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Tertiarization & sustainability new challenges for management in the digital era

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Short Papers

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Tertiarization & sustainability. New challenges for management in the digital era

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Short Papers

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To the reader,

this volume contains the short papers of the Sinergie-SIMA 2025 Management Conference, hosted by the University of Genova on June 12th and 13th 2025.

Tertiarization is one of the most salient profiles of the structural change and economic development that have characterized the recent decades (Jorgenson & Timmer, 2011). The growth of the service industry affects multiple sectors, e.g. wholesaling/retailing, tourism/hospitality, transport and logistics, health services, public administration, education, communication, banking and financial services, and B2B services (Baines *et al.*, 2017; Barrett *et al.*, 2015).

This growing relevance of services in the economy and the society has stimulated a broader interdisciplinary debate, e.g., the impact of tertiarization on the performance of the entire economic system, the innovation and digitalization of services, and the applicability of service management issues for the transformation of product-based business models.

Based on these premises, the 2025 Sinergie-SIMA Conference aims to explore the role of services as part of the evolution of society in terms of relevance, growth, competitiveness, innovation, but also sustainability and well-being. The lens of analysis used to explore this phenomenon will be digitalization, as it is shaping service innovation in more traditional sectors (e.g., social and sanitary services, tourism, retailing, etc.) and it is boosting knowledge-intensive business services (KIBS). Thus, digitalization is a key driver of the business model transformation, facilitating the transition of manufacturing firms towards digital servitization, enabling a new automation frontier (Frank *et al.*, 2019; Kastalli & Van Looy, 2013; Liu *et al.*, 2024), and paving the way for new opportunities for value creation within the global economy (Ostrom *et al.*, 2015).

The application of digital technologies to services (e.g., Artificial Intelligence, Big Data Analytics, Internet of Things, Machine Learning, Additive Manufacturing, Virtual Reality, Augmented Reality, Metaverse) also facilitates the pursuit of relevant environmental and social issues, for example contributing significantly to the achievement of greater systemic efficiency that help attain the Sustainable Development Goals (SDGs) and circular economy (Xing & Liu, 2023). Leveraging advanced technologies enables the extraction of valuable insights from vast amounts of information, facilitating informed decision-making, personalized service offerings, optimizing service delivery processes, and enhanced customer experiences (Chauhan *et al.*, 2022). Big data plays a strategic role in developing novel solutions that address evolving societal challenges, while driving sustainable growth and innovativeness in the digital era (Cappa *et al.*, 2022; Ciampi *et al.*, 2021; Mikalef *et al.*, 2019). Therefore, the real challenge today is to harness the application of digitalization to enhance the service-oriented approach and empower companies' economic, social, and environmental performances, generating and consolidating greater trust and loyalty among their employees, customers, and suppliers for a more sustainable, inclusive, and better society (Shaukat *et al.*, 2016).

AIDEA devoted a Conference to the tertiarization and new challenges for management and governance 25 years ago in Genoa, and many scholars focused on these topics from multiple perspectives and with original approaches.

The 2025 Sinergie-SIMA Genoa Conference, in continuity with the past, is an excellent opportunity to discuss our community's research efforts in the service economy and management, in order to identify new effective solutions suitable to face the current digital era. Different theories, methodological approaches, and units of analysis are required to generate scientific research impacting theories but also outlining wide-ranging strategies that can offer valuable insights to business leaders, companies, and institutions. More precisely, the Conference was a great occasion to discuss the research efforts of our research community within tracks related to the:

- Conference theme (Tertiarization & sustainability. New challenges for management in the digital era),
- SIMA thematic groups (Artificial intelligence in management, Entrepreneurship, Innovation & Technology Management, International Business, Marketing, Purpose-driven Businesses,

Retailing & Service Management, Small & Family Business, Strategic Communication, Strategy & Governance, Supply Chain Management, Logistics & Operations, Sustainability, and Tourism & Culture Management),

- Management Case Studies.

The Conference call for papers gave the opportunity to submit either short and long papers. Overall, the editorial staff received 311 submissions of which 263 short papers and 49 long papers.

For the *short and long papers*, the evaluation followed the peer review process, with a double-blind review performed by, respectively, one and two referees - university lecturers and experts about the topic - selected among SIMA and the community of Sinergie members.

In detail, the referees applied the following criteria to evaluate the submissions:

- clarity of the research aims,
- accuracy of the methodological approach,
- contribution in terms of originality/innovativeness,
- theoretical and practical contribution,
- clarity of communication,
- significance of the bibliographical basis.

The *peer review* process resulted in full acceptance or rejection of the submissions. In the case of disagreement among reviewers' evaluations, the decision was taken by the Chairs of the SIMA thematic groups or conference track. Each work was then sent back to the Authors together with the referees' reports. The suggestions received by the referees were used by the Authors during the presentation of their research works at the Conference.

The evaluation process ended with the acceptance of 293 papers (249 short papers and 44 long papers). This volume proposes the short papers whose Authors have authorized their publication.

All the short papers published in this volume were presented and discussed during the Conference and published online on the web portal of Sinergie-SIMA Management Conference (<https://www.sijmsima.it/>).

While thanking all the Authors, Chairs, and participants, we hope that this volume will contribute to advancing knowledge about tertiarization and sustainability in management.

The Conference Chairs

Lara Penco, Arabella Mocciano Li Destri, and Marta Ugolini

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Track 2
Entrepreneurship

Learning and experimentation throughout the pre-entry phase of the entrepreneurial processes

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Abstract

This preliminary study investigates the pre-market-entry phase of entrepreneurship, exploring how team size and composition, in particular the heterogeneity of team members' work experience and field of education, are associated with the gestation activities performed by entrepreneurial teams. We measure these activities by the number of steps teams undertake to validate their entrepreneurial ideas. Analyzing participants' data collected from the application forms of three different editions of an Italian startup business plan competition, we examine the relationship between these steps and team heterogeneity. We also examine how the interaction between team size and heterogeneity correlates with the number of steps. The findings suggest that larger teams with higher diversity in their educational backgrounds engage in more entrepreneurial steps, while work experience is weakly associated with entrepreneurial steps. These insights contribute to research on entrepreneurial learning and team dynamics, highlighting the importance of a detailed examination of how team characteristics shape entrepreneurs' actions during the initial stages of the venture-building process.

Framing of the research. *The wide variation in firms' performance, even within the same sectors, has long puzzled scholars who have focused on the gestational period of new ventures in search for the origin of the key factors of performance. To explain performance heterogeneity, researchers have explored various possible causes, including firms' initial resource endowments (Barney, 1986), the behavioral and cognitive limitations of decision-makers (Gavetti, 2012; Simon, 1979), and the role of uncertainty and expectations in shaping entrepreneurial actions (Camuffo et al., 2024; Felin & Zenger, 2017; Zellweger & Zenger, 2023).*

Recent research highlights that startup survival and performance are primarily “determined by ex-ante heterogeneity rather than persistent ex post shocks” (Sterk et al., 2021, p. 547). Beyond market opportunities and resource endowments, these initial differences largely stem from founders' actions before firm incorporation and market entry (Bennett & Chatterji, 2023; Chen et al., 2018). These actions pertain to specific stages of entrepreneurial endeavors: initiation (e.g., opportunity recognition, intention, entry, and team formation) and engagement (e.g., organizing and learning) (Shepherd et al., 2019). The collection of actions undertaken during this pre-market phase, known as gestation activities (Arenius et al., 2017; Reynolds, 1997), constitute the gestation process (Carter et al., 1996; Hopp & Sonderegger, 2015; Lichtenstein et al., 2007) and can be categorized based on their intended aim or effect (Bennett & Chatterji, 2023; Reynolds, 2006; Reynolds & Curtin, 2008). Some of these actions portray a learning process, that is, an iterative experimental approach to validating the expected profitability of the business idea through practical steps, such as developing business plans, participating in competitions, creating prototypes, gathering customer feedback, and seeking funding. The extent and duration of this validation process are influenced by various factors, including the characteristics of prospective entrepreneurs-e.g., employment status, industry experience, prior entrepreneurial experience, and psychological traits like confidence (Bennett & Chatterji, 2023; Camerer & Lovallo, 1999; Chen et al., 2018; Li et al., 2023; Roelandt et al., 2023).

While prior research has significantly contributed to our understanding of early-stage entrepreneurial activity, we still lack a comprehensive theory that connects the antecedents of the entrepreneurial steps undertaken to validate a business idea (e.g., characteristics of the entrepreneurial team or their resources) with the number and type of entrepreneurial steps (e.g., pivoting, termination of the project, or performance of survived projects) and the consequences of such steps. Indeed, extant research has primarily examined “what” entrepreneurs do, often considering specific activities (e.g., developing a business plan) in isolation rather than adopting a holistic perspective (Müller et al., 2023). The absence of a unifying theoretical framework is underscored by the plethora of different approaches used to identify and categorize entrepreneurial activities (Bennett and Chatterji, 2023; Li et al., 2023; Roelandt et al., 2023).

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To address the limitations highlighted above, this study aims to explore the process through which prospective entrepreneurs learn about the market potential of their business ideas. Specifically, we investigate how team-level characteristics, rather than just individual traits, shape the learning process. Building on research on the effects of team-level heterogeneity on post-entry performance (Bantel & Jackson, 1989; Carpenter, 2002; Hambrick et al., 1996), we propose that team-level heterogeneity is also a significant factor during the gestation phase of entrepreneurial projects.

Purpose of the paper. Within the three-phase business creation process proposed by Reynolds (2016), we examine how the ex-ante characteristics of the entrepreneurial team relate to the entrepreneurial steps they undertake in both the active nascent and business creation phases, which comprise all activities done before (or close to) incorporation like hiring the first employee or performing the first sale, and that ultimately influence post-entry performance. Specifically, we explore the relationship between the number of entrepreneurial steps and the following team-level characteristics: (1) team size, (2) the educational diversity of team members, and (3) the work experience diversity of team members. Although variables related to team composition have been extensively researched in the past (Williams & O'Reilly, III, 1998), the focus of earlier studies has been mainly on how those characteristics shape performance (Carpenter, 2002; Guzzo & Dickson, 1996; Jin et al., 2017; Naranjo-Gil et al., 2008; Wang et al., 2017), while rarely focusing on how team characteristics affect what the team does. Meanwhile, the literature concerning the gestation activities performed in the pre-entry phase primarily focuses on the individual entrepreneur (Bennett & Chatterji, 2023) rather than the team. Therefore, this study aims to bridge this gap by examining the role of team characteristics in pre-entry gestation activities.

Methodology. Much research on entrepreneurial behaviors and actions utilized archival data from the PSED dataset (Müller et al., 2023). PSED-based studies cover nascent activities such as the development of a business plan, the creation of a prototype, the identification of competitors and target markets as well as the formal market entry (Delmar & Shane, 2003; Hopp & Sonderegger, 2015; Kim et al., 2015; Liao et al., 2005; Menzies et al., 2006). These studies concentrate on the overall population of nascent entrepreneurs, which implies a high heterogeneity at the individual level.

Data used in this study were collected from the application forms filed by entrepreneurial teams that took part in StartCup Lombardia, a prominent business plan competition taking place in Italy. This competition attracts early-stage entrepreneurial teams, including those with startups less than one year old, with at least one member affiliated with a Lombardy university. The data covers the period 2022-2024 and comprises 329 projects and 1129 participants. The use of data on entrepreneurial teams related to academic research allows us to answer the call to investigate the entrepreneurial process in more homogeneous settings (Bennett and Chatterji, 2023).

Table 1 presents descriptive statistics for our study variables. At the individual level (upper part of Table 1), the variable WORK EXPERIENCE indicates that team members have 8.6 years of overall work experience on average. Moreover, the median value computed for this variable, 5 years, suggests that team members are still inexperienced professionals. We use a set of binary variables to categorize the field of education of participants (e.g., EDUCATION_ENGINEERING, EDUCATION_BUSINESS). In our context, 71.3% of the participants specialize in a STEM discipline, with 40.0% of team members earning a title in Engineering. We also find that 22.0% of individuals were trained in a business-related discipline. This piece of evidence suggests that while a background in STEM disciplines may be necessary to identify entrepreneurial ideas in science or technology-based fields, the availability of managerial competencies in the founding team is important to translate those ideas into an actual startup.

The lower part of Table 1 displays descriptive statistics for team-level variables. We start by considering ENTREPRENEURIAL STEPS, a variable that counts the total number of gestational activities carried out by each team. To construct this variable, we exploited the unstructured data we retrieved from the application forms and the attached documents (presentation decks, resumes, and official documents from the chamber of commerce). To analyze the applications, four independent reviewers extracted text from various fields (e.g., project description, product or solution description, target customers/market, and competitors). These reviewers then analyzed and codified the extracted text to identify the entrepreneurial steps each team undertook before applying to the competition. The set of entrepreneurial steps, adapted from Bennett and Chatterji's (2023) taxonomy, includes 18 distinct actions that can be grouped into the following categories: i) Explicitly identifying the startup's direct and/or indirect competitors; ii) Contacting an external partner with relevant industry experience; iii) Building a prototype or pilot project; iv) Reaching out to potential customers for the product/service being offered; v) Securing funding from non-professional investors. Descriptive statistics for ENTREPRENEURIAL STEPS indicate that teams in our sample carried out an average number of 6.62 steps with a standard deviation of 3.56. The top 10 percent of teams in our sample carried out 11 or more steps.

Tab. 1: Descriptive statistics

	Observations	Mean	Median	Std. Dev.	Minimum	Maximus
<i>Individual level</i>						
WORK EXPERIENCE	1129	8.569	5.000	9.116	0.000	50.000
EDUCATION_BUSINESS	1129	0.220	0	0.414	0	1
EDUCATION_ENGINEERING	1129	0.400	0	0.490	0	1
EDUCATION_LAW	1129	0.019	0	0.135	0	1
EDUCATION_LITERARY STUDIES	1129	0.049	0	0.215	0	1
EDUCATION_MATHEMATICS	1129	0.019	0	0.138	0	1
EDUCATION_SCIENCE	1129	0.159	0	0.365	0	1
EDUCATION_TECHNOLOGY	1129	0.135	0	0.341	0	1
<i>Team level</i>						
ENTREPRENEURIAL STEPS	329	6.620	6	3.559	0	16
TEAM SIZE	329	3.432	3.000	1.748	1	10
TEAM SIZE_CATEGORY	329	0.416	0.000	0.494	0	1
DIVERSITY_WORK EXPERIENCE	329	0.509	0.445	0.469	0.000	2.828
WORK EXPERIENCE_HETEROGENEITY	329	0.495	0	0.501	0	1
DIVERSITY_EDUCATION	329	0.317	0.444	0.270	0.000	0.800
EDUCATION_HETEROGENEITY	329	0.398	0	0.490	0	1

As for the factors associated with the number of entrepreneurial steps undertaken by each group, we focused on the following three antecedents. We considered the number of individuals involved in each group to construct the variable *TEAM SIZE*. Descriptive statistics for this variable show that the average team comprises 3.43 people with a standard deviation of 1.75 and a median equal to 3. Starting from this variable, we constructed a two-category variable, *TEAM SIZE CATEGORY* which takes on the value 0 (i.e., small team) if the number of team members is lower or equal to the sample median for the variable *TEAM SIZE*, and the value 1 (i.e., large team) for observations with a value greater than the median.

The construction of the second variable, *WORK EXPERIENCE HETEROGENEITY*, builds on data referring to the variable *DIVERSITY WORK EXPERIENCE*. This latter variable was calculated with the coefficient of variation ($CV = \frac{\sigma}{\mu}$) using the data from *WORK EXPERIENCE* consolidated at the team level using the relative averages (μ) and standard deviations (σ). The average CV is 0.51—meaning that, on average, the standard deviation of *DIVERSITY WORK EXPERIENCE* is around half the average of the work experience, while the overall standard deviation of the same variable is 0.47. Using the median of the CV (0.45) as a reference point, we construct the binary variable *WORK EXPERIENCE HETEROGENEITY*, which is used to cluster teams into two groups. *WORK EXPERIENCE HETEROGENEITY* is equal to 0 for teams with a computed CV lower or equal to the median (more homogeneous in terms of experience). *WORK EXPERIENCE HETEROGENEITY* is equal to 1 for teams with a coefficient higher than the median (more heterogeneity).

EDUCATION HETEROGENEITY, our third variable, derives from *DIVERSITY EDUCATION*, which is calculated with the Gini-Simpson's index of diversity ($Diversity\ Education_i = 1 - \sum_{i=1}^R f_i^2$), where $(f)_i$ are the frequencies of the i -th education field among the seven *EDUCATION* variables. *DIVERSITY EDUCATION* has an average value of 0.32, a standard deviation of 0.27, and a median of 0.44. Moreover, almost 62% of the projects have a value of *DIVERSITY EDUCATION* below 0.5. *EDUCATION HETEROGENEITY* is equal to 1 for values of *DIVERSITY EDUCATION* above 0.44, the sample median (heterogeneous teams) and is equal to 0 for values below the median (homogeneous teams).

Results. To illustrate our preliminary results we report two boxplots: one refers to the relationship between *ENTREPRENEURIAL STEPS* and *WORK EXPERIENCE HETEROGENEITY* (Figure 1), and the other the association between *ENTREPRENEURIAL STEPS* and the interaction between *TEAM SIZE CATEGORY* and *EDUCATION HETEROGENEITY* (Figure 2). In the figures, the boxes describe the interquartile range (hereafter, *IQR*, or the range between the third and the first quartiles), while the upper (lower) bound of the “whiskers” is calculated by taking the largest value of the dataset within 1.5 times the value of the *IQR* above the third quartile (below the first quartile). The horizontal line is the median, while the cross is the mean. Any dot outside the whiskers are “outliers”, i.e., observations with a value of more (less) than the upper (lower) bound.

Fig. 1: Number of entrepreneurial steps by work experience

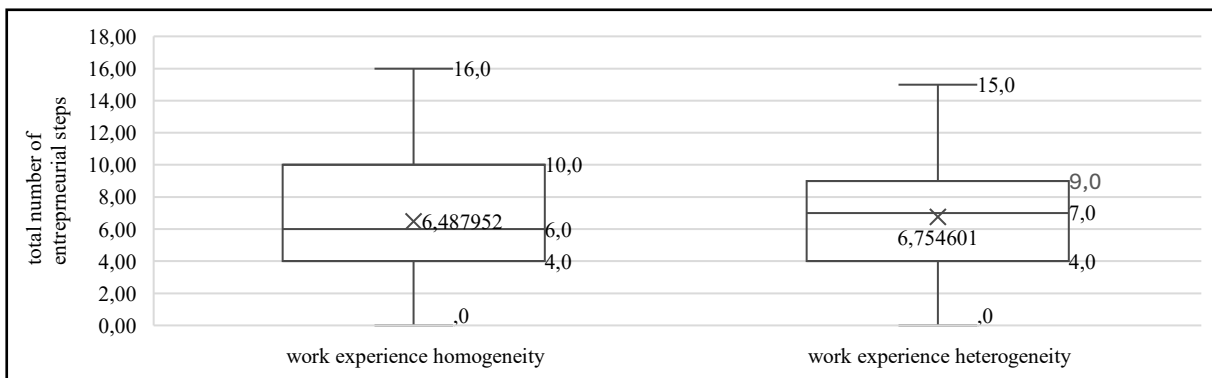
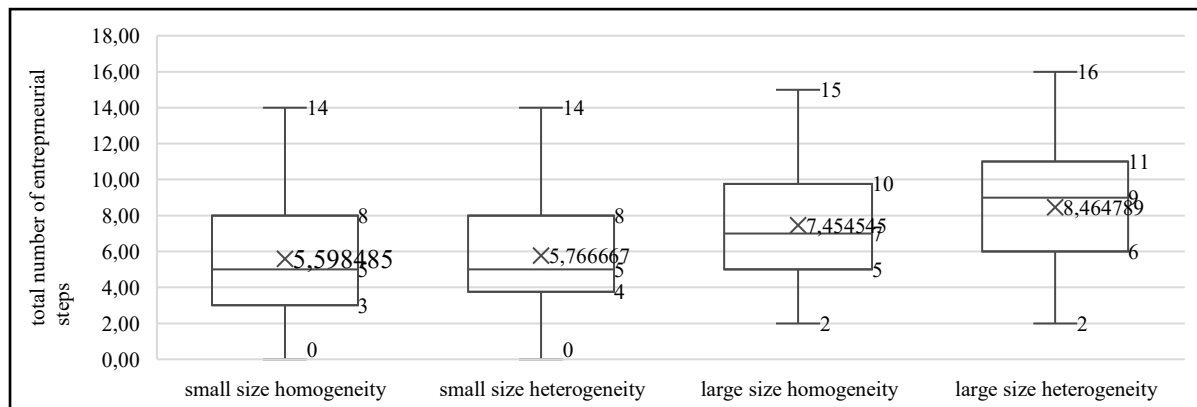


Fig. 2: Number of entrepreneurial steps by team size and field of education



Work experience heterogeneity (Figure 1) is weakly correlated with the average number of steps undertaken by the teams (from 6.49 to 6.76). Looking at the interaction between educational background heterogeneity and team size when considering the number of steps undertaken by the team (Figure 2), the boxplots show that, for larger teams, educational heterogeneity is associated with a unitary increase in the number of steps performed on average—from 7.46 of the homogeneous teams to 8.47 of the heterogeneous teams, an increase of 13.55%. Instead, in smaller teams, an increase in work experience heterogeneity is associated with a 3.02% increase in the average number of steps, from 5.60 to 5.77 steps. We also find that larger, homogeneous teams perform more steps on average compared with smaller, homogeneous teams, from 5.60 to 7.46 steps or a 33.17% increase. The difference between large and small teams is more marked among heterogeneous teams, from 5.77 to 8.47 steps on average or a 46.78% increase. Finally, larger teams always perform at least 2 steps, while some smaller teams (7.16% of teams) perform 1 or less steps.

Research limitations. Our research is not without limitations. First and foremost, our primary dataset relies on texts and data collected at the time the teams submitted their application to the business plan competition, which we did not oversee. This means that relevant information (such as the timing of steps) was often missing and thus could not be included in our analysis. Moreover, we had to code and interpret the steps undertaken by the entrepreneurial teams from self-reported texts. We tried to limit potential biases and errors in interpretation and coding of the data by assigning this line of work to multiple researchers and cross-checking the outcome of their tasks for (dis)agreements to converge on a common ground.

There might also be some questions about the context from which we draw our results. The competition was held in the Lombardy region, which is the most prominent Italian region in terms of startup activity, with more than a quarter of the total number of innovative startups (Unioncamere et al., 2024). Moreover, participation was limited to entrepreneurial teams with at least one member affiliated with a university based in the same region, which might limit the generalizability of our results to other startups that do not have connections with a university in the same region or other regions.

Another limitation is that we used general work experience instead of focusing on work experience specific to the economic sector of the entrepreneurial project, which might partially explain why we observe a limited correlation between *ENTREPRENEURIAL STEPS* and *WORK EXPERIENCE_{HETEROGENEITY}*. To mitigate this limitation, we are developing two other databases: one on team members' job experience and career, and the other on team members' education. Based on the resumes provided by applicants and their LinkedIn profiles we started to track the educational career of team members—relevant bachelor degrees, master degrees, and PhD degrees and the related institutions, while we are also collecting information about their professional experience by looking at the evolution of their career path, the position and job title, the employer type (if relevant), and the time spent on each position.

Once the dataset is integrated as reported above, we plan to undertake additional analyses that exploit more advanced statistical tools. On the one hand, we will carry out a cluster analysis on the entrepreneurial steps (i.e., administrative vs. learning steps) to identify recurrent patterns in the types of gestion activities performed by teams with specific characteristics. On the other hand, we will conduct a multivariate regression analysis to examine the association between the variables described in this paper, while controlling for individual traits of the team leader.

Managerial implications. Our preliminary results suggest that work experience heterogeneity does not translate significantly into more intense testing of the entrepreneurial idea measured by the number of steps carried out by the team. Educational heterogeneity is also weakly correlated with the number of steps. However, the difference between homogenous and heterogenous teams in terms of educational background is substantial in large teams. Thus, team size seems to be the primary driver of the number of steps and interacts with educational background heterogeneity. These findings have an interesting implication for nascent entrepreneurs as they highlight the benefits of taking on board more team members, preferably with a differentiated technical background. We should note that these results could be partly due to the limited average size of the sample projects; a small increase in the number of members in a small-sized team may significantly impact on the division of labor among team members and the ability to test their entrepreneurial idea on a larger scale.

Originality of the paper. We contribute to studies that view entrepreneurship as a process and explore how would-be entrepreneurs test the viability of entrepreneurial ideas before startup incorporation or around the time of market entry. More precisely, we provide two contributions. First, we provide further insights on entrepreneurial steps undertaken by future and nascent entrepreneurs by using an original source of information, which comprises a relatively more homogeneous set of individuals, that is, individuals with connections with academic research, as compared with previous studies. For instance, Bennett and Chatterji (2023) collect data on individuals from the general U.S. population; thus, they had to track entrepreneurial intention ex-post (for those who had yet to launch a startup). Instead, our research used data about entrepreneurial teams and individuals that applied for a business plan competition, which implies that they already manifested a clear motivation for entrepreneurship and, in some cases, had started a new firm. Second, we answer the call for more granular and detailed information about nascent entrepreneurial individuals (Bennett & Chatterji, 2023; Li et al., 2023; Roelandt et al., 2023). To the best of our knowledge, previous research mainly used the educational level of entrepreneurs without focusing on how different educational backgrounds impact the gestation process, i.e., the steps undertaken to test the quality of their business idea. Finally, we also address the call of Shepherd et al. (2019) for a deeper understanding of the role of teams' characteristics in entrepreneurial endeavor.

Key words: *Entrepreneurial steps; Team characteristics; Education background; Work experience; Business plan competition*

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