ON THE ORGANIZATIONAL DESIGN OF ENTREPRENEURIAL VENTURES: A FIRST EMPIRICAL LOOK!

Paola Rovelli*

Assistant Professor at Free University of Bozen-Bolzano
Faculty of Economics and Management, Centre for Family Business Management
Piazza Università 1 - Universitätsplatz 1, 39100, Bolzano-Bozen
Email: paola.rovelli@unibz.it
Phone: 0039 0471 013022
ORCID: 0000-0002-1860-8693

Vincenzo Butticè

Assistant Professor at Politecnico di Milano School of Management
Department of Management, Economics and Industrial Engineering
Via Lambruschini 4/b, 20156, Milano
Email: vincenzo.buttice@polimi.it
Phone: 0039 02 2399 2738
ORCID: 0000-0001-7202-0236

*Corresponding author

Abstract

Several studies claim that entrepreneurial venture should pay attention to their organizational design in order to improve performance. However, a clear understanding on how these ventures organize is still missing. Entrepreneurial ventures' organizational design still remains an ambiguous concept, which has been rarely analyzed empirically. In this paper, we borrow organizational design elements from the literature on established firms and we use them as a lens to provide a fist empirical overview on the entrepreneurial ventures' organization. We analyze a sample of 255 Italian entrepreneurial ventures, focusing on their top management teams and on the most important organizational design elements: hierarchical structure, size, functional specialization, and delegation. In so doing, we first relate these elements to four contingency factors (i.e., EV's

size, age, industry, and geographical location) and then we adopt a two-step cluster analysis to understand whether the complementarities and interdependencies among organizational design elements give rise to organizational configurations. Results reveal the presence of three distinct configurations, which we named *collaborative TMT*, *centric TMT*, and *professional TMT*.

Keywords: entrepreneurial ventures, organizational design, top management team, organizational configurations

1. INTRODUCTION

An entrepreneurial venture is a young independent firm (i.e., not controlled by another firm) that is established by one entrepreneur or a group of entrepreneurs who "perceive an opportunity, and create an organization to pursue it" (Bygrave & Hofer, 1991). During the last 10 year, the organizational design of EVs has become an increasingly debated issue in the literature. Inspired by the life cycle approach (Boeker & Karichalil, 2002; Boeker & Wiltbank, 2005; Jayaraman et al., 2000), it is widely diffused the idea that a timely adoption of a "professional" organization – i.e., an organization that mimics that of successful incumbent firms – leads to better performance. However, despite the growing interest and the theoretical papers dealing with EVs' organizational aspects, it still remains an ambiguous concept. Indeed, there is a lack of robust quantitative empirical evidence on how EVs do organize. In this paper, we offer a first, empirical, look at EVs' organization, by focusing on the most important element of EVs, which is their Top Management Team (TMT). While there is general consensus on the definition of the TMT of established corporations, in the case of EVs, its definition is more ambiguous. Here we consider as members of the TMT of a focal venture all individuals who collectively or autonomously decide about the strategy of the venture. Accordingly, the TMT includes firm's CEO and owner-managers but may also include other professional (i.e., non-owner) managers who report to the CEO.

To analyze the organization of EVs' TMT, we borrow organizational elements from the literature on established firms and we use them as a lens to investigate ventures' organization. Specifically, we consider variables that capture the extent of a hierarchical (vs. polyarchical) structure within the TMT (i.e., whether one TMT member acts as the TMT's leader), the size of the TMT, the level of functional specialization of TMT members, and the allocation of decision authority among them. In our opinion, our effort can be of inspiration for future research interested in investigating the antecedents and consequences of EVs' organizational design, thus aimed at covering the gap left by the weak literature on this topic.

Our paper is thus empirical and descriptive. Focusing on the above-mentioned organizational design elements, we offer a picture of the organization of a sample composed of 255 Italian EVs. We retrieved data through a survey data collection, which allowed to get access to fine-grained data on TMTs' organizational design. As far as we know, this study represents one of the first attempts to provide a large scale empirical evidence on this topic.

The remaining of the paper is organized as follows. First, review the literature on the organizational design elements we study in this paper. Second, we describe the empirical methodology and provide details on the dataset and the measures of organizational design we use. Third, we offer an empirical description of the organization of EVs' TMTs by considering a set of contingencies, as well as relating organizational elements to each other. Then, we provide the results of an explorative analysis of the configurations of organizational design elements that EVs adopt for their TMTs. Finally, we sum up our main results in the concluding section, also outlining possible future research directions on applied research on the organization of EVs.

2. LITERATURE REVIEW

The literature on organizational design has mainly focused on large established firms (see Colombo et al., 2016 for a review), while we have comparatively less studies that have explicitly investigated the organization of EVs. Moreover, these studies have often focused on one or few organizational design aspects, hence we lack a holistic picture of the EVs' organization. This section is meant to introduce the organizational design elements we included in our investigation and to synthesize the few studies related to these elements available in the literature. Particularly, we focus on the EVs' hierarchy, functional specialization, and allocation of decision authority.

Hierarchy. A *hierarchy* exists in an organization when members are ranked according to their relative authority (Oxford Dictionary). Accordingly, in a hierarchy, organization members at higher levels have the power to approve or deny the decisions of those at lower ones. The literature has widely discussed that establishing a hierarchy may have both advantages and disadvantages given the characteristics of the organization and of the competitive environment the organization operate in (Colombo et al., 2016). According to the information processing theory (Galbraith, 1974), the introduction of a hierarchy within the organization may increase information processing costs. Particularly, it has been noted that information costs increase with the number of organization level, because organization members at higher levels have the final approval of the decisions taken at lower levels of the organization. This flow of information upwards and downwards the hierarchy causes losses of information and delays (Keren & Levhari, 1983; Radner, 1993; Van Zandt, 1999). Clearly these costs increase with the number of hierarchical levels, resulting in more time required for decision making. However, establishing a hierarchy may bring advantages related to the reduction of costly mistakes

made by the organization. Indeed, a hierarchical organization is typically more conservative, since it stops more projects and denies more decisions (Sah & Stiglitz, 1986). Accordingly, establishing a hierarchy is advantageous when the probability of wrong decisions is high and mistakes have a large negative effect on performance. This occurs, for instance, when the quality of projects that an organization has to screen for approval is highly skewed with several *low quality* projects existing (Colombo et al., 2016). In juxtaposition with the hierarchal organization, scholars have introduced the concept of *polyarchy*, where authority is granted to multiple organization members (Dahl, 1965), and decisions are taken collegially. The polyarchy may solve the information processing problem of a hierarchical organization, at the expenses of a less conservative (and riskier) organization.

To the best of our knowledge, only the study by Colombo and Grilli (2013) analyzed the formation of a hierarchical structure in high-tech entrepreneurial ventures. The authors investigated the antecedents of the change of an owner-managed venture from a flat hierarchy, composed of two layers (that is, the owner-managers and the employees), to a three-layer hierarchy that also includes a layer of professional salaried middle managers. They show that the information overload caused by a highly competitive and unpredictable business environment propels the introduction of a middle manager level.

Specialization. Specialization leads to the decomposition of complex tasks into subtasks that are assigned to diverse organizational members. The literature on this topic has acknowledged that specialization may contribute to cope with uncertainty. Indeed, by matching people and tasks, specialization allows to enhance problem-solving at the organizational level (Thompson, 1967). As in the case of the hierarchy, it does not exist a unique recipe to define the proper level of specialization within the organization. Rather, organization members should define specialization basing on the analysis of the advantages and disadvantages it may bring. Specialization allows organization members to achieve higher productivity derived from the enhanced possibility of learning by doing (Moreland & Argote, 2003). Studies that have investigated specialization in EVs have also noted that specialization facilitates the assessment of organizational members, which is otherwise difficult since the highly turbulent environment EVs operate in (Sine et al., 2006). Moreover, this literature has shown that ventures having highly specialized entrepreneurial teams grow larger in sales compared to their non-specialized counterparts (Sine et al., 2006) and are faster in decision making (Talaulicar et al., 2005). While it clearly represents an advantage, if taken to extreme specialization may cause organization

members alienation and loss of competencies caused by their continuous focus on a narrow set of tasks (Colombo et al., 2016). Moreover, it is conventional wisdom that specialization increases coordination costs and decreases the flexibility of an organization and therefore its ability to react to environmental changes (Burns & Stalker, 1961).

Allocation of decision authority. Allocation of decision authority refers as the way in which decision authority is distributed at the various levels of the firm (Aghion & Tirole, 1997; Hempel et al., 2012; Lin & Germain, 2003). Organization members at the highest level in the hierarchy may decide to keep centralized decision authority or to delegate it to other organization members at lower hierarchical levels. If kept centralized, the ultimate authority to approve decisions is granted only to the organization members at the top of a hierarchy. Conversely, if decision authority is delegated downward in the hierarchy, other organization members can take decisions (Pugh et al., 1963). As discussed above, according to information processing, centralization of decision authority may cause leakages of information and delays in decision making, particularly when the hierarchy has several levels (Harris & Raviv, 2002; Harris & Raviv, 2005). Delegation reduces these pitfalls since it allows organization members to make decisions independently and concurrently. Furthermore, through delegation of operating decisions downward the firm's hierarchy, the time of the individuals at higher levels of the hierarchy is freed, thus they can focus their attention and efforts on strategic decisions (Garicano, 2000). The major drawback of delegation relates to the loss of control that occurs when the decision authority is allocated to organization member at lower levels (Dessein, 2002). Accordingly, the identification of the correct level of delegation should result from the assessment of its advantages, in terms of reduced losses of information, and its drawbacks, in terms of loss of control. In the context of EVs, delegation has been mainly studied through a psychological perspective. For instance, Miller and Toulouse (1986) showed that *flexible* CEOs (i.e., individuals highly concerned with personal pleasure and diversion) have a greater propensity to delegate, whereas CEOs with a strong need for achievement tend to centralize decision authority. Other studies examining the delegation of decision authority have linked this organizational design aspect to performances. In this respect, Caruana et al. (1998) showed that centralization of decision authority hampers the identification and exploitation of entrepreneurial opportunities.

3. EMPIRICAL METHODOLOGY

3.1. Premise

The organization of an EV is a structure that results from the combination of a number of elements that interact in a complex way. In this paper, we aim at offering an empirical look at the organization of the EVs' TMT by focusing on the most important organizational design elements: hierarchical structure, size, specialization, and delegation (e.g., Burton et al., 2006; Child, 1972; Daft, 2010; Galbraith, 1973; Jones, 2010; Mintzberg, 1993). By relying on established measures of these elements, we develop a stylized description of the EVs' TMT. We do so by relating organizational design elements to some contingency factors (i.e., EV's size, age, industry, and geographical location) and to each other. In so doing, we also adopt a configurational approach to understand whether the aforementioned elements cluster together in defined organizational configurations. Indeed, organizational design elements are characterized by interdependences and complementarities, so as it would be possible to understand their actual effect (i.e., the joint effect of the design of its organizational elements) on the EV's behavior (Ennen & Richter, 2010; Thompson, 1967) only by simultaneously considering these elements. Our approach thus allows us to provide a robust large-scale empirical evidence on the organization of EVs, thus shedding new light on the current debate on this topic.

We use four types of measures to quantitatively define the structure of the EV's TMT. First, the extent of a hierarchical (vs. polyarchical) structure within the TMT, meaning whether there is a TMT member who acts as the TMT's leader. Second, we analyze the size of the TMT, which counts how many individuals are part of the team. Third, we investigate the level of functional specialization of these individuals. Last, we focus on the allocation of decision authority, which defines to what extent strategic decisions are delegated within the TMT.

3.2. Sample and data

To provide a first empirical look of the organizational design of EVs' TMTs, we use a sample of 255 Italian EVs, founded by graduates from the largest Italian technical university (hereafter: the University). In so doing, we followed the previous studies on the organization of EVs in resorting to a convenience sample (e.g., Beckman & Burton, 2008; Boeker & Wiltbank, 2005; Sine et al., 2006; Talaulicar et al., 2005), which, as shown below, allowed us to obtain a high response rate to the survey (e.g., Kriauciunas et al., 2011). Data on the organizational design of sample firms were collected through an online survey administered in the second semester of 2015. The target population included 1,889 firms that were founded between 2004 and 2010 by

one or more individuals who graduated from the University between 2002 and 2010, were located in Italy, and survived as independent firms until December 2014 (i.e., at December 2014, these firms were 10 years old or younger). For all these firms, we retrieved information on shareholders and accounting data from the AIDA commercial database managed by Bureau Van Dijk. We also searched for the personal email and/or telephone contact of one of the owner-managers of the firms. Finally, the survey was administered to a population of 1,075 entrepreneurs from as many EVs.

The survey questionnaire included several questions on the organization of EVs, relating to the hierarchical versus polyarchical structure, the size, the functional specialization, and the allocation of decision authority of EVs' TMTs. Following established practices (e.g., Rovelli & Rossi-Lamastra, 2018), we conducted both a pilot test and a pre-test of the questionnaire before administering the survey. In April 2015, we did the pilot test asking five entrepreneurs, who did not find the EVs included in the target population, to answer the questionnaire and give feedback. Then, a new version of the questionnaire was pre-tested by a sample of 100 EVs randomly extracted from the target population. Only 10% of these EVs answered the questionnaire. The low response rate led to improving the contact methodology. Instead of sending out invitation emails, which were rarely read by entrepreneurs during the pre-test, the research team decided to administer the questionnaire through direct phone calls with the target respondents. Conversely, no problems emerged regarding the questionnaire.

Starting from June 2015, entrepreneurs included in the target population were contacted by trained research assistants through a phone call, followed by an email containing the link to access the online questionnaire on SurveyMonkey. For each questionnaire received, answers were checked for internal coherence. If needed, missing data were recovered, and mistakes were corrected through an additional phone call with respondent entrepreneurs. Ownership data were also crosschecked by trained assistants with information from other secondary sources (e.g., the companies' and investors' websites). In case of misalignment, the data were again checked during phone calls with the respondent entrepreneurs. Finally, we obtained 255 completed questionnaires with no missing data, corresponding to a 24.1% response rate.

We performed several checks to control for the reliability of the data, the representativeness of the sample, and the possible presence of non-response biases (results are available from the authors upon request). First, we checked the reliability of the collected data by triangulating the answers received from 24 respondent

entrepreneurs with those provided by a second respondent in the same EVs. The analysis, based on t-tests and Kolmogorov-Smirnov tests for equality of distribution functions for continuous variables, and chi-squared tests for categorical variables, did not reveal any significant difference over the organizational design elements considered in this study, thus confirming the reliability of our data. Second, we checked whether the sample of 255 EVs is representative of the target population of 1,075 EVs. Also in this case we used t-tests, Kolmogorov-Smirnov tests for equality of distribution functions, and chi-squared tests. We did not find any difference between the distribution of the sample and the one of the target population with respect to the size of the EVs (measured by sales in 2015, t-test = 0.518, p-value = 0.605), their foundation year ($\chi^2(9) = 1.142$, p-value = 0.285), the geographical area where EVs are located ($\chi^2(2) = 3.041$, p-value = 0.219) and the industry in which they operate ($\chi^2(3) = 2.661$, p-value = 0.447).[1] We also checked that there are no significant differences between early and late respondents[2] as for the variables reflecting EVs' organization. No problems emerged.

The majority of the 255 EVs of our study is located in the North of Italy (93.7%), with 48.6% of them in the University province. Most of the EVs operate in the service industry (75.7%), while only 14.1% are in manufacturing. In most cases, EVs were founded by a team of entrepreneurs (64.7%). On average, sample EVs are 4.3 years old, with average of 10 employees.

3.3. Measures of organizational design

We used the survey data to create four variables measuring the organization of EVs' TMTs: (i) *TMT hierarchical structure*, (ii) *TMT size*, (iii) *TMT functional specialization*, and (iv) *TMT delegation of decision authority*.

[1] We considered 3 geographical areas – i.e., North, Center, and South of Italy – and 4 industries – i.e., manufacturing, services, and constructions.

[2] Early respondents are entrepreneurs who answered after the initial phone call and related email; late respondents are instead those that answered after at least one email reminder.

TMT hierarchical structure is a dummy variable equal to 1 in case it is possible to identify a single entrepreneur who leads the TMT (and the EV), being the ultimate one responsible for its strategy; the dummy variable is 0 otherwise.[3]

TMT size is the number of members of the TMT of the focal EV.

TMT functional specialization measures the extent to which the activities concerning the different functional areas in the EV are concentrated in the hands of one (or a few) managers instead of being spread across all TMT members. For this purpose, we took inspiration from Sine et al. (2006) and computed *TMT functional specialization* as the average number of functional assignments per member of the TMT. We considered the following 9 functional areas: administration and finance, communication and public relations, human resources, R&D, purchasing, production, marketing and sales, operations and logistics, and strategy development. For each functional area, the respondent to the survey questionnaire indicated the responsible manager(s). *TMT functional specialization* is equal to $10 - \frac{\sum_{m=1}^{M} s_m}{M}$, where M is the size of the TMT, and s_m is the number of functional areas assigned to the *m* manager. Therefore, the minimum level of functional specialization is 1, when all TMT members address all the 9 functional areas under consideration. The maximum value is 9, corresponding to a situation where there are 9 members in the TMT, each of them addressing a specific functional area.

TMT delegation of decision authority captures whether authority over the strategic decisions under consideration is centralized or delegated downward the organizational hierarchy (Colombo & Delmastro, 2004; Hempel et al., 2012; Lin & Germain, 2003), and specifically among TMT members. Indeed, when a decision is made by the TMT, it may be centralized at the top (i.e., made by the CEO in case of a hierarchical TMT, or by the management committee leading the firm in case of a polyarchical TMT) or be delegated to an individual member of the TMT different from the CEO (e.g., the VP for R&D). In the questionnaire, we

[3] When *TMT hierarchical structure* is equal to 1 and the venture is a stock company, the leading entrepreneur generally combines the roles of CEO and President. When the EV is a limited liability non-stock company, the leading entrepreneur is generally assigned the title of CEO and there is no President. When *TMT hierarchical structure* equals 0, there is typically more than one CEO if the venture is a limited liability non-stock company, while the roles of CEO and President are attributed to different individuals if the venture is a stock company.

provided a list of 19 strategic decisions, reported in the following Table 1. For each strategic decision under consideration, respondents were asked to indicate who in the EV was responsible for the decision and how the decision was made. For example, in case there is a CEO at the top of the EV's hierarchy, the following five situations, in descending order of level of delegation, were defined: (1) the CEO makes the decision; (2) a member of the TMT makes the decision, but the approval of the CEO is needed; (3) a member of the TMT makes the decision autonomously; (4) an EV's employee or middle manager makes the decision but the approval of a TMT member is needed; (5) an EV's employee or middle manager makes the decision autonomously. *TMT delegation of decision authority* is the average level of delegation considering only the decisions made within the TMT (i.e., in the example above, decisions for which the respondent gave value 1, 2, or 3 to the corresponding question).

------- Insert here Table 1 -------

3.4. Method

The aim of the analysis is to provide an empirical overview of the organization of EVs' TMTs. To do so, we provide descriptive statistics of the abovementioned organizational design elements by relating them both to a set of contingency factors and to each other. For what concern the contingency factors, we considered: (i) *EV size*, (ii) *EV age*, (iii) *EV industry*, and (iv) *EV geographical location*. *EV size* is a dummy variable that distinguished between small and large EVs; as a threshold we considered the median of the sample, which is equal to 5 employees. *EV age* is a categorical variable that groups EVs in classes of age. As mentioned before EVs in the sample have a maximum age of 10 years. To create the variable, we considered the following classes: 1 year, between 2 and 5 years, between 6 and 9 years, and 10 years. *EV industry* identifies the industry in which the EV operates, among (i) services, (ii) manufacturing, and (iii) constructions. Finally, *EV geographical location* indicates whether the EV is located in the North, Center or South of Italy. Using these contingency factors, we tested whether statistical differences exist along the four organizational design elements by using t-tests, ANOVA tests, and Scheffe post-hoc test.

Mirroring previous research (e.g., Gruber et al., 2010; Ichniowski et al., 1997; Milgrom & Roberts, 1990), we then applied a configurational approach to the four organizational design elements to capture TMT configurations. In line with previous studies (e.g., Gibson & Birkinshaw, 2004; Gruber et al., 2010; Guedri & McGuire, 2011), we performed a two-step cluster analysis to detect the presence of configurations of

organizational design elements. This analysis is indeed a well-known methodology for data reduction purposes (e.g., Kaufman & Rousseeuw, 2009; Rogerson, 2001; Wang et al., 2017) and identifying similar groups – in our case configurations – based on a set of variables (for some examples, see Birley & Westhead, 1990; Covin & Slevin, 1988; Forte et al., 2000; Gruber et al., 2010; Youndt et al., 2004). To determine the number of clusters, we used the hierarchical cluster analysis of Ward (1963), and then we assigned the EVs in the sample to clusters using the k-mean clustering method. We then determined which pairs of clusters were significantly different among all variables using the Scheffe pairwise comparison of means. Variables were standardized and checked for outliers, since cluster analysis tends to be sensitive to these.

4. RESULTS

4.1. Empirical evidence on the organizational design of EVs' TMTs

Considering the whole sample, the 63.14% of EVs has a hierarchical TMT, with an average number of members equal to 2.330. TMT members have a low average functional specialization, equal to 3.503, and an average level of delegation of decision authority of 1.419, which means that strategic decisions are on average made either by the CEO or the group of entrepreneurs leading the EV or by a member of the TMT with the approval of the former. It is thus rare that individual TMT members decide autonomously. The decisions that are more frequently delegated to individual top managers relate to purchases (1.68), the design of management control systems (1.66), production insourcing/outsourcing (1.57), and the introduction of significant changes in products and/or services (1.56) and marketing activities (1.56). In contrast, decisions that are more frequently centralized at the top of the hierarchy relate to major business investments (1.21), significant changes in the organizational structure (1.31), and hiring and firing (1.34). In Tables 2, 3, 4 and 5, we report the descriptive statistics (i.e., means) and tests of the organizational design variable considering the four abovementioned contingency factors.

------- Insert here Tables 2, 3, 4, and 5 -------

Analyzing data, we did not find any difference in the organizational design depending on the industry in which the EV operates (Table 4) and its age (Table 3). This means that both the type of activity carried out by the EV and the time passed since its foundation do not affect the organization of the TMT, but that instead there might by other influential factors. A case in point are the size (Table 2) and the geographical location

(Table 5) of the EV. While *TMT hierarchical structure* does not change depending on the size of the EV, statistical differences emerged comparing small and large EVs basing on *TMT size*, *TMT functional specialization*, and *TMT delegation of decision authority*. Specifically, larger EVs have larger TMTs (p-value = 0.037), which are more functionally specialized (p-value = 0.016) and with a greater level of delegation of strategic decision (p-value = 0.001). Similarly, statistical differences emerged when considering the geographical location of the EV, with the only difference that in this case all organizational design elements significantly vary. In this case, the major differences emerge when comparing Northern vs. Southern EVs. The latter are more frequently organized hierarchically (p-value = 0.0486), but with smaller (p-value = 0.037) and less functionally specialized (p-value = 0.035) TMTs in which strategic decision are more centralized compared to Northern EVs (p-value = 0.057).

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Apart from investigating differences depending on these contingencies, as a preliminary step to the search for organizational configurations we also related organizational design elements to each other. Table 6 presents correlations among the four organizational design variables. With the exception of *TMT hierarchical structure* and *TMT delegation of decision authority*, all other pairs of elements are correlated at 99% level of significance. Specifically, *TMT size* and *TMT functional specialization* appear to decrease when moving from a polyarchical to a hierarchical TMT (corr. = -0.318 and -0.222, respectively). *TMT functional specialization* and *TMT delegation of decision authority* (corr. = 0.601), which are positively correlated, increase instead with the increase in *TMT size* (corr. = 0.706 and 0.410, respectively).

------- Insert here Tables 7, 8 and 9 -------

In Table 7 we show the average levels of *TMT size*, *TMT functional specialization*, and *TMT delegation of decision authority* at the two levels of the variable *TMT hierarchical structure*. In so doing, we also present t-test of the difference in these average levers between hierarchical and polyarchical TMTs. What emerges from the data is that hierarchical TMTs are significantly smaller than polyarchical ones (p-value = 0.000) and have a significantly lower level of functional specialization (p-value = 0.000); no statistical differences emerged instead analyzing *TMT delegation of decision authority*. The latter does not significantly vary also when comparing alternative levels of *TMT size* (Table 8). There are instead significant differences in the *TMT functional specialization* (Table 9) when increasing the TMT from 2 to 3 members (p-value = 0); while not

significant, the functional specialization increases with the increase in the size of the TMT. Finally, analyzing together delegation and functional specialization, it emerges that the former increases the more the TMT is specialized; however, *TMT delegation of decision authority* is significantly different only comparing TMTs with a functional specialization lower than 3 and comprised between 3 and 6.

4.2. Organizational design configurations

Once provided a picture of the TMT organization considering the single organizational design elements separately, we followed suggestions from the literature (e.g., Ennen & Richter, 2010) and we investigated whether organizational configuration exists in EVs. Cluster analysis provided support for the presence of three well-characterized clusters, which correspond to three alternative organizational configurations of *TMT hierarchical structure*, *TMT size*, *TMT functional specialization*, and *TMT delegation of decision authority*.

------- Insert here Table 10 -------

For each of the four organizational design variables included in the analysis, Table 10 shows the mean of the overall sample and the cluster means. To make the interpretation easier, we report non-standardized values (which we instead used in the analysis – see above). Table 10 also reports the p-value of the ANOVA tests; these tests show that the means of all the variables are significantly different among clusters at 99%. Following Gruber et al. (2010) and based on the results of the Scheffe post hoc tests, we indicated for each variable the existing significant differences among clusters. Specifically, the same superscript label indicates that the mean of the variable does not significantly differ among clusters. The highest mean is labeled with "a", the next highest mean with "b", and the lowest mean with "c". Table 11 reports a description of the three clusters. Based on their characteristics, we named the three organizational configurations: *collaborative TMT*, *centric TMT*, and *professional TMT*.

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The following Figure 1 offers instead a visual representation of the three organizational configurations, which helps understanding their characteristics and differences.

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The *collaborative TMT* configuration is characterized by a large, polyarchical team. Indeed, *TMT hierarchical structure* is lower and statistically different from both the *centric TMT* and the *professional TMT* (p-value = 0.000 and 0.000, respectively), which instead do not differ with respect to this organizational design

element (p-value = 0.132). Similarly, this type of configuration is as large as the *professional TMT* one (p-value = 0.199), but statistically larger than the *centric TMT* (p-value = 0.000). The polyarchical structure of this configuration pairs with an average level of *TMT functional specialization* and *TMT delegation of decision authority*, which are both statistically different among configurations at 99% level of significance. This means that the TMT is formed by a large number of members who are specialized in the functional area under their responsibility and who collaborate in making strategic decision. This is the reason why we named this configuration as *collaborative TMT*.

The other two configurations are instead at the opposite extremes of both the two latter organizational design elements. The lowest level of *TMT functional specialization* and *TMT delegation of decision authority* characterized the so-called *centric TMT*. In this configuration it is possible to identify a CEO leading the TMT (i.e., high *TMT hierarchical structure*), who supervises a limited number of TMT members (i.e., small *TMT size*). These TMT members have a low functional specialization and a limited amount of decision authority over strategic decisions, which are instead centralized in the hands of the CEO. For these reasons, we called this configuration *centric TMT*.

Also the third configuration presents a hierarchical structure. However, the TMT adopting this configuration is larger than the *centric TMT*, and its *TMT size* is comparable to those of the *collaborative TMT*. While in the *centric TMT* decisions are made autonomously by the CEO, this configuration mimics the one of professional, established firms in that the CEO decides to lever on the knowledge that is distributed among TMT members, who are functionally specialized, and provide them a high degree of decision authority. We thus called this configuration as *professional TMT*.

Relating these three organizational configurations to the contingency factors considered above, chi-tests revealed statistical differences in the distribution with respect to *EV size* (p-value = 0.032) and *EV geographical location* (p-value = 0.014). Specifically, the majority of *centric TMT* configurations (65.56%) are adopted by small EVs, while *collaborative TMT* and *professional TMT* configurations are almost equally distributed between small and large EVs: the 56.10% of *collaborative TMT* are in small EVs, while the 54.22% of *professional TMT* are in large EVs. Considering small and large EVs separately, the majority of *small EVs* adopts the *centric TMT* (41.26%), while the majority of large EVs the *professional TMT* configuration (40.18%). About geographical location, while in the North of Italy EVs are equally distributed among the three

types of configurations, both in the Center and in the South we observed a prevalence of the *centric TMT* configuration (66.67% and 79.92%, respectively), while the *collaborative TMT* configuration is almost absent (0.00% and 7.69%, respectively).

5. CONCLUSIONS

There is a large and increasing interest in the literature towards the organizational design of EVs, which is seen as key for achieving better performance. Nevertheless, this literature is based on little data and EVs' organization still remains an ambiguous concept. A robust quantitative empirical evidence on how EVs organize is indeed lacking.

In this paper, we offered a first, empirical, look at EVs' organizational design, by focusing on how their TMTs are organized. Analyzing a database of 255 Italian EVs, we provided a picture of their TMT's organization by considering four important organizational elements: the hierarchical vs. polyarchical structure of the TMT, its size, the functional specialization of its member, and the extent to which strategic decisions are delegated among them (e.g., Burton et al., 2006; Child, 1972; Daft, 2010; Galbraith, 1973; Jones, 2010; Mintzberg, 1993). First, we described these organizational elements by considering the sample on average and comparing EVs depending on four contingency factors: EV's size, age, industry, and geographical location. Results demonstrated that on average EVs in the sample have hierarchical and small TMTs, with low functionally specialized members who typically need the approval of the CEO or of the group of entrepreneurs leading the TMT for the decision they make. Differences in TMT's organization exist comparing EVs on size and geographical location. Specifically, larger EVs have larger TMTs, the members of which are more functionally specialized and receive greater decision authority over strategic decisions. Moreover, EVs located in the North of Italy have more frequently hierarchical TMTs, smaller, less functionally specialized, and with a greater centralization of decision authority. We also observed variations in organizational design elements with respect to each other. At a first sight, hierarchical TMTs are significantly smaller than polyarchical ones, functional specialization increase with TMT's size, when this size is limited, as well as delegation of decision authority increases with specialization, when the latter is lower than a certain threshold (i.e., 6). We then went deeper in the analysis by adopting a cluster analysis in search for organizational configurations. It is indeed established in the organizational design literature that to understand the whole organization it is necessary to

consider all organizational elements jointly, thus taking into account their interdependencies and complementarities (Ennen & Richter, 2010; Thompson, 1967). Our exploratory cluster analysis revealed the presence of three well-characterized organizational configurations: *collaborative TMT*, *centric TMT*, and *professional TMT*. The *collaborative TMT* configuration is characterized by small, polyarchic TMTs, where members have an average level of functional specialization and delegation of decision authority, in the sense that they collaborate and work together to make strategic decisions. The *centric TMT* configuration instead presents a CEO that leads a small team of individuals, with a low functional specialization and delegation of decision authority; in this type of configuration, the CEO centralizes the authority in her/his hands and makes strategic decisions autonomously. Finally, the *professional TMT* configuration is the one that better mimics the one of established firms. Indeed, in these large TMTs there is a hierarchical structure, in which TMT members are highly functionally specialized and their specific knowledge is exploited by the CEO who allocated decision authority to them. In line with theory (e.g., Harris & Raviv, 2005; Jensen & Meckling, 1992), in this way each strategic decision is made by those that possess greater knowledge (i.e., the functionally specialized managers). This configuration appears consistent with prior literature on the topic, which has well documented that properly allocating decision authority allows firms to make better quality and timely decisions (Grant, 1996; Jensen & Meckling, 1992), improve firm efficiency (Harris & Raviv, 2005) and ultimately enhance their performance (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989; Lin & Germain, 2003). The delegation of decision authority may also allow these EVs to use in an efficient way the knowledge that is distributed in the firm (Jensen & Meckling, 1992). As a consequence, decisions may be made more quickly, since different organization members have the possibility to decide at the same time but independently, avoiding the leaks (Keren & Levhari, 1979, 1983, 1989) and delays (Radner, 1993; Van Zandt, 1999) in transmitting information throughout the firm that are instead typical of centralization.

We are confident that the results presented in this paper shed new light into the organization of EVs. Specifically, they are the first step towards the full understanding of the antecedents and consequences of the organization of EVs' TMTs. Researchers may thus exploit the measures we presented and the organizational configurations we identified to further develop the literature on EVs. Much of what is known about the internal organization of firms is based on the study of large established organizations. Only a handful of studies have gone to the core of the constitutive elements of the internal organization in these firms, such as the emergence

of hierarchy (Colombo & Grilli, 2013) or functional specialization (Sine et al., 2006). This paper highlights an interesting variety among EVs' organization and suggests important deviations from a standard evolutionary path. Moving from this result, we suggest scholars two possible directions that we think may be fruitful for future research. On one hand, researches may explore the factors that determine how an EV's TMT decides to organize – i.e., their antecedents, motivations, and processes. Several factors may play a role: entrepreneur(s)' individual characteristics (e.g., gender, age, personality traits, education, previous work experiences), institutional aspects related to the location of the EV or to the University in which the entrepreneur(s) studied, and the presence of external equity investors. On other hand, it would be interesting to investigate the consequences of the organizational configuration adopted. For instance, our results on the organizational configurations may inspire future research aiming at testing whether a configuration rather than another is associated to better EVs' performance. Similarly, EVs' configuration may be linked to the attraction of talents or to the acquisition of other key resources. Among these, the attraction of external financing appears as a particularly interesting avenue for further research. Scholars may investigate whether some of the organizational configurations we highlighted are more legitimated in the eyes of external investors, thus allowing EVs to obtain financing.

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TABLES

Table 1. List of strategic decisions considered in the analysis

N.	Strategic decision
1	Developing innovative products and services
2	Introducing significant changes in products and/or services
3	Introducing major changes in marketing activities
4	Entry or exit decisions from markets
5	Opening of new product lines
6	Major price decisions
7	Radical changes in organizational processes and procedures
8	Significant changes in the organizational structure
9	Strategic alliances/partnership with other firms or organizations (acquisitions and joint venture are not included)
10	Major business investments (e.g., acquisitions, joint ventures, creation of new firms, opening new plants, creation of new infrastructures)
11	Hiring and firing
12	Promotions, salaries and incentives for the employees
13	Design of management control systems (e.g., planning, budgeting, controlling)
14	Relations with external equity investors (e.g., Business Angels, Venture Capitalists)
15	Opening/closing of relations with financial institutions
16	Strategic decisions about purchases (e.g., major supplier selection)
17	Strategic decisions about production insourcing/outsourcing
18	Expansion of production capability, expansion and modernization of production equipment and plants

Table 2. Means and tests of organizational design elements by EV size

	Sample mean	Small EV (n = 143)	Large EV (n = 112)	t-test p-value
TMT hierarchical structure	0.6314	0.6224	0.6429	0.7378
TMT size	2.3294	2.1818	2.5179	0.0373
TMT functional specialization	3.5031	3.2083	3.8795	0.0164
TMT delegation of decision authority	1.4189	1.3302	1.5321	0.0005

Table 3. Means and tests of organizational design elements by EV age

	Sample mean	1 yr (n = 39)	2 yr ≤ age ≤ 5 yr (n = 131)	6 yr ≤ age≤9 yr (n = 80)	10 yr (n = 5)	ANOVA p-value
TMT hierarchical structure	0.6314	0.6410	0.6107	0.6500	0.8000	0.8073
TMT size	2.3294	2.5897	2.2748	2.3125	2.0000	0.5352
TMT functional specialization	3.5031	3.8387	3.4669	3.3800	3.8020	0.7408
TMT delegation of decision authority	1.4189	1.4401	1.3963	1.4493	1.3579	0.8473

Table 4. Means and tests of organizational design elements by EV industry

	Sample mean	Services (n = 193)	Manufacture (n = 36)	Constructions (n = 26)	ANOVA p-value
TMT hierarchical structure	0.6314	0.6166	0.7500	0.5769	0.2629
TMT size	2.3294	2.3886	2.1944	2.0769	0.4033
TMT functional specialization	3.5031	3.5590	3.4161	3.2085	0.7297
TMT delegation of decision authority	1.4189	1.4223	1.3768	1.4514	0.8075

Table 5. Means and tests of organizational design elements by EV geographical location

	Sample mean	North (n = 239)	Center (n = 3)	South (n = 13)	ANOVA p-value
TMT hierarchical structure	0.6314	0.6192[b]	0.3333[a,b]	0.9231[a]	0.0486
TMT size	2.3294	2.3806[a]	2.0000[a,b]	1.4615[b]	0.0371
TMT functional specialization	3.5031	3.5926[a]	3.0000[a,b]	1.9738[b]	0.0345
TMT delegation of decision authority	1.4189	1.4368[a]	1.1961[a,b]	1.1397[b]	0.0568

In the table, means with the same superscript label are not statistically different basing on the Scheffe post-hoc test. The label "a" represents the highest value and "b" the lowest value.

Table 6. Descriptive statistics and correlations among organizational design variables

		Mean	S.D.	(1)	(2)	(3)	(4)
(1)	TMT hierarchical structure	0.6314	0.4834	1.0000			
(2)	TMT size	2.3294	1.2803	-0.3177 (0.0001)	1.0000		
(3)	TMT functional specialization	3.5031	2.2220	-0.2222 (0.0003)	0.7060 (0.0000)	1.0000	
(4)	TMT delegation of decision authority	1.4189	0.4656	-0.0237 (0.7069)	0.4103 (0.0000)	0.6014 (0.0000)	1.0000

For correlations between the dummy variable (*TMT functional specialization*) and the other continuous variables we used Point-Biserial correlations, while between continuous variables we used Pearson's correlations.
P-values in parentheses.

Table 7. TMT hierarchical structure and distribution of TMT size, TMT functional specialization, and TMT delegation of decision authority

TMT hierarchical structure	Number of observations	%	Average TMT size	t-test[a] p-value	Average TMT functional specialization	t-test[b] p-value	Average TMT delegation of decision authority	t-test[c] p-value
0	64	36.86	2.8617	-	4.1493	-	1.4333	-
1	161	63.14	2.0186	0.0000	3.1258	0.0003	1.4104	0.7063
Total	225	100.00	2.3294	-	3.5031	-	1.4189	-

[a] H_0: $TMT\ size_0 = TMT\ size_1$, with *TMT size* being the average number of TMT members in correspondence of a polyarchical (0) or a hierarchical (1) or TMT structure.
[b] H_0: $TMT\ functional\ specialization_0 = TMT\ functional\ specialization_1$, with *TMT functional specialization* being the average level of functional specialization of TMT members in correspondence of a polyarchical (0) or a hierarchical (1) or TMT structure.
[c] H_0: $TMT\ delegation\ of\ decision\ authority_0 = TMT\ delegation\ of\ decision\ authority_1$, with *TMT delegation of decision authority* being the average level of delegation of decision authority within the TMT in correspondence of a polyarchical (0) or a hierarchical (1) or TMT structure.

Table 8. TMT size and distribution of TMT functional specialization and TMT delegation of decision authority

TMT size	Number of observations	%	Average TMT functional specialization	t-test[a] p-value	Average TMT delegation of decision authority	t-test[b] p-value
1	80	31.37	1.0000	-	1	-
2	75	29.41	3.7289	0.0000	1.5870	0.0000
3	62	24.31	5.2265	0.0000	1.6709	0.2897
4	19	7.45	5.6711	0.1986	1.5517	0.2858
5	14	5.49	5.5857	0.8995	1.6514	0.4733
≥ 6	5	1.96	4.7260	0.5197	1.3165	0.1398
Total	255	100.00	3.5031	-	1.4189	-

[a] H_0: *TMT functional specialization*$_j$ = *TMT functional specialization*$_{j-1}$, j = 2, 3, 4, 5, ≥ 6, with *TMT functional specialization* being the average level of functional specialization of TMT members in correspondence of a TMT with a j number of members.

[b] H_0: *TMT delegation of decision authority*$_j$ = *TMT delegation of decision authority*$_{j-1}$, j = 2, 3, 4, 5, ≥ 6, with *TMT delegation of decision authority* being the average level of delegation of decision authority within the TMT in correspondence of a TMT with a j number of members.

Table 9. TMT functional specialization and distribution of TMT delegation of decision authority

TMT specialization	Number of observations	%	Average TMT delegation of decision authority	t-test[a] p-value
≤ 3	115	45.10	1.1219	-
3 < x ≤ 6	107	41.96	1.6517	0.0000
> 6	33	12.94	1.6984	0.5860
Total	255	100.00	1.1489	-

[a] H_0: *TMT delegation of decision authority*$_j$ = *TMT delegation of decision authority*$_{j-1}$, j = ≤ 3, 3 < x ≤ 6, > 6, with *TMT delegation of decision authority* being the average level of delegation of decision authority within the TMT in correspondence of a TMT with a j level of functional specialization.

Table 10. Result of the cluster analysis

Organizational design elements	Sample mean	**1** (n = 82) ***Collaborative TMT***	**2** (n = 90) ***Centric TMT***	**3** (n = 83) ***Professional TMT***	ANOVA p-value
TMT hierarchical structure	0.6314	0.2073[b]	0.8889[a]	0.7711[a]	0.0000
TMT size	2.3294	2.8659[a]	1.1111[b]	3.1205[a]	0.0000
TMT functional specialization	3.5031	4.3160[b]	1.0278[c]	5.3841[a]	0.0000
TMT delegation of decision authority	1.4189	1.3113[b]	1.0076[c]	1.9710[a]	0.0000

In the table, cluster means are reported. In each row, cluster means with the same superscript label are not statistically different basing on the Scheffe post-hoc test. The label "a" represents the highest value, "b" the middle level, and "c" the lowest value.

Table 11. Verbal cluster description

Organizational design elements	**1** (n = 82) ***Collaborative TMT***	**2** (n = 90) ***Centric TMT***	**3** (n = 83) ***Professional TMT***
TMT hierarchical structure	POLYARCHICAL	HIERARCHICAL	HIERARCHICAL
TMT size	LARGE	SMALL	LARGE
TMT functional specialization	MEDIUM	LOW	HIGH
TMT delegation of decision authority	MEDIUM	LOW	HIGH

FIGURE

Figure 1. Visual representation of the three organizational configurations