

Top management teams characteristics and firms performance: literature review and avenues for future research

Literature
review and
avenues

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Abstract

Purpose – The purpose of this paper is to review the empirical literature on the relationship between the characteristics of the top management teams (TMTs) and the performance of entrepreneurial firms.

Design/methodology/approach – A literature review was carried out on 33 empirical studies related to TMTs and performance through analyzing and summarizing the quantitative studies conducted in this area.

Findings – The results of the literature review show that the relationship between TMTs (demographics and heterogeneity) and the performance of entrepreneurial firms is not straightforward and further investigation is still needed in this area.

Practical implications – The author maps the theoretical and empirical research of TMT demographics and heterogeneity in relation to firms' performance and possible moderators and mediators, which govern the relationship between TMT composition and firms' performance.

Originality/value – The author presents a detailed future research agenda for the purpose of advancing the theoretical and empirical knowledge on TMT-performance links. The review provides a comprehensive picture of TMT-firms' performance literature and what should be done to enrich the literature.

Keywords Performance, Diversity, Top management, Team management, TMT, Entrepreneurship, Team, Heterogeneity

Paper type Literature review

1. Introduction

Over the past few decades, there has been a strong interest in the teams establishing and running new firms (Cerqueti *et al.*, 2020; Homberg and Bui, 2013; Pahos and Galanaki, 2019). Indeed, the studies on the top management team (TMT) dynamics and organizational outcomes are dramatically increasing (Nielsen, 2010; Zhou and Rosini, 2015). These studies are linked to the literature that highlights how the characteristics of managers affect and predict firms' performance (Hambrick and Mason, 1984).

The research on TMT has examined the influence of several team characteristics on firms' performance such as aggregated TMT characteristics (Kor, 2003) and size (Bruton and



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Rubanik, 2002; Chaganti *et al.*, 2008), as well as the heterogeneity of the people in the team (Tanikawa and Jung, 2016; Nielsen and Nielsen, 2013). However, TMT studies show inconclusive and controversial findings of many team characteristics (Box and Larsson Segerlind, 2018; Kakarika, 2013; Nielsen, 2010; Zhou and Rosini, 2015). For example, the effect of TMT demographics on performance has been found positive (Carpenter, 2002), negative (Stuart and Abetti, 1990; Michel and Hambrick, 1992) or insignificant (Stuart and Abetti, 1990). In addition, the existing literature suggests that the relationship between TMT demographics and the firm's performance is bounded or mediated by other factors.

Possible reasons for the lack of strong empirical evidence on the linkage between TMT characteristics and performance are represented by the diverse theoretical frameworks used and the diversity of the different methodological approaches, sampling and measurement errors (Nielsen, 2010; Song *et al.*, 2008). In this context, this paper aims at conducting a literature review on TMT and the performance of entrepreneurial firms and attempts to identify some avenues for a future research agenda. In particular, the author surveyed the management and strategy literature:

- on the relationship between TMT characteristics and firm performance;
- on TMT heterogeneity and firm performance; and
- on the moderating and mediating effects on the TMT-firm performance linkage.

This paper is organized as follows: First, it presents the research methodology used in the analysis. Second, it explores the main theories used in the TMT-firm performance relation. Third, it measures of performance are discussed. Fourth, it analyzes the empirical studies grouped into three clusters, namely, the aggregated characteristics of TMT, the heterogeneity of TMT and the moderating and mediating effects. Finally, it discusses the results of the analysis and it proposes potential avenues of future research.

2. The research method

For the aim of reviewing the current state of TMT-performance research in entrepreneurial ventures, the author carried out a keyword search on the Ebscohost and Scopus databases, as well as the Social Science Citation Index, limited to articles published in the period of 1990-2018 as of April, 2019 in business, organizational behavior and management journals, conferences proceedings and book chapters.

Several terms are found in the literature to introduce firms TMT as follows: new venture team (Busenitz *et al.*, 2005), new venture TMT (Ensley *et al.*, 2002), the founding team (Chaganti *et al.*, 2008), the entrepreneurial team (Vissa and Chacar, 2009), start-up team (Franke *et al.*, 2008) and early TMT (Beckman *et al.*, 2007). Based on these premises, the following keywords were used in the search: new venture teams and/or founding team and/or entrepreneurial team and/or entrepreneurial TMT, start-ups, spin-offs, performance, growth, survival, diversity, heterogeneity, demographics and composition.

The articles only addressed the relationship between TMT demographics and heterogeneity and firms-level performance. After a comprehensive screening, the search process uncovered 33 studies used for the literature review analysis. Table 1 below provides an overview of the sample studies, reporting: the independent variables related to TMT, the dependent variables related to performance, control variables (if any) and moderating and/or mediating (if any) and the relative findings.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Stuart and Abetti (1990)	Strategy; founding experience; education; entrepreneurial experience; marketing experience; technical experience; management experience; age and TMT entrepreneurial experience	Average of revenues growth; average growth in performance; productivity and profitability	N/A	N/A	Entrepreneurial and management Experience were the most significant factors. Other factors such as: age, technical experience and TMT experience were not significant. Higher education was negatively related to performance
Eisenhardt and Schoonhoven (1990)	Joint experience; TMT size; industry experience; heterogeneity; technical innovation; competitive concentration and market stage (growth, emergent or mature)	Sales growth	Firm age; firm size; book to bill ratio and initial capital	Top-management team x growth-market stage; firm age x market stage; firm age x joint experience; firm age x team size; firm age x top management teams and firm age x top management teams x growth market	The main effects and interaction effects for founding TMT and market stage were significant in the firm's growth. Both competitive concentration and technical innovation were not significant. Market stage and founding TMT effects were large over time
Cooper <i>et al.</i> (1994)	TMT industry experience; TMT education; TMT gender; TMT management experience; TMT minority groups; TMT size; initial capital; TMT use of external advisors; TMT members working at nonprofit before founding the venture and parents of TMT owning a business.	Marginal survival or growth	Industry differences	N/A	Education is a significant predictor of marginal survival and growth while gender did not influence survival but affected growth. Members with parents owing a business influenced growth but not survival. Industry skills and know-how an initial capital influenced both growth and survival

(continued)

Table 1.
The empirical studies on TMT and performance of entrepreneurial ventures

Table 1.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
McGee and Dowling (1994)	TMT market experience; TMT technical experience and R&D cooperative arrangements	Sales growth	Year of incorporation and total assets	Moderating effects of R&D cooperative arrangements	TMT experience and R&D technical cooperation were significantly associated with average sales growth. Technical cooperation is more effective when TMT is more experienced and knowledgeable
McGee <i>et al.</i> (1995)	TMT marketing experience; TMT technical experience; TMT production experience; External marketing arrangements; external R&D arrangement and external production arrangements	Sales growth	Year of incorporation; total intangible and tangible assets	Moderating effects of (marketing, production and R&D arrangements)	The association between sales growth and marketing arrangement is stronger when TMT acquires more marketing experience. A positive moderation effect of marketing experience was found. Ventures with technical managers who have no technical experience trying to pursue R&D arrangement had a bad performance
Ensley <i>et al.</i> (1998)	TMT heterogeneity: education level; education major and functional background	Revenues and sales growth	Team size	N/A	Heterogeneity is negatively linked to growth and functional background and education specialization diversity are negatively related to revenues
Kilduff <i>et al.</i> (2000)	TMT age; national; functional heterogeneity and cognitive heterogeneity	Organizational performance in terms of market share	Team size; advantaged and disadvantaged firms takeover by team	N/A	Only age heterogeneity showed a significant positive effect on final market share

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Table 1.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Carpenter (2002)	TMT education heterogeneity; TMT background heterogeneity and TMT tenure heterogeneity	Return on assets	Organizational size; industry membership; degree of diversification; TMT size; TMT international experience; TMT nationality and TMT average tenure	Moderating effects of internationalization and TMT average tenure	The positive associations between TMT heterogeneity (education, functional background and tenure) and performance rely on the level of internationalization. These associations are stronger in short-tenured TMT
Richard and Shelor (2002)	TMT age heterogeneity	Return on assets	Firm size; industry type and individual firm leverage	Moderating effects of innovation; environmental complexity and decentralization	The effect of TMT age heterogeneity on return on assets is marginally negative while it is positively strong on sales growth. The association between TMT age diversity and ROA is curvilinear. For firms operating in a complex setting, TMT age heterogeneity at low-medium extents has a positive impact on sales growth. The effect becomes negative for TMT age diversity at higher levels
Kor (2003)	Shared team-specific experience; founders firm-specific experience industry experience of the team and founders in TMT	Rate of entrepreneurial growth (annual rate of sales growth)	Team age; team size; TMT tenure heterogeneity; firm age; firm size and number of years after IPO	Moderating effects of industry-specific management experience in the team and shared team-specific experience	Founder-based firm-specific experience in the TMT has a positive influence on entrepreneurial growth. A positive association is found between industry-specific experience and the growth of the venture only when the interaction of founder-based

Table 1.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Colombo and Grilli (2005)	Founders education and founders prior experience (managerial, entrepreneurial and industry-specific experience), Founders educational and experience heterogeneity	employment growth	Access to external private equity financing and firm size	N/A	firm-specific and industry experiences is controlled. When the team shared experience increases, the association between founder based-specific experience and firm growth weakens Years of academic qualifications in economics, management, scientific and technical fields exerted a positive impact on growth. Founders' previous work experience in the same industry as the new firm is a significant and positive predictor of growth. Experience in different industries of the new firm did not show any significant effect on growth Technical experience rather than commercial experience is a significant determinant of growth. Entrepreneurial experience significantly and positively relates to growth
Enasley and Hmieleski (2005)	A combined measure of heterogeneity among TMT member	Net cash flow and sales growth	Firm size; TMT size and number of years since the firm was established	N/A	General heterogeneity was significant in predicting net cash flow and sales growth only in a nationally representative sample of a non-university spinoffs

(continued)

Authors (year)	DV	Controls	Moderating/mediating effects	Findings
Aspelund <i>et al.</i> (2005)	Firm survival	Year of the establishment; business sector; the degree of service orientation and time to the first sale	N/A	TMT functional heterogeneity is likely to reduce venture death
Chandler <i>et al.</i> (2005)	Sales and turnover	Industry differences	Moderating effects of environmental dynamism and venture stage of development	Larger team size is beneficial to new firms. Team members' addition or departure is contingent on two factors: the early stage of firm development and the environmental dynamism. Positive moderating effects were found
Aden <i>et al.</i> (2006)	Return on assets	Team size; firm size and international work experience	Moderating effects of international risk management factors	TMT demographic diversity (age, functional background and team tenure) is a significant predictor of firms' performance as moderated by international risk management factors. The moderating effect of international risk management is positive
Amason <i>et al.</i> (2006)	Average growth in sales; profitability and stock market performance	Industry differences (low novelty and high novelty); firm age; firm size and technological change	Firms novelty	The fit between team compositions and ventures novelty is reflected in ventures performance

(continued)

Table 1.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Hmieleski and Ensley (2007)	TMT heterogeneity	A summarized index of annual revenues and employment growth	Firm age; firm revenue and TMT size	Moderating effects of leadership behaviors and environmental dynamism	Heterogenous TMT performs best when the leader is directive and within a dynamic industry environment. On the contrary, heterogeneous TMT perform best under empowering leader within a stable industry environment
Beckman <i>et al.</i> (2007)	TMT functional heterogeneity; TMT background affiliation heterogeneity and TMT turnover	Venture capital funding	Team size; team experience; team tenure; venture size; venture industry and amount of venture capital funding	N/A	TMT background affiliation heterogeneity, TMT functional heterogeneity is positively related to venture capital funding. TMT exit is negatively associated with IPO
Henneke and Lüthje (2007)	TMT educational Heterogeneity	Innovativeness	N/A	Mediators of environmental scanning and strategic openness	Environmental scanning and strategic planning mediate the association between TMT educational heterogeneity and level of innovativeness
Li (2008)	TMT tenure; TMT percentage in founders and TMT functional heterogeneity	Pre-IPO management team restructuring	Firm development stage and venture capitalist	Moderating effects of firm growth	TMT tenure, TMT founder percentage and TMT functional heterogeneity have a negative influence on TMT restricting in pre-IPO firms. The impact of these variables is stronger when the firm growth is high than when it is low

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Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Zimmerman (2008)	TMT tenure heterogeneity; TMT education heterogeneity; TMT functional background heterogeneity and TMT age heterogeneity	Capital raised at IPO	Equity raised; year of IPO; firm age; hot market; TMT size; TMT tenure; prior sales; founder experience; entrepreneurial experience; VC backing and underwriter reputation	N/A	TMT functional background and educational background heterogeneity have a positive impact on the amount of capital raised at IPO
Boone and Hendriks (2009)	TMT functional-background heterogeneity	Return on sales	Number of employees; team size and percentage of customized projects	Moderating effects of collaborative behavior; decentralized decision-making and accurate information exchange.	Functional background heterogeneity significantly and positively predicted return on sales. Positive interactions were found concerning the effects of collaborative behavior and functional background heterogeneity, decentralized decision-making and functional background heterogeneity and accurate information exchange and functional background heterogeneity on return on sales
Leary and DeVaughn (2009)	TMT occupational heterogeneity	Successful firm launch	Macroeconomic variables	N/A	TMT occupational diversity has a positive impact on successful firms launch
Zahra and Wiklund (2010)	TMT functional heterogeneity	Product innovation	N/A	Moderating effects of behavioral integration	TMT functional heterogeneity is positively associated with products innovation and the relationship is positively moderated by social integration among TMT members

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Table 1.

Table 1.

Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Boerner <i>et al.</i> (2011)	Age heterogeneity; educational background heterogeneity; industry experience heterogeneity and tenure heterogeneity	ROA Sales growth	Firm size; team size; team tenure and team average age	Moderating effects of TMT longevity	The relationship between age heterogeneity, educational background heterogeneity, industry experience heterogeneity and performance is moderated by TMT longevity
Zimmerman and Brouthers (2012)	Gender heterogeneity	International diversification	Firm size; manager age; manager functional experience; manager education level; risk propensity and manager international experience	Team gender diversity is significantly associated with international diversification	Team gender diversity is significantly associated with international diversification.
Zheng (2012)	Prior shared experience	A self-reported measure of firm growth	TMT heterogeneity (age, education and gender; all treated as control variables)	Mediating effects of transactive memory system	The control variables of TMT heterogeneity were not significant on a firm's growth
Bjørnåli and Aspelund (2012)	TMT functional background heterogeneity; TMT age heterogeneity; TMT industry background heterogeneity and TMT education heterogeneity.	International sales; and international strategic alliances	Firm; firm size and firm stage (old and young)	N/A	TMT heterogeneity in industry experience and functional background increases the likelihood of to achieve international sales and strategic alliances
Yuan <i>et al.</i> (2014)	TMT background heterogeneity	Firms' innovativeness	TMT tenure; TMT size; ROA and firm resources	Moderating effects of related diversification; industry advertising intensity and industry growth	TMT background heterogeneity is a significant predictor of firm innovativeness. All moderates were insignificant

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Authors (year)	IV	DV	Controls	Moderating/mediating effects	Findings
Visintin and Pittino (2015)	TMT with heterogeneity in education specialization; TMT with heterogeneity in previous experience and TMT with educational specialization in the business field.	Employment growth	TMT age; firm size; sector of activity; business model and ownership stake	N/A	TMT heterogeneity in educational specializations showed to negatively influence employment growth. No significant link was found between the previous experience of TMT and growth
Wang <i>et al.</i> (2015)	TMT functional heterogeneity	Innovation performance; long term performance and short term performance	TMT age; TMT age heterogeneity; the proportion of women and firm scale	N/A	TMT functional heterogeneity does not improve a firm's corporate performance and is negatively associated with innovation performance and performance at the short-run
Li (2017)	TMT functional background heterogeneity	Innovation; internationalization and return on assets	TMT size; TMT education diversity; firm size; firm age; industry type and leverage capability	N/A	TMT's functional background heterogeneity is a significant predictor of innovation but not internationalization
Smolinski <i>et al.</i> (2018)	TMT gender heterogeneity; TMT age heterogeneity; TMT education background heterogeneity and TMT functional assignment heterogeneity	Firm performance	N/A	Moderating effects of turbulent environment	TMT age and gender diversity are not related to firm performance in turbulent environments. TMT (i.e. educational and functional background diversity) positively are significant predictors of performance in turbulent environments

Table 1.

3. Theoretical foundations

Upper echelon theory (UET) provides a strong theoretical basis in entrepreneurship research regarding the impact of the top management characteristics on organizational outcomes (Ben-Hafaïedh, 2017; Biga-Diambeidou *et al.*, 2019; Jin *et al.*, 2017). The UET assumes that top management characteristics can explain some external and internal decision-making processes and affect company performance (Carpenter *et al.*, 2004). According to this model, the characteristics of values, experience, age and education can strongly affect how managers interpret situations and how they make strategic decisions, which will ultimately affect firms' performance. Hence, in this context, top management teams' characteristics can reflect the high performance of their ventures. Although several studies analyzed the individual impact of Chief Executive Officers, recent studies have approached the TMT as a unit of analysis (Hambrick, 2007).

Related to UET, the *human capital theory* posits that labor is heterogeneous, hence a person's productivity reflects the differences in skills, competencies, knowledge and capacities (Shrader and Siegel, 2007). According to Gimeno *et al.* (1997), productivity, management characteristics and the experience of the TMT can be linked to an enhanced competitive advantage and improved company performance.

The social capital theory emphasizes the advantages of social relations to individual performance (Coleman, 1988). Therefore, a start-up might benefit from the entrepreneurs' networks and social connections (Hsu, 2007). These ties are recognized as results of previous involvement in entrepreneurial businesses and prior experience or social connections (Adler and Kwon, 2002). Therefore, the social capital of entrepreneurial team members is a dynamic interaction and is built as a result of TMT social activities and is rooted in a social interactive system (Sahaym, 2005).

3.1 Top management team heterogeneity

TMT heterogeneity can be analyzed from two perspectives. The first perspective is *the information processing and the decision-making* of the UET. This perspective highlights the positive impact of TMT heterogeneity in firms (Hambrick and Mason, 1984), as it assumed that heterogeneous teams have broader knowledge and skills, which will eventually provide these teams with several resources to be used in making strategic decisions for the firm (van Knippenberg and Schippers, 2007).

The second perspective is the *social identity perspective*, which assumes that the diversity among team members produces a categorization, which, in turn, will stimulate effective conflict and interpersonal clashes among team members (Jehn *et al.*, 1999). This theory is supported by previous studies that found that homogeneous teams rather than heterogeneous have a positive effect on group cohesion (O'Reilly *et al.*, 1989) and performance (Murnighan and Conlon, 1991).

3.2 Measures of performance

In TMT literature, organizational outcomes were measured in different manners. Different researchers used firm-level performance, while others relied on team-level performance measures. Firm-level performance indicators include initial public offerings (IPO), survival, profitability, growth and innovativeness (Zhou and Rosini, 2015). In the same line, business death or survival was used as a dependent variable in TMT literature (Aspelund *et al.*, 2005; Cooper *et al.*, 1994). It is noteworthy to highlight the fact that growth as a measure of performance is cited as the most significant measure in new ventures research (Brush and Vanderwerf, 1992). This variable is measured as sales growth (Amason *et al.*, 2006; Boerner *et al.*, 2011; Eisenhardt and Schoonhoven, 1990; Ensley *et al.*, 1998; Ensley and Hmieleski, 2005; Kor, 2003; McGee and Dowling, 1994; McGee *et al.*, 1995), employment growth (Hmieleski and Ensley, 2007; Colombo and Grilli, 2005; Visintin and Pittino, 2015) and revenue growth

(Ensley and Hmieleski, 2005; Stuart and Abetti, 1990). Other performance measures at the firm level were return on assets (ROA) (Auden *et al.*, 2006; Boerner *et al.*, 2011; Carpenter, 2002; Richard and Shelor, 2002), net cash flow (Ensley and Hmieleski, 2005), revenues (Ensley *et al.*, 1998; Hmieleski and Ensley, 2007), profitability (Amason *et al.*, 2006; Stuart and Abetti, 1990), innovation (Li, 2017; Wang *et al.*, 2015), innovativeness (Henneke and Lüthje, 2007; Yuan *et al.*, 2014) and capital raised at IPO (Zimmerman, 2008).

4. Review of the empirical evidence

4.1 Top management team characteristics

In this section, the studies that link firm performance to TMT size, age, education and experience are reviewed.

4.2 Top management team size

TMT size is not a commonly tested factor in entrepreneurial studies (Maschke and Knyphausen-Aufsess, 2012), but has always been viewed as a determinant of firms' performance (Haleblian and Finkelstein, 1993). Large teams are linked to the greater ability of processing and absorbing information (Eisenhardt and Schoonhoven, 1990) and the ability to perform several tasks (Eisenhardt and Schoonhoven, 1990). Hence, larger teams will have better access to the resources, which will ultimately increase the available human capital in the firm (Jin *et al.*, 2017). Furthermore, there will be greater networking support for larger teams, which, in turn, will lead to higher levels of profitability because of the amounts of funds received due to the social connections with external investors (Shane and Stuart, 2002).

Larger team size demonstrated to be a significant predictor of new venture sales and staff growth (Eisenhardt and Schoonhoven, 1990; and Cooper *et al.*, 1994) and provides benefits at the level of executing difficult tasks in a complex business environment (Hmieleski and Ensley, 2007).

4.3 Top management team age

TMT average age is another characteristic, which has been studied and linked to firms' performance (Zimmerman, 2008). Younger teams have the tendency to take more risks and follow novel styles of management (Hambrick and Mason, 1984; Boeker, 1988) and are commonly associated with business growth (Child, 1974). It has been argued by Boeker (1988) that younger entrepreneurs are more receptive to change and they better understand innovations. Furthermore, firms led by youthful managers have less probability to experience crisis (Mudambi and Treichel, 2005).

4.4 Top management team education

In general, education reflects someone's skills and knowledge (Hambrick and Mason, 1984) and is associated with the ability to process information (Bantel, 1993). Several studies treated education as a proxy of entrepreneurs' educational background such as intelligence and problem-solving capability.

In the literature, the education of TMT was positively associated with greater levels of innovative activities (Bantel and Jackson, 1989) and with strategic orientation (Hambrick and Mason, 1984).

In general, there is a strong agreement among different researchers that TMT education and firm growth are positively associated (Maschke and Knyphausen-Aufsess, 2012). For instance, previous studies (Stuart and Abetti, 1990; Cooper *et al.*, 1994), found that education can stimulate higher growth levels, better performance and high profitability. Additionally,

a study by [Colombo and Grilli \(2005\)](#) found that education of economic and management sciences has a significant impact on growth.

4.5 Top management team experience

General experience is seen as a source of higher productivity, growth and better economic value of the business ([Shrader and Siegel, 2007](#)). Different types of experience were examined in the literature including specific-industry experience, functional experience and firm-founding experience. Studies that tested the effect of specific industry experience found that this type of experience is a significant predictor of employee growth ([Cooper et al., 1994](#)), going public ([Shane and Stuart, 2002](#)) and sales growth ([McGee and Dowling, 1994](#)). Besides, [Zheng \(2012\)](#) found that prior shared experiences of the founders of the venture positively affect a firm's growth.

According to several studies, specific industry experience provides benefits for new ventures such as access to product design, production processes and know-how tools ([Klepper and Sleeper, 2005](#)). [Colombo and Grilli \(2005\)](#) found that prior working experience in the same industry is linked to employment growth. Moreover, [Kor \(2003\)](#), found that founder-based firm-specific experience in the TMT has a positive influence on entrepreneurial growth.

Previous studies have shown that previous functional experience of managers is positively related to the rate of initial public offering ([Beckman and Burton, 2008](#)). It is noteworthy to highlight the fact that it has been argued that firms with the fit between the functional background and the strategy pursued in the firm demonstrate better performance ([McGee et al., 1995](#); [McGee and Dowling, 1994](#); [Maschke and Knyphausen-Aufsess, 2012](#)).

In addition, the founding experience of TMT was found to exert a positive impact on the firm. For instance, the founding experience of TMT demonstrated to significantly affect the likelihood of going public ([Beckman et al., 2007](#)) and of increasing new venture valuations ([Hsu, 2007](#)).

4.6 Top management team heterogeneity

According to [Hambrick and Mason \(1984\)](#), TMT heterogeneity is assessed in terms of noticeable characteristics, which are viewed as proxies for features that impact company performance and strategic decisions. Although the extant literature regarding the relationship between heterogeneity of teams and performance shows that TMT heterogeneity exerts a positive effect on the successful launch of new ventures ([Leary and DeVaughn, 2009](#)) and it is positively related with performance ([Boone and Hendriks, 2009](#); [Ensley and Hmieleski, 2005](#); [Homberg and Bui, 2013](#)), the results are scattered ([Bell et al., 2011](#)) with negative relationships ([Ensley et al., 1998](#); [Richard and Shelor, 2002](#); [Li, 2008](#); [Wang et al., 2015](#)) or insignificant relationships ([Visintin and Pittino, 2015](#); [Wang et al., 2015](#)) between TMT heterogeneity and firms' performance. It is important to note that heterogeneity research is very sensitive to the operationalization of heterogeneity ([Thommes and Klabuhn, 2019](#)).

In this section, the studies on TMT heterogeneity in age, education, functional background and tenure will be reviewed.

4.7 Top management team age heterogeneity

The social categorization perspective predicts that age diversity will exert negative impacts on group processes introducing more conflicts ([Linville and Jones, 1980](#)) and negatively affects firms' performance. On the contrary, the information processing perspective suggests that heterogeneity in age among TMT widens the perspectives used in determining the strategic issues and stimulates creativity, which positively affects

performance (Richard and Shelor, 2002). Indeed, high age heterogeneity of TMT was linked to enhanced company performance (Richard and Shelor, 2002; Kilduff *et al.*, 2000). This can be explained by the fact that age heterogeneity grants the team members with different perspectives and greater access to information, which will ultimately enhance decision-making (Williams and O'Reilly, 1998). Age heterogeneity has been demonstrated to be a significant predictor of company performance (Auden *et al.*, 2006; Thommes and Klabuhn, 2019; Zimmerman, 2008). On the contrary, Richard and Shelor (2002) found the effect of TMT age heterogeneity on return on assets is marginally negative while it is positively strong on sales growth. Age diversity was not related to the firm's performance in turbulent environments such as that seen in the study of Smolinski *et al.* (2018).

4.8 Top management team education heterogeneity

TMT education heterogeneity has been extensively studied in the literature (Zimmerman, 2008). The TMT literature points out that diversity in TMT education is positively associated with performance (Beckman *et al.*, 2007; Ensley and Hmieleski, 2005; Naranjo-Gil *et al.*, 2008; Smith *et al.*, 1994), greater capital raised (Zimmerman, 2008), strategic response (Hambrick *et al.*, 1996). The positive links between TMT education heterogeneity and performance can be because of a higher level of creativity introduced by heterogeneity (Smith *et al.*, 1994). Some scholars argued that the higher the TMT education heterogeneity, the better performance would be (Milliken and Martins, 1996), as the diversity of the team education would allocate different sources of information and would enhance cognitive benefits including better ideas and improved decision-making.

A number of empirical studies carried out in different contexts have pointed to the positive impact of educational heterogeneity of management teams on the firm performance (Smolinski *et al.*, 2018; Smith *et al.*, 1994; Hambrick *et al.*, 1996; Ensley and Hmieleski, 2005; Naranjo-Gil *et al.*, 2008) and on the firm-level behavior (Bantel, 1993; Hambrick *et al.*, 1996; Carpenter and Fedrickson, 2001). On the contrary, Visintin and Pittino (2015) found that TMT heterogeneity in educational specializations negatively affects the employment growth of the spin-offs. Smolinski *et al.* (2018) found that TMT heterogeneity in education is positively associated with performance in turbulent environments.

4.9 Top management team functional background heterogeneity

According to Zimmerman (2008), a team with cross-functional experience in different areas enables the company to better address its strategic issues than a team focused on one functional area. Functional background affects the company's strategic choices (Boeker, 1988). Different scholars (Zimmerman, 2008; Hambrick *et al.*, 1996) found that diverse functional backgrounds stimulate effective decision-making and encourage creativity and innovation, which, in turn, influence firm performance. The different perspectives of TMT enable the team to produce diverse interpretations and opinions while evaluating different alternates, which will foster innovation and creative decision-making. The effect of TMT functional background diversity in companies was examined in TMT literature. In the sample of studies, Aspelund *et al.* (2005) found that TMT functional heterogeneity is likely to reduce venture death. Moreover, Zimmerman (2008) found that TMT functional background heterogeneity is positively related to the amount of capital generated at the IPO. Furthermore, Beckman *et al.* (2007) demonstrated a positive association between TMT functional background heterogeneity and venture capital funding. Smolinski *et al.* (2018) found that TMT functional heterogeneity affects firms' performance in turbulent environments. Bjørnåli and Aspelund (2012) found that TMT heterogeneity functional background increases the likelihood to achieve international sales and strategic alliances.

Smolinski *et al.* (2018) found that TMT functional background heterogeneity has a positive effect on performance in turbulent environments. On the contrary, Wang *et al.* (2015), found that TMT functional heterogeneity does not improve the corporate performance of a firm and it is negatively associated with innovation performance and short-run performance. Moreover, Visintin and Pittino (2015) found that the effect of TMT heterogeneity in previous experience on employment growth is insignificant.

4.10 Top management team tenure heterogeneity

The TMT tenure reflects the work time of time managers as a team (Ping, 2007). Although it has been argued that homogeneous team tenure reflects a similar understating of the company strategies and the status quo and is also positively associated with the team's ability to create consensus on fundamental decisions (Bantel, 1993), the empirical results are not conclusive. Williams and O'Reilly (1998) mentioned that higher tenure diversity would contribute to high turnover and less effective communication. On another note, TMT tenure heterogeneity demonstrated to exert a positive influence on strategic change and company performance (Hambrick *et al.*, 1996). Auden *et al.* (2006) argued TMT tenure diversity is a significant predictor of firms' performance. Hambrick *et al.* (1996) demonstrated that TMT tenure diversity has a positive influence on the firm strategic and competitive response. Moreover, Zimmerman (2008) demonstrated a positive link between tenure heterogeneity and capital raised at the IPO.

4.11 Moderators and mediators in the top management team-performance linkage

Researchers have assumed that the relationship between TMT dynamics and performance is not simple and it is defined by some intervening or moderating variables. Given the fact that TMT composition might exert a positive or a negative effect on the firms' performance, there is a strong need to further examine the conditions that contribute to the TMT-performance associations.

Some studies examined possible mediators such as environmental analysis and planning (Henneke and Lüthje, 2007) and transactive memory systems (Zheng, 2012) and moderators of firm novelty (Amason *et al.*, 2006), research and development arrangement (McGee and Dowling, 1994; McGee *et al.*, 1995), internationalization (Carpenter, 2002), innovation, environmental complexity, decentralization (Richard and Shelor, 2002), environmental dynamism (Chandler *et al.*, 2005; Hmieleski and Ensley, 2007), turbulent environment (Smolinski *et al.*, 2018), TMT longevity (Boerner *et al.*, 2011), behavioral integration (Zahra and Wiklund, 2010), firm growth (Li, 2008) and international risk management factors (Auden *et al.*, 2006).

Pertaining to the moderating effects, McGee *et al.* (1995) suggested the relationship between sales growth and marketing arrangements is stronger when TMT acquires more marketing experience and positive moderation effects of marketing experience were found. They added that ventures with technical managers without technical experience attempting to pursue research and development (R&D) arrangement, had rather poor performance. Further, Richard and Shelor (2002) demonstrated that the association between TMT age heterogeneity and ROA is curvilinear. For firms operating in a complex setting, TMT age heterogeneity at low-medium extents has been shown to have a positive impact on sales growth. Carpenter (2002) found that the positive associations between TMT heterogeneity (education, functional background and tenure) and performance rely on the level of internationalization. These associations are stronger in short-tenured TMT. Auden *et al.* (2006) clarified that TMT demographic diversity (age, functional background and team tenure) is a significant predictor of firms' performance and it is positively moderated by

international risk management factors. Amason *et al.* (2006) found the fit between team compositions and venture performance is positively moderated by firm novelty. On another note, it was found that heterogeneous TMT performs best when the leader is directive and inside a dynamic industrial environment, while heterogeneous TMT performs best under empowering leadership inside a stable industrial environment (Hmieleski and Ensley, 2007). Li (2008) has found the impact of TMT heterogeneity on TMT restricting in pre-IPO firms stronger when firm growth is high rather than when it is low. Boerner *et al.* (2011) demonstrated that TMT longevity moderates the relationship between the TMT dominions of heterogeneity and firms' performance. Zahra and Wiklund (2010) found that TMT functional heterogeneity is positively associated with product innovation and the relationship is positively moderated by social integration among TMT members. Finally, Yuan *et al.* (2014) found all moderators (diversification; industry advertising intensity; industry growth) were not significant.

Industry characteristics seem to play a significant role in the relationship between TMT composition and firms' performance (Jin *et al.*, 2017). Different researchers were interested in studying the effects of environmental characteristics (Edelman and Yli-Renko, 2010). For instance, the industrial organization perspective suggests that the industry has an influence on a firm's performance (Porter, 1985). The cognitive perspective examined how the business environment can affect entrepreneurs' cognitive framing during the first stages of firm creation (Edelman and Yli-Renko, 2010; McMullen and Shepherd, 2006). The organizational ecology perspective views the business industry as a crucial founding condition, which affects the death of the firm (Swaminathan, 1996).

Industries face different degrees of uncertainty that affect the predictability of business events and outcomes (Knight, 1921). Two types of sectors were mostly examined in the TMT literature: high-tech industries and low-tech industries. The high-tech industry is characterized by uncertainty, dynamism and complexity (Bahrami and Evans, 1995). In such circumstances, high-tech industries require additional capabilities and skills to run the business (Gartner, 1985). Different researchers have pointed out in a high-tech industry, experienced team members will be taking less time to take particular actions to adapt to the high velocity and the complexity of the environment (Kobus *et al.*, 2001). This is in line with UET that proposes that TMT characteristics working in uncertain business environments are more likely to be reflected in organizational outcomes (Hambrick and Mason, 1984). This suggests that in highly uncertain and dynamic business environments, teams with higher profiles in terms of skills, knowledge and experience, are more likely to have a better understanding and entrepreneurial cognition and can improve the firm's activities. More specifically, TMT heterogeneity effects on a firm's performance might be more important in high-tech business environments because of the technological complexity and the massive use of research and knowledge (Utterback, 1996). Moreover, it is well-documented in TMT literature that the diversity of information and knowledge can minimize uncertainty in innovative and complex business settings (McMullen and Shepherd, 2006). Empirically, previous studies suggest that more diverse teams contribute positively to a firm's performance in more dynamic and uncertain environments and less diverse teams can be beneficial in more stable settings (Hambrick *et al.*, 1996; Eisenhardt and Schoonhoven, 1990).

5. Future opportunities for empirical analyzes

The first opportunity for future research is relative to the characteristics of the TMT, which in some cases are found to be insignificant or give puzzling effects on the performance of entrepreneurial firms. Therefore, future research should be devoted to investigating these dimensions of TMT by providing additional evidence of their relevance. The second avenue

of opportunities for empirical investigation could be identifying new mediating mechanisms (Mannix and Neale, 2005), moderating effects (Knight *et al.*, 1999; Li and Hambrick, 2005; Nielsen, 2010) and boundary conditions (Nielsen, 2010). Third, most of the reviewed articles in this paper used UET as their main theoretical foundation. There is a strong need to use alternate theories together with UET to draw a clearer picture of whether TMT dynamics and composition contribute to the firm's performance and success. Following a multifaceted approach, combining demographic, informational and personality diversity of TMT would provide a better prediction of the firms' performance (Nielsen, 2010; Jehn *et al.*, 1999). Fourth, it could be interesting to study the TMT heterogeneity variables together, as they were extensively studied separately but rarely examined in conjunction (Zimmerman, 2008). Fifth, most of what has been analyzed in the TMT heterogeneity research was centered on age, education, experience, functional background and tenure and very little research was found on gender heterogeneity. In the reviewed studies, it appeared that only two studies examined gender heterogeneity (see Smolinski *et al.*, 2018; Zimmerman and Brouthers, 2012).

Sixth, one possible area of research could be focused on the antecedents of TMT compositions and dynamics. With few exceptions (Boeker and Wiltbank, 2005; Boone *et al.*, 2004), this area remains limited, as most of the research focused on the outcomes of TMT characteristics and heterogeneity. Therefore, future research may also shed light on the role of social processes (Ruef *et al.*, 2003) and that of the processes aimed at enhancing the functional diversity of skills (Boeker and Wiltbank, 2005) that may play a role in the choices related to the composition of the founding teams (Davidsson and Honig, 2003).

Seventh, while most of TMT heterogeneity research focuses on how teams composition diversity contributes to firms' performance, there is a scattered line of research, on how firms' growth and the changes of the organizational elements might lead to some changes in teams compositions, which needs to be addressed.

Finally, the following two factors (innovation and internationalization) were not addressed in the TMT literature as intervening mechanisms between TMT and entrepreneurial firms' performance and further research is needed to examine their intervening effects.

5.1 Innovation as a mediator

Innovation has been associated with the enhancement of the competitive positioning (Filatotchev and Piesse, 2009; Li, 1999), operational efficiency (Li, 2017) and product quality (Filatotchev and Piesse, 2009). Innovation helps firms to quickly introduce new technologies, which would enable them to respond to environmental changes in an effective manner. Moreover, innovation demonstrated to play a significant role in sustaining a competitive advantage, which will increase the profitability of the firm (Kim and Mauborgne, 2002).

On another note, innovation is more likely to take place in firms with people who have diverse experiences, backgrounds, knowledge and skills (Yuan *et al.*, 2014), especially because innovative activities are attributed to people's ability, experience and knowledge. When people in organizations are diverse, multiple sources of information will be generated with the aim of resolving sophisticated problems (Certo *et al.*, 2006). More specifically, the diversity of knowledge, experiences and backgrounds of TMT will produce different perspectives and opinions while evaluating options and hence encouraging innovation, creativity and decision-making (Zahra and Wiklund, 2010). Bantel and Jackson (1989) suggested that TMTs with diversity in their characteristics tend to expand their information sources and produce more innovative alternates. This is was supported by the study of Yuan *et al.* (2014), who found that TMT background heterogeneity is positively related to

firms' innovativeness and by the study of Zahra and Wiklund (2010), which established positive links between TMT functional heterogeneity and innovation. Regardless of this support on the importance of TMT heterogeneity for innovation, other researchers (O'Reilly *et al.*, 1993; Jehn *et al.*, 1999) view diversity as a source of conflict and that would hinder information sharing and eventually innovation as well. For this reason, further investigation is needed in this area, especially examining innovation as a mediating mechanism.

5.2 Internationalization as a mediator

Firms entering an international market face high levels of ambiguity, complexity and environmental uncertainty (Herrmann and Datta, 2005). TMT diversity can mitigate the internationalization process in firms. For instance, previous studies found that TMT functional background heterogeneity has an effect on the firm's ability to respond to international complexities and uncertainties (Carpenter and Fedrickson, 2001; Herrmann and Datta, 2005). Moreover, research suggests that TMT's previous experience is beneficial for the firm to grow (Boone and Hendriks, 2009; Sapienza *et al.*, 2006) as they can provide positional advantages to deal with uncertain and complex international decisions. In the same line, social capital and external networks of TMT might enhance the access to international contexts (Hitt *et al.*, 2001). Hence, TMT heterogeneity help firms at the level of identifying critical factors, observing opportunities and trends and integrating a diverse set of skills and resources.

On another note, although links between internationalization and performance have been well-established (Delios and Beamish, 1999; Geringer *et al.*, 2000; Tallman and Li, 1996), further investigation is needed to understand the role of internationalization as an intervening mechanism between TMT heterogeneity and performance.

5.3 On the methodological approaches

First, the author observed that very limited studies investigated the UET using qualitative methods (O'Reilly *et al.*, 1993; Pitcher and Smith, 2001). Hence, more qualitative studies on TMT and performance, instead of traditional and quantitative research methods, could help to explain better the mechanisms at stake and possible missing factors.

As a second methodological issue, the sampling approach mostly used in the TMT studies was a purposive non-probability random sampling (Nielsen, 2010). Usually, random sampling is recommended in social science, as it is representative of the population and reduces systematic error (Hitt *et al.*, 2010). Hence, the results of TMT studies need to be interpreted with caution due to their sampling method nature. Moreover, it is very hard to compare results across different contexts and cultures with purposive sampling techniques. For reliability and validity purposes, it is also recommended for future studies to use structural equation modeling (SEM) based on covariance or correlation matrixes (instead of traditional regression techniques), as SEM would help in testing multidirectional associations in complicated models (Kline, 2005). Furthermore, causality studies are very limited in TMT composition research. Hence, longitudinal studies are very much needed in this field of research.

6. Contribution and imitations

As the articles surveyed in this paper are published in many respected peer-reviewed journals, it can be said that the analysis builds confidence in the findings of the literature. In this research, all studies, which did not fall into the category of quality research were not included in this research. This research is important as it analyzes not only the relationship between top management teams and firm's performance but it also allows for a better

understating of the underlining mechanisms and bounding conditions, which govern the links between top management teams and firm's performance. Consequently, a context-based analysis of the results from the studies reviewed enabled accurate and balanced coverage including most of the appropriate influencing variables.

The articles surveyed in this paper used different theoretical approaches. The most common approaches are the upper echelons theory, information and decision-making theory and social categorization. The analysis was limited to the studies of the external differences in TMT such as age, education, skills, experience and tenure, while differences related to informational flows and personality of TMT and cultural diversity were not included. On another note, this research highlighted only the links between top management teams and entrepreneurial firm performance, in which teams' performance was not included.

7. Managerial implications

Although there are two opposing views on the possible effects TMT diversity can exert on a firm's performance, the results of the articles reviewed showed that TMT diversity, to some extent, is beneficial to better firms' performance. Nevertheless, policymakers and managers may consider moderate diversity in team members as it may provide fertile grounds for more innovative views and better problem-solving abilities. Therefore, combining team members with moderate diversity could possibly help firms to highly perform and at the same time minimize any potential conflict because of high levels of diversity (Kakarika, 2013). In such situations, the richness of perspectives, creative-oriented thinking, diverse social networks and moderate levels of conflicting voices could be ideal for entrepreneurial firms to achieve better performance.

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