, as we did, when measures are unobservable, and look into comparable heterogeneity in management teams, or the heterogeneity of what Finkelstein, Hambrick, and Cannella (2009) label as the 'supra-TMT' (the management team and the board). Suprateams could be the CEO and the board, but more usually the venturing management team and the board (Bjornali et al., 2017). More recent studies by Erikson et al. (2022) employed the former operationalizations (the incumbent CEO and the board), whereas other studies ought to do the latter, looking into venturing management teams and the board, not unlike what Ma, Kor, and Seidl (2021) recommend. Ma et al. (2021) basically say that the time has come to look into the top management team's *role* structures, and we have just started to look into the role structure of not the CEO-TMT relationships, but the CEO-board relationships. It is worth noting that we should expect differences

across continents and countries, as the legislative systems are different. For instance, the institutional context in Norway is that all board members typically are non-executives, where only full-time executives lead and implement (Huse, 2009). This may be different in other cultures, regions, and countries, although the European Economic Area has somewhat similar competitive rules, the governance legislations may vary.

Future research may also explore the nature of board leadership role structure vis a vis the frequency of competitive moves, and not least pay attention to the differential performance of such new firms, as we have only addressed the level of competitive moves. For instance, one would expect that the dual leadership structure would be beneficial for the number of competitive moves (Garg & Eisenhardt, 2017, p. 1858) as the speed and number of such moves are considered to be a source of temporal competitive advantage (Chen et al., 2010; Katila et al., 2012). Given that the dual board leadership structure in the very early stages offers structure to a decision-making situation with high fundamental uncertainty, we should expect that such a leadership role structure is better than the alternative, but are there any differences with regard to family-sponsored CEOs, as opposed to non-family CEOs? We do not know.

5.3. Conclusion

In conclusion, it appears that family-sponsored new high-tech firms at the earliest stages will benefit greatly from boards with more outside board members, given that this heterogeneity interacts with another useful resource- in this case, family funding. We have seen that the entrepreneurial theory of the firm grounded in the dispersion of knowledge may help us understand the nature of knowledge-intensive new firms' emergence and their early growth. The board heterogeneity of imaginations, expectations and interpretations is crucial to this end.

We may also add, in accordance with the *extended* socioemotional wealth perspective, that the implications of this study are to appoint external board members when investing in new initiatives as part of a business renewal process. Our understanding is that such a renewal process reflects what in the corporate venturing literature is known as *external* corporate venturing, as is the case when family funds are reinvested in new related initiatives such as new high-tech firms.

Credit author statement

Delivered during first submission.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

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