

# Entrepreneurship and new product development: Exploring the “advantage of youth” and “business acumen” views

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## Abstract

We explore the relevance of two different views on new product development (NPD) drivers, defined as “advantage of youth” and “business acumen.” The two arguments, that establish a negative relationship between an individual’s age and NPD and a positive impact of professional experience on NPD, are theoretically contextualized and empirically tested in the entrepreneurship domain. Considering a sample of more than 4000 Italian entrepreneurs of innovative start-ups, a series of econometric analyses confirm that both effects apply and reveal interesting nuances as to the relevance of the age effect and the relative importance of different dimensions of entrepreneurs’ business acumen on NPD. Further additional analyses highlight how both the “advantage of youth” and “business acumen” do not necessarily lead to successful entrepreneurial NPD, but at the same time, they both are found to importantly characterize top performers among entrepreneurs engaging in NPD. Overall, this in-depth analysis on entrepreneurial NPD and its drivers underlies the importance of a micro-founded and individual-based approach in the study of new product dynamics, and in doing so, it contributes to enrich the upper echelons perspective and related frameworks on innovation outcomes through entrepreneurship. By theorizing and documenting those personal demographic and human capital traits which are mostly associated with entrepreneurial NPD, a series of interesting implications quite naturally descend for several stakeholders: (prospective) entrepreneurs, managers who aim at nurturing an intrapreneurship culture within their companies and policy makers interested in increasing dynamic efficiency in the economic system through the launch of new products and services.

## KEYWORDS

business acumen, innovative entrepreneurship, youth advantage

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## 1 | INTRODUCTION

What entrepreneurship scholars often deem important is not entrepreneurship rates per se but, more specifically, how many entrepreneurial acts truly stem from recognition, creation and exploitation of genuine innovative opportunities (Baumol & Strom, 2007). From the seminal contributions of Schumpeter (1912/1934, 1939) to more recent microeconomic theories of entrepreneurship (e.g., the knowledge spillover theory, Audretsch & Keilbach, 2007), passing through macroeconomic theoretical analyses (e.g., endogenous and Schumpeterian growth theory models, see Aghion & Howitt, 1998), the capability to supply new ideas/products/services to the market is indicated as the engine of dynamic efficiency that leads to better prospects in terms of socio-economic welfare (Agarwal et al., 2010; Mishra et al., 1996; Schumpeter, 1912/1934).

Accordingly, the study of factors that may either foster or hamper the introduction of new products to the market by entrepreneurs has greatly attracted the interest of both the academic community and the policy-making arena. Needless to say, new products introduced by entrepreneurial ventures can be either successful or not. This is fully revealed only *ex-post*, and it is probably strongly idiosyncratic (e.g., Lee & Yoon, 2015) and difficult to foresee *ex-ante* (e.g., Stockstrom & Herstatt, 2008), depending on several contingent factors (e.g., Balachandra & Friar, 1997). At the same time, it is clearly important to understand which drivers are behind the (individual or team) decision to embark on entrepreneurship through the launch of a new product (e.g., Deeds et al., 2000), especially in high-tech and knowledge-intensive sectors (Park, 2005). In fact, it is only by ensuring a sufficiently high flow of new ideas towards markets that an economic system may increase the odds that some of these ideas, embodied into new products and services, will be successful, and in doing so, enhance dynamic efficiency and increase social welfare (Audretsch, 2007; Schumpeter, 1912/1934). Hence, given the relevance of the topic, different streams of literature have adopted multiple theoretical lenses to analyze the phenomenon of new product/service development (NPD) through entrepreneurship; and recently, some scholars have also started pursuing an integrative approach between innovation management and entrepreneurship to analyze new product-based entrepreneurial phenomena (e.g., Klenner et al., 2022; Mansoori & Lackeus, 2020). On this ground, keeping the importance of institutions and contextual factors in spurring favorable dynamics in this area unaltered (Baumol, 1990), a conspicuous body of literature has adopted a micro-based view focused on individual human capital characteristics as important antecedents of entrepreneurial NPD (e.g., Marvel & Lumpkin, 2007; Shane, 2000; Wright et al., 2007). Though this “trait-based” approach has

### Practitioner points

- Entrepreneurial alertness towards new product/service development (NPD) is high when founders are in their 20s and 30s, and it can be further solicited if entrepreneurs have matured previous entrepreneurship and management experience; while other types of human capital, for example, education, appear as less relevant.
- Intrapreneurship teams will be more naturally inclined to engage in NPD activities when formed by young members who have gained some headship familiarity, and by favoring the *breadth* of their experience rather a *depth* in their competences.
- Initiatives such as “junior enterprise” non-profit organizations and “job rotation programs” for junior managers, to the extent that are capable to expand the knowledge spectrum of participants towards several domains, can enhance NPD capabilities of firms.
- The drivers of the entrepreneurial NPD phenomenon are not necessarily strong predictors of its success: the inherent non-deterministic nature of (entrepreneurial) NPD success calls for the adoption of an “open” approach to the matter, more oriented to “create favorable conditions for” and then “tolerate failure” rather than to go searching for *ex-ante* elusive “picking (NPD) winners” strategies.

not been immune to criticism (e.g., Gartner, 1998), the identification of characteristics that make entrepreneurs more likely to bring a new product/service to the marketplace is still a topic of intense research, as testified by a recent article by Liang et al. (2018) in the *Journal of Political Economy*. This article, which is only tangent to the issue at stake here, since it explores the relationship between demographics and entrepreneurship rates at country-level, is built upon and relies on two (untested) arguments that effectively exemplify different views on entrepreneurship and NPD. These views are not necessarily at odds with each other and, to our knowledge, have never really been theoretically contextualized to the entrepreneurship domain and then empirically tested together. The first view, which is labeled “advantage of youth”, considers young entrepreneurs relatively more creative and apt to take risks than mature ones. Accordingly, the former should be more likely to introduce new products to the market than the latter. The second view, “business acumen”, emphasizes the importance of job experience for

entrepreneurs who decide to seize and exploit new entrepreneurial opportunities through the launch of a new product/service and, in particular, the management competences acquired by entrepreneurs in their previous occupation. This second factor should cause high human capital entrepreneurs to have more chances of developing new products than low human capital ones.

From a theoretical perspective, both views belong to the upper echelons tradition (Hambrick, 2007; Hambrick & Mason, 1984), which identifies managerial background characteristics as fundamental antecedents of a firm's strategies and outcomes. Specific emphasis is placed on managers' values and perceptions which, under bounded rationality (Cyert & March, 1963; Simon, 1972), form the basis for their strategic choices. In this respect, the two dimensions considered by this study, that is, competence and age, are among the observable characteristics considered most important in influencing individuals' mental schemas and, consequently, actions (Hambrick & Mason, 1984, pp. 198–200). Accordingly, we focus on them, given also the rich anecdotal evidence that points to both directions. As to youth, the website *whateverlife.com*, which first created a service in the early 2000s for the provision of Myspace layouts and tutorials, was launched by a 14-year-old girl (Scholz, 2012). In the same vein, the skiing app Edge for tracking performance along mountain routes and challenge friends was launched by two teenagers (Chapman, 2016). But there are also many entrepreneurial NPD episodes that highlight the importance of the human capital acquired by entrepreneurs throughout time. For example, Niklas Zennstrom defined Kazaa, his entrepreneurial episode before the creation of Skype, as “probably the best experience in terms of learning” (see Grilli, 2014, p. 277). IPassMe, an innovative mobile wallet platform launched in 2013, was founded by two experienced engineers who exploited their significant backgrounds in multiple domains, including business management relationships and software development (Pigozzo, 2015).

These are only a few examples but, regardless of the success of these initiatives, chronicles often (implicitly) identify either the “advantage of youth” or “business acumen” as decisive antecedents of entrepreneurial NPD. Hence, adopting a more thorough perspective, our study addresses the following questions: which of the two notions is more relevant? Are “advantage of youth” and “business acumen” views both consistent when it comes to entrepreneurial NPD? Or does one vanish once the other is controlled for?

We, therefore, jointly analyze the relative merits of the two arguments and dig into these supposedly existing relationships by highlighting their constitutive factors and nuances, thus providing a first detailed investigation of the issue in the context of entrepreneurship and NPD.

Broadly speaking, the relationship between age, a firm's human capital and its outcomes has been investigated in different streams of literature in economics and management. In this respect, our contribution with this study is tangent and complementary to several of the realms that have delved into related aspects, such as the relationships between entrepreneurs' age and the success of firms (Azoulay et al., 2020), between inventors' age and patents (Giuri et al., 2007; Mariani & Romanelli, 2007), between age and creativity (Simonton, 1988, 2007), and between founders' human capital and the growth of firms (Colombo & Grilli, 2005, 2010).

However, the focus of our study differs from the one adopted by these studies, since our research endeavor gauges the relevance of the two views, “business acumen” and “advantage of youth”, in the not-yet-investigated domain of entrepreneurship and NPD, and does so, by considering the two factors jointly and in-depth. In fact, following Ardito et al. (2015) and their systematic review on the multilevel antecedents of product innovations, there is a “lack of research on the effects of entrepreneurs' characteristics on the introduction of innovative products” (p. 128). Moreover, the scant empirical literature on the age and the innovative capacity of individuals is prevalently descriptive and usually suffers from potential omitted variables and unobserved heterogeneity problems (Frosch, 2011).<sup>1</sup> Our approach, which examines the overall influence on NPD of both an entrepreneur's age and her age-related business experience in order to verify whether they both jointly apply or not, overcomes this important deficiency. Moreover, we dig into these two important drivers for entrepreneurial NPD. Besides attesting the monotonicity of the “advantage of youth” effect, we also explore in detail the “business acumen” factor. We specifically investigate the relative importance of different founders' human capital characteristics and analyze whether *breadth* rather than *depth* of founders' work experience is more associated with entrepreneurial NPD. Lastly, in a distinct and separate analysis, we also examine the extent to which both the “advantage of youth” and “business acumen” arguments characterize successful entrepreneurial NPD. This additional inquiry documents that albeit the impact of entrepreneurs' age and business acumen on entrepreneurial NPD performance is on average statistically negligible, both factors are still found to importantly characterize top performers among entrepreneurs engaging in NPD.

<sup>1</sup>From Frosch (2011, p. 417): “However, despite the valuable contributions of the studies [...] to the general discussion about the age-dependence of innovative capacity, they remain mostly descriptive, and should therefore be interpreted with great caution. Even in the few multivariate studies based on the most extensive data currently available on inventors' characteristics, the omission of further age-related determinants of inventive activity may still induce estimation bias.”

Overall, these results and the multifaceted picture they assemble contribute to the upper echelons perspective (e.g., Hambrick, 2007; Hambrick & Mason, 1984) and related frameworks, that is, the competence-based (e.g., Colombo & Grilli, 2005, 2010; Cooper & Bruno, 1977; Grant, 1996) and social capital (e.g., Aldrich & Zimmer, 1986; Kim & Aldrich, 2005) views in entrepreneurship, by enriching our understanding of why and how demographic and human capital traits of entrepreneurs impact innovation dynamics through the launch of new products and services. In doing so, this micro-founded and individual-based approach delivers a series of interesting indications for several stakeholders, including (prospective) entrepreneurs, managers, educators and policy makers.

## 2 | THEORETICAL FRAMEWORK

### 2.1 | Entrepreneurship and NPD

What do we know about the main characteristics of individuals who choose to establish a new innovative venture based on the development of a new product/service for the market? Admittedly, little. Broadening the focus, it is possible to identify three main related but distinct sets of studies, which have dealt at various degrees with the theme of entrepreneurship and NPD. Needless to say, entrepreneurship is a concept that does not just embrace the mere creation of a new firm, but it involves several other dimensions. Adopting this perspective, one stream of literature has directed its attention towards the influence of entrepreneurial orientation (Frishammar & Hörte, 2007; Hong et al., 2013; Morgan et al., 2015; Morgan & Anokhin, 2020; Rivas et al., 2020; Srivastava & Lee, 2005; Wong, 2014; Yu et al., 2014), organizational ambidexterity (Fain et al., 2018; Lee et al., 2017; Smith & Beretta, 2021; Wei et al., 2014) and, more generally, other firms' distinctive characteristics and strategies (Dowell, 2006; Kim et al., 2015; Simon & Shrader, 2012; Song et al., 2010; Tang & Murphy, 2012; Xiao et al., 2021) on NPD. However, the spotlight has not necessarily been on newly established organizations but rather on corporate entrepreneurship (e.g., Rivas et al., 2020; Smith & Beretta, 2021; Srivastava & Lee, 2005) or on established firms which enter different markets from their core one (e.g., Dowell, 2006; Kim et al., 2015). Moreover, the level of analysis of this literature has been prevalently exerted at group level (e.g., teams, workforce), rather than at the individual one, with an interest in NPD performance (e.g., Song et al., 2010; Xiao et al., 2021) rather than in the occurrence of the phenomenon per se. Overall, and forcibly adopting a panoramic view, studies in this line of research, besides highlighting the importance of entrepreneurial orientation and other firms' attributes (e.g., size, prior innovation experience, technological competence, among others),

emphasize how “no start-up is an island” when it comes to NPD. Indeed, in line with the seminal contribution of Teece (1986), the capability of new innovative ventures to establish and stipulate collaborations with external providers of complementary assets (e.g., relevant information, complementary knowledge, distribution channels) is identified as a crucial factor in the launch of the new product/service (e.g., Andries et al., 2021; Xiao et al., 2021; Yu et al., 2014).

A second and equally important stream has concentrated its attention on the process of NPD, by investigating models, techniques and heuristics (e.g., design thinking, lean start-up, and agile approaches) adopted by start-ups to introduce new products in the market (e.g., Deeds & Hill, 1996; Harms & Schwery, 2020; Hu et al., 2017; Pavia, 1991; Sordi et al., 2020; Souder et al., 1997; Yap & Souder, 1994; see Shepherd & Gruber, 2021 and Silva et al., 2020 for reviews of the literature on lean start-up approaches), with particular emphasis on the achieved performance (e.g., Harms & Schwery, 2020; Hu et al., 2017; Souder et al., 1997; Yap & Souder, 1994). Broadly speaking, this stream highlights how NPD in new ventures assures to different rationales (and methodologies) than those characterizing NPD in established organizations.

More recently, a third realm of studies (Ghezzi, 2019; Klenner et al., 2022; Mansoori & Lackéus, 2020; Sarooghi et al., 2019), complementary to the latter above, has started exploring the interrelationships between different NPD approaches (e.g., design thinking, lean start-up) and theories of entrepreneurship (e.g., effectuation, bricolage), by emphasizing the importance of an integration between the two which may offer significant opportunities for “a prescription-based and pragmatic view of the entrepreneurial process” (Mansoori & Lackéus, 2020, p. 812).

Grounding on this idea that NPD in entrepreneurship is a playing field on its own but may benefit from insights sourced by neighboring fields, and acknowledging the importance of the internal resources and the external links of start-ups in this context (Verona, 1999), we explore the “advantage of youth” and “business acumen” arguments on entrepreneurial NPD by mainly relying on the upper echelons perspective (Hambrick, 2007; Hambrick & Mason, 1984), where individual entrepreneurial characteristics are deemed essential antecedents of the strategies applied by start-ups. Being multidisciplinary in its core essence (Hambrick & Mason, 1984, p. 193), the approach constitutes the backbone of our reasoning, where youth studies (e.g., Lehman, 1953), the competence-based view of a start-up (Colombo & Grilli, 2005; Cooper & Bruno, 1977; Grant, 1996) and the social capital approach in entrepreneurship (Aldrich & Zimmer, 1986; Kim & Aldrich, 2005) are all important and strictly related conceptual pieces, which help to unveil the entrepreneur's role in NPD. The former depicts the physiological, psychological and cultural



aspects associated with youth in modern societies. The latter two propose how, especially in the early life stage, the competences and social capital of an innovative start-up largely coincide with those of the entrepreneur, where also the ability to combine and orchestrate internal and external resources greatly mirrors the personal characteristics and psychological traits of the entrepreneur (Baert et al., 2016). If there are some examples in the literature on the nexus between entrepreneurship and NPD which adopt a similar lens of investigation (e.g., Deligianni et al., 2019), the dimensions of the entrepreneur's age and "business acumen", and their impact on NPD, have remained largely underresearched.

## 2.2 | Advantage of youth

Young entrepreneurs should have a relative advantage in NPD for two distinct reasons. One is physiological and the other is of an institutional nature. First, even if generalizations are always difficult and should be handled with care (see *infra*), youth is often considered the life cycle stage of an individual that is most associated with enthusiasm, an open mind and creative energy combined with less disillusionment about the facts of life (Abra, 1989; Frosch, 2009; Lehman, 1953). In other words, youth poses less inhibiting forces to the unfolding of the creative talent (when present) of individuals, since many cognitive traits associated with creativity, such as flexible (Barak & Levenberg, 2016) and divergent (Guilford, 1967) thinking, are found to decline with age (McCrae et al., 1987; Reese et al., 2001). Moreover, this creative potential is generally associated with the most powerful intellectual, cognitive, and physical capabilities of young individuals (e.g., Frosch, 2009; Schaie, 1958), which further increases the chances of turning creative efforts into reality. Second, young individuals have, on average, less societal and institutional arrangements and obligations to fulfill (e.g., Husén, 1987); hence, they could be more prone to face risks and bear the consequences (e.g., Ruth & Birren, 1985; Tiwari & Goel, 2020).

Both these lines of reasoning have been found to be relevant by early literature in psychology and cognitive sciences (Kaufman & Horn, 1996; Lindenberger et al., 1992; Ruth & Birren, 1985; Ryan et al., 2000). For example, Ruth and Birren (1985, p. 99), interpreting their results on creative performance on a sample of 150 well-educated individuals, speak for the first time of a "disadvantage of the old" due to "reduced speed of information processing" and "decreased willingness to risk original solutions." As it is often the case, later contributions in the field challenge this view (Cromptley, 1995), pointing to several possible confounding factors (e.g., education, professional experience) and methodological issues, which may bias the supposedly negative

relationship between age and creativity; even if, admittedly, while adding new insights, they are unable to fully counter-veil it (e.g., Foos & Boone, 2008; Roskos-ewoldsen et al., 2008). Basically, with differences and nuances, the idea that, considering the whole life cycle of an individual, the relationship between creativity and age is an inverted U-shaped curve is still firmly consolidated in psychology literature (e.g., Simonton, 1988). The curve predicts a peak in adolescence and early adulthood, followed by a slow decrease until maturity, and a sharp drop in old age.

The same type of arguments has also migrated to different streams of literature in economics and management (e.g., Liang et al., 2018), and similar ideas and findings related to the topic of "advantage of youth" have been put forward and, to some extent, documented there too, although probably in a less vigorous form. For example, in his urban studies on creative classes in U.S. cities, Florida (2002) relies, among other factors, on a strict relationship between youth and creativity.

Thus, to the extent that NPD requires more creativity and risk-bearing than other strategies pursued by the nascent entrepreneurs, and to the extent that these characteristics should decline with age, the "advantage of youth" hypothesis in our setting can be expressed as follows:

**Hypothesis 1.** The probability of starting an innovative business based on the introduction of new products/services should decrease with the age of the entrepreneur.

## 2.3 | Business acumen

As already stated, on theoretical grounds, it is possible to assert that entrepreneurs characterized by great "business acumen" should be more prone to NPD than inexperienced entrepreneurs. First, in many knowledge-intensive sectors, entrepreneurial opportunities can be recognized only if individuals have matured a deep understanding of the underlying technology and the way to market it, where both circumstances can clearly benefit by work experience (e.g., Ardichvili et al., 2003; Corbett, 2007; Marvel, 2013; Shane, 2000). Such deep knowledge is also generally appreciated by stakeholders and providers of complementary assets (Grilli & Murtinu, 2018; Packalen, 2007), also including, most notably, financiers and venture capitalists (e.g., Baum & Silverman, 2004; Colombo & Grilli, 2010; Gimmon & Levie, 2010; Ko & McKelvie, 2018). Indeed, for a nascent entrepreneur, pursuing a product innovation strategy from scratch often entails deep knowledge of the market (e.g., Claudy et al., 2016). The required knowledge can often embrace multiple domains (e.g., Atuahene-Gima & Wei, 2011;

Cui & Xiao, 2019). In fact, many innovative entrepreneurial ideas need to envisage and develop a new technical or technological solution but they require knowledge about design, marketing, price and commercial strategies too (Brush et al., 2001; Knockaert et al., 2013). Clearly, all these key activities have learning-by-doing properties and are, therefore, significantly characterized by economies of learning gained through work experience (Colombo & Grilli, 2005, 2010; Ganotakis, 2012). Besides, the knowledge embodied in a new innovative product may often require the combination of several sources and, from the viewpoint of a nascent start-up, stepping into R&D networks (Rothaermel & Deeds, 2006; Shan et al., 1994). Furthermore, the new product should “reach” the market, which implies access to well-established distribution channels, both virtual and other (e.g., Gans & Stern, 2003; Teece, 1986). Job experience, more than other forms of human capital (e.g., education), brings a remarkable set of contacts, strong and weak ties (Granovetter, 1973). This social capital of an entrepreneur can be crucial in enabling the new start-up to stipulate pre-commercial R&D alliances, commercial partnerships and, finally, gain access to the market (Packalen, 2007).

Looking at the literature on strategic alliances in entrepreneurship (e.g., Aldrich & Zimmer, 1986), we can argue that the pre-entry work experience of founders is a key asset for the social connections an innovative start-up may activate (e.g., Dubini & Aldrich, 2001; Brüderl & Preisendörfer, 1998). Several studies on the alliances of firms point to trust as an important driver for partner selection, where trust is built on frequent interaction between parties (e.g., Gulati, 1995; Li et al., 2008). Accordingly, Mosey & Wright, (2007) show that entrepreneurs' prior business experience shapes a start-up's ability to develop ties and industry networks, and to attract industry partners (on this point, see also Helfat & Peteraf, 2003). Moreover, long-standing work experience and past professional achievements may also enhance the prominence of entrepreneurs in the eyes of potential partners (e.g., Eisenhardt & Schoonhoven, 1996). Consolidated experience of entrepreneurs in work-related matters ensures a better chance of having built a reputation in the same domain. This, in turn, should enhance their possibility of establishing valuable partnerships with third parties in order to implement and launch the new product on the market. Thus, all in all, relying on arguments based on learning capabilities and social capital, both enhanced by “business acumen”, this second view on entrepreneurship and NPD can be synthesized as follows:

**Hypothesis 2.** The probability of starting an innovative business based on the introduction of new products/services should increase with the professional experience of the entrepreneur.

Human capital is a multifaceted dimension by definition, with different cognitive experiences offering diversified learning opportunities to individuals and contributing to a different extent to their set of competencies and skills (Becker, 1975; Hambrick, 2007; Hambrick & Mason, 1984). If the debate about whether entrepreneurs are “jacks of all trades” or not is still open (e.g., see Lazear, 2005; Silva, 2007), there is much less disagreement on the fact that the human capital of founders has an impact on the strategies of start-ups, and that different dimensions of human capital may generate diversified entrepreneurial conducts (e.g., Colombo & Grilli, 2005, 2010; Feeser & Willard, 1990; Ganotakis, 2012). Quoting Cooper and Bruno (1977, p. 21): “[...] For a new, high-technology firm, the primary assets are the knowledge and skills of the founders. Any competitive advantage the new firm achieves is likely to be based upon what the founders can do better than others.” Starting from Cooper and Bruno (1977), many scholars in the competence-based view stream have looked at the sphere of past headship experiences as particularly relevant human capital-enhancing episodes for an entrepreneur (see among others, Brüderl et al., 1992; Delmar & Shane, 2006; Stuart & Abetti, 1990). Following this stream, we advance the idea that, in the domain of “business acumen”, a specific typology of professional experience, that is, entrepreneurship and management experience, should be relevantly associated with entrepreneurial NPD.

More specifically, we argue that the lines of reasoning already developed about the importance of social capital in facilitating access to complementary assets should be particularly pertinent for individuals who have previously matured experience as prior managers and entrepreneurs, given the great array of ties and contacts those positions usually enable, and the consequent enhanced possibilities to leverage on them to access providers of complementary assets (e.g., Dubini & Aldrich, 2001; Mosey & Wright, 2007). Second, having already developed some experience on how to orchestrate human resources should also be particularly important in the development of new innovative products (Deligianni et al., 2019). In fact, NPD is conceived as a process that needs constant and systematic management throughout its different phases (Bacon et al., 1994), as it involves the recombination of different knowledge domains (Ettlie & Subramaniam, 2004), which are often embodied in individuals with different backgrounds and culture. This superior ability in recognizing multiple interdependencies across functions and operations, given its relevance for venture performance (Andersén, 2021; Sirmon et al., 2007, 2011), should also increase the credibility of experienced entrepreneurs and former managers in the eyes of prospective partners, thus further facilitating collaborations. Third, and related to orchestration capabilities but more directly linked to its successful execution, the competence on “how to lead”—besides innate characteristics

(e.g., Grint, 2010)—is also deemed to be a trial-and-error process that benefits from extensive on-field experience (Brüderl et al., 1992; Grint, 2010; Thomas & Cheese, 2005). This “leadership experience” (Brüderl et al., 1992, p. 229) is generally more valuable and relevant as the complexity and uncertainty of the environment on which the entrepreneur is called to operate increase (e.g., Gahan et al., 2021). This is typical of the market (e.g., Gans & Stern, 2003; Teece, 1986) and technological (e.g., Tidd & Bessant, 2020) contexts where innovative start-ups are embedded. Thus, grounding again on an upper echelons perspective further enriched by the aforementioned social capital and competence-based views of entrepreneurship, we argue that previous knowledge on how to manage individuals, resources and relationships should well comply with the technical and economic complexities of many NPD projects. It is, therefore, likely to represent a distinctive characteristic of entrepreneurs engaging in NPD. Hence, we posit that:

**Hypothesis 3.** Within “business acumen”, entrepreneurship and management experience should positively impact the probability of starting an innovative business based on the introduction of new products/services.

Besides the emphasis on headship experience, the other interesting aspect put forward by the social capital and competence-based view in the study of entrepreneurship stems from the seminal contribution of Becker (1975), which makes the fundamental distinction between general and specific human capital (see among others Colombo & Grilli, 2005, 2010; Ganotakis, 2012). The discussion about the pros and cons of being a “specialist” rather than a “generalist” is still very much lively even in the popular press (e.g., Epstein, 2019; Gladwell, 2009). When it comes to human capital, *breadth* and *depth* of knowledge, which may clearly be in a trade-off relationship, are both deemed of importance in enhancing the creative potential of individuals. On the one hand, spanning different contexts provides an individual with a heterogeneous body of knowledge, and this *breadth* is typically considered germinal to creative thinking (Nelson & Winter, 1982; Taylor & Greve, 2006).<sup>2</sup> It is often also considered an important antecedent of flexible and divergent thinking where both are often positively associated to creativity. On the other hand, depth in domain-specific expertise may help individuals identify specific problems and ad-hoc solutions by better

mastering specificities of knowledge components and the connections between them (Dane, 2010).

Adopting a contingency perspective on the matter (Teodoridis et al., 2019), we advance the hypothesis that, in the case of innovative entrepreneurship and NPD, a wide range of professional experience should not necessarily bring drawbacks with respect to a more specialized professional curriculum. This argument is rooted in the competence-based view of the firm and in the complex, often intrinsically chaotic, nature of the NPD activity (Biazzo, 2009; McCarthy et al., 2006). In fact, the intrinsic combinatorial complexity that many NPD projects often entail (Loch & Kavadias, 2002), at the entrepreneurial level, should offer significant benefits to individuals who are able to think *out of the box*, while specialism may bring the risk of a *tunnel vision*, which would prevent the same individuals from identifying solutions to problems faced during the NPD activity (Hambrick & Mason, 1984).<sup>3</sup> While other typologies of innovations (e.g., process innovation) may clearly benefit from in-depth specific knowledge of the business at stake, the introduction of a brand new product/service may conversely be the result of re-combining (apparently) distant domains (Cousins et al., 2011). The entrepreneur who is able to do so may clearly benefit from the *breadth* of individual experience matured in different fields.

Second, even admitting that specialists could overcome their supposedly narrower vision, and thus be able identify new product ideas, it is doubtful they will convincingly and persistently pursue them to the extent that these ideas require the person to access unfamiliar domains (in R&D, production or commercial areas). This promptness to rapidly discharge every relative distant activity from one's own knowledge background, the so-called “competence trap” (Levinthal & March, 1981; Levitt & March, 1988), increases along with the *depth* of knowledge in a certain field; while, conversely, it should not affect “generalists” (see Denrell & Le Mens, 2020, p. 184). Thirdly, and relatedly, persistent specialization throughout time in the same geographical or sectorial domain may increase trust and cohesion in the social relationships activated (e.g., see Aldrich & Zimmer, 1986, p. 15; Ibarra, 1993), but at the same time, can also strongly limit the exposure of entrepreneurs to different cultures, thus restraining their array of achievable contacts (Aldrich & Zimmer, 1986; Granovetter, 1973). Conversely, a large *breadth* of knowledge, alongside a possible advantage for start-ups in better intercepting consumer needs in (increasingly global) markets (e.g., see Aldrich & Zimmer, 1986, pp. 18–19), can also ease the entrepreneurial NPD process in the embryonic phase, since a relatively large and

<sup>2</sup>Nelson and Winter (1982, p.130) write: “The creation of any sort of novelty in art, science, or practical life—consists to a substantial extent of a recombination of conceptual and physical materials that were previously in existence.”

<sup>3</sup>In line with Hambrick and Mason (1984, p. 195) specialization may limit entrepreneurs' perceptions because “one selectively perceives only some of the phenomena included in the field of vision.”

heterogeneous network base can enhance trial possibilities in pilot testing (for example, in the experimentation stage of seeking the best product market fit in lean start-up approaches, see e.g., Blank, 2013, Ghezzi, 2019).<sup>4</sup>

Thus, while a consistent body of studies in the entrepreneurship literature highlights how the recognition (or creation) of innovative entrepreneurial opportunities in knowledge-intensive sectors could mainly stem from *direct* knowledge of both market and technologies (e.g., Shane, 2000), in the context of NPD, we argue about the importance of taking advantage of “multiple domains to produce new knowledge combinations” (Alvarez et al., 2013, p. 309), which may ultimately lead entrepreneurs to create new products (Marvel & Lumpkin, 2007; Teodoridis et al., 2019).<sup>5</sup>

In this respect, we also advance the idea that the advantages of *breadth* may involve both the sectorial and the geographical dimensions, that is, past work experience in different industries and foreign countries. Thus, our last hypothesis is the following:

**Hypothesis 4.** Within “business acumen”, a wide range of geographical and sectorial professional experiences rather than a specialized background should increase the probability of starting an innovative business based on the introduction of new products/services.

### 3 | DATA AND METHODOLOGY

#### 3.1 | Research setting and data

The objective of this research article can be carried out by considering a survey launched by the National Committee of

<sup>4</sup>It is interesting to note that, besides the well-known positive impact on productivity (on existing activities) that we have known since Plato (1945) and Smith (1937), studies in educational and psychological sciences (e.g., Patston & Osborne, 2016) have also shown that specialization may increase an individual's aspirations towards perfectionism (in future endeavors). In turn, this literature deems (maladaptive) perfectionism an important antecedent for procrastination or a reason to abandon, in the first place, an uncertain project (e.g., Kobori et al., 2020; see Shafran et al., 2002 for a discussion). In other words, an excessive search for perfection by entrepreneurs triggered by too much specialization may unduly cancel or unproductively delay the whole NPD process.

<sup>5</sup>Whether NPD will be successful or not is another matter. Especially if one refers to high-tech sectors, the empirical evidence generally lends support to the superior importance of specific vs. generic human capital dimensions in spurring new technology-based firm performance (e.g., see Colombo & Grilli, 2005; Ganotakis, 2012; Grilli, 2014 for a review of the literature). The additional evidence provided in this study (see the dedicated sub-section) suggests that entrepreneurial NPD success could also be relatively insensitive to both dimensions.

the Italian Ministry for Economic Development (MISE) on “Monitoring and Evaluation of National policies for the Ecosystem of Italian Innovative Start-ups”, administered by the Italian National Institute of Statistics (ISTAT) in April and May 2016. The questionnaire was aimed at collecting information on Italian innovative start-ups along a series of dimensions including entrepreneurs' demographic characteristics, their human capital endowment and the pursued innovation strategies. In fact, at the close of 2012, the Italian Government issued a law (Law no. 221/2012, modified by further amendments, the so-called *Italian Start-up Act*) introducing the opportunity for start-ups to qualify themselves as young innovative companies (YICs). This status is reserved to limited companies, younger than 5 years, which operate in high and medium technology-related businesses. YICs are required to comply with at least one of the following criteria: (i) owner or licensee of a patent or a registered software; (ii) at least one third of employees should hold a Ph.D. or a research tenure (or at least 66% of the employees should possess an MSc degree); (iii) investments in R&D should account for at least 15% of the revenues (or operating costs, if they exceed the revenues). Until a company qualifies as an YIC, it cannot distribute dividends and cannot be listed on a stock exchange. Annual revenues must be lower than € 5 million, and the company must not be originated from a spin-off or a merger of previously existing operations. YICs (as identified by the Law) are granted specific incentives, exemptions and access to privileged (and discounted) services. A brief synopsis of the Law is provided in Grilli (2019).<sup>6</sup>

The questionnaire targeted the whole population of Italian YICs, which, as of December 2015, counted 5150 start-ups. Our sample contains information about 4069 entrepreneurs of 1777 start-ups, and assuredly represents the population of YICs in all dimensions concerning which ISTAT had information on both sides, that is, population and sampled firms, including the geographic location and industry affiliation of the companies. The innovative nature of the population (and sample) of firms analyzed herein is an ideal test-bed. Indeed, it enables to compare the strength of the two hypotheses, that is, “advantage of youth” and “business acumen”, in a setting where start-ups introducing NPD are compared with other similar start-ups that do not deal with NPD but which, at the same time, are still interested in innovative matters, albeit in different domains (e.g., process, marketing or organizational innovation). Hence, our analysis should not be altered and confounded by potential compositional effects given the absence, in the sample, of firms that are intrinsically not interested in innovation, such as, for instance, lifestyle companies or small brick

<sup>6</sup>A complete description is available on the government website of MISE (<http://www.mise.gov.it>).



TABLE 1 Definition of explanatory variables

| Variable                   | Description  |
|----------------------------|--|
| Age                        | Entrepreneur's age at December 31, 2015.   |
| Entrepreneurial experience | Years of entrepreneurial experience matured by the entrepreneur before start-up's foundation.  |
| Managerial experience      | Years of management experience matured by the entrepreneur before start-up's foundation.   |
| Specific work experience   | Years of work experience as employee matured by the entrepreneur in the same sector of the start-up before firm's foundation.  |
| Generic work experience    | Years of work experience as employee matured by the entrepreneur in other sectors with respect to the activity of the start-up, before firm's foundation.  |
| Foreign work experience    | Dummy that equals one if the entrepreneur has matured some work experience (including free-lance) in a foreign country before start-up's foundation, zero otherwise.   |
| Graduate education         | Years of graduate and post-graduate education of the entrepreneur.   |
| International education    | Dummy that equals one if the entrepreneur has matured some educational experience in a foreign country before start-up's foundation, zero otherwise.   |
| Male                       | Dummy that equals one for a male entrepreneur, zero otherwise.   |
| Incubation                 | Dummy that equals one if the start-up of the entrepreneur has ever been located in a certified business incubator, zero otherwise.   |
| VC-backed                  | Percentage of the equity shares of the start-up of the entrepreneur eventually held by a venture capitalist (VC) at foundation.  |
| TEA                        | Value of the Total early-stage Entrepreneurial Activity Index at regional (NUTS 2) level (based on the percentage of 18–64 population who are either a nascent entrepreneur or owner-manager of a new business in the year 2015, source: GEM). |

Note: If not otherwise specified, the source of the variable is the *Startup Survey*.

and mortar retail stores. Moreover, our sample collects information at the very beginning of operations of start-ups. Thus, on the one hand, this limits any typical strong bias of survey-based studies (e.g., survivorship, retrospective biases); on the other hand, it avoids any reverse causality concern, which is a recurrent problem in empirical tests of the upper echelons perspective (see Hambrick, 2007, p. 338). Basically, in our case, the direction of causality can only go from entrepreneurs' characteristics to the strategies adopted by start-ups, and not the other way round. Furthermore, data belongs to the same institutional framework, that is, Italy, which is an interesting setting in its own way. In fact, the relevance of micro-enterprises in the Italian economy (OECD, 2021) and its long tradition in design (Lees-Maffei & Fallan, 2014) make the investigation of entrepreneurial dynamics and NPD particularly compelling in the selected context.

### 3.2 | Model specification and methodology

Our hypotheses on the “advantage of youth” and the “business acumen” views are tested by means of a series of probit models, since our dependent variable is a binary

indicator.<sup>7</sup> More specifically, we pose the following equation:

$$p(\text{NPD} = 1 | X_{ifrs}) = \Phi(\beta \text{Age}_i + \gamma' \text{Business Acumen}_i + \delta' C_{ifrs}); \quad (1)$$

where  $p$  is the probability of observing our dependent variable  $\text{NPD}$  equal to 1, and subscript  $i$  stands for the entrepreneur introducing the new product/service. The  $X$  vector of explanatory variables includes the independent variables of interest, that is, the covariate  $\text{Age}$  and the vector  $\text{Business Acumen}$ , and similarly to other studies that investigate (through probit models) the

<sup>7</sup>In this respect, two remarks are in order. First, it is worthwhile to note that the choice of the classical alternative model, i.e., logit model, brings very similar findings. Secondly, the alternative measure for NPD that is often used in the literature investigating the impact of the characteristics of managers and CEOs on NPD's occurrence in established firms is represented by the continuous indicator given by the number of new product innovations or trademarks introduced (e.g., Nasirov et al., 2021; Querbach et al., 2020). This latter approach is clearly much less viable (and informative) in our framework, which is made of entrepreneurs of newly founded start-ups that are often based on a single product/service.

probability of observing NPD, a series of control variables at various levels of analysis ( $C$ ), where  $f$  indicates firm-level,  $r$  is the regional-level and  $s$  stands for the different industrial sectors (e.g., Hottenrott & Lopes-Bento, 2016; Lederman, 2010). A complete description of explanatory variables is provided in Table 1. Descriptive statistics and the correlation matrix of the independent variables are presented in Table 2.

### 3.2.1 | The dependent variable

Entrepreneurs in our sample were asked to indicate whether their start-up introduced a completely new product/service or not into the market. Despite the subjective nature of the measure, the survey was designed to reduce the risk of inappropriate answers as much as possible. In particular, a two-step procedure was envisaged to increase the awareness of entrepreneurs on this matter. Respondents were, in fact, first asked whether they introduced a product/service market innovation, and only after that, were they (if relevant) requested to specify whether this product/service market innovation represented just an improvement of an existing product/service or rather a substantial brand new product/service, compared with the existing supply in the market. Only entrepreneurs selecting this second option were considered as those engaging in NPD. Thus, those reporting the launch of a brand new product/service on the market are 42.6%.

### 3.2.2 | Youth and business acumen variables

The average *Age* of entrepreneurs is 41.7 years, with an age range from 19 to 84 years.<sup>8</sup> The vector *Business Acumen* includes several human capital dimensions. Specifically, *Entrepreneurial experience* and *Managerial experience* are the years of entrepreneurial and managerial experience gained by founders in previous occupations. On average, entrepreneurs score 2.8 and 5.4 years on these dimensions, respectively. Entrepreneurs acquired 1.7 and 1.2 years of work experience as employees in a similar sector (*Specific work experience*) and in completely unrelated sectors to the one of the start-up (*Generic work experience*), respectively. 13.7% of entrepreneurs developed their work (including freelance)

<sup>8</sup>Note that we measure the age of entrepreneurs as of December 31, 2015. However, note that the alternative choice to operationalize the age of entrepreneurs at founding time leave all our findings totally unaltered.

TABLE 2 Descriptive statistics and correlation matrix

|                        | Mean   | S.D.   | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 Age                  | 41.667 | 10.971 | 1.000  |        |        |        |        |        |        |        |        |        |        |
| 2 Entrepreneurial exp. | 2.761  | 7.829  | 0.210  | 1.000  |        |        |        |        |        |        |        |        |        |
| 3 Managerial exp.      | 5.401  | 10.458 | 0.379  | -0.182 | 1.000  |        |        |        |        |        |        |        |        |
| 4 Specific work exp.   | 1.738  | 6.710  | 0.234  | -0.091 | -0.134 | 1.000  |        |        |        |        |        |        |        |
| 5 Generic work exp.    | 1.268  | 4.787  | 0.029  | -0.094 | -0.137 | -0.069 | 1.000  |        |        |        |        |        |        |
| 6 Foreign work exp.    | 0.137  | 0.344  | 0.075  | -0.043 | 0.062  | 0.128  | -0.023 | 1.000  |        |        |        |        |        |
| 7 Graduate educ.       | 4.000  | 2.735  | -0.049 | -0.105 | -0.016 | -0.009 | -0.050 | 0.090  | 1.000  |        |        |        |        |
| 8 International educ.  | 0.077  | 0.267  | -0.011 | -0.028 | 0.024  | 0.025  | -0.034 | 0.149  | 0.147  | 1.000  |        |        |        |
| 9 Male                 | 0.818  | 0.386  | 0.065  | 0.050  | 0.076  | 0.022  | -0.033 | 0.028  | -0.085 | 0.024  | 1.000  |        |        |
| 10 Incubation          | 0.297  | 0.457  | -0.084 | -0.014 | -0.056 | 0.005  | -0.014 | 0.013  | 0.119  | 0.050  | -0.037 | 1.000  |        |
| 11 VC-backed           | 4.894  | 19.523 | -0.086 | -0.010 | -0.037 | -0.016 | -0.042 | 0.030  | 0.001  | 0.039  | 0.039  | 0.114  | 1.000  |
| 12 TEA                 | 0.042  | 0.020  | -0.093 | -0.033 | -0.042 | -0.032 | 0.004  | -0.005 | -0.027 | -0.004 | 0.023  | -0.070 | -0.009 |

Note: Number of observations: 4069.

experience, at least partly, in a foreign country (*Foreign work experience*).

### 3.2.3 | Control variables

Following the literature investigating the determinants of NPD (e.g., Hottenrott & Lopes-Bento, 2016; Lederman, 2010), the Equation (1) includes a series of control variables. The first set of controls is entrepreneur-specific and includes graduate and post-graduate years of education (*Graduate education*), a dummy capturing whether this education was at least partly gained abroad (*International education*) and a dummy on gender (*Male*). In fact, the upper echelons theory (e.g., Hambrick, 2007; Hambrick & Mason, 1984), the competence-based perspective (e.g., Colombo & Grilli, 2005, 2010; Ganotakis, 2012) and the social capital view in entrepreneurship (Brüderl & Preisendörfer, 1998) all point to educational attainments and gender as individual characteristics potentially affecting a firm's strategy. Controls at firm level were also introduced. In particular, a dummy variable capturing whether the start-up has ever been located in a business incubator (*Incubation*) and a variable reporting the equity shares of the company eventually held by a venture capitalist (VC) at foundation in percentage terms (*VC-backed*). In fact, a start-up's innovative traits may be positively associated with business incubation (e.g., Mrkajic, 2017) and VC-backing (e.g., Bertoni & Tykvová, 2015). Finally, the Entrepreneurial Activity Index, that is, *TEA*, sourced from the Global Entrepreneurship Monitor (GEM), is also introduced into model specification in order to check for different entrepreneurial rates across different regions (at NUTS 2 level) where entrepreneurs locate their business. A series of NACE.2-one digit industry dummies were also inserted to control for sector heterogeneity.

## 4 | RESULTS

### 4.1 | Main findings

Results of the probit analysis are reported in Table 3. The unit of analysis is the single entrepreneur, while standard errors are clustered at firm level. Column I reports coefficients and Column II highlights the corresponding marginal effects. The probability of NPD by entrepreneurs is found to decrease with the age of an entrepreneur, as shown by the negative and statistically significant impact (1%) of the variable *Age*. On average, a one-year increase reduces the probability by 0.5%. Thus, Hypothesis H1 is confirmed. All “business acumen”-related variables have a positive impact and a Likelihood ratio test confirms their joint statistical relevance at 5% level ( $\chi^2[5] = 11.90$ ).

This confirms Hypothesis H2. Then, both the years of entrepreneurial experience and those matured as managers have a positive influence on NPD and this, in turn, brings support to Hypothesis H3. More specifically, a one-year increase in the variables *Entrepreneurial experience* and *Managerial experience* raises the probability of introducing a new product by 0.3% and 0.2%, respectively, with both effects being significant at a level of 10%. *Generic work experience* shows a positive and significant coefficient (at 5%), with a marginal effect of 0.5%; while *Specific work experience* is found to positively affect NPD, albeit the effect is statistically weak. Entrepreneurs who experienced a work episode in a foreign country are more likely to introduce new products, since this circumstance, on average, increases the probability of NPD by 5%. A Wald test confirms that the combination of coefficients of *Generic work experience* and *Foreign work experience* is greater at the 5% significance level than the coefficient of *Specific work experience*, thus fully corroborating Hypothesis H4. Keeping all other independent variables at their mean (for continuous) or median (for dummy variables) values, an entrepreneur with only high specific work experience as an employee in the home country (i.e., *Specific work experience* set at its mean value plus one standard deviation, *Generic work experience* and *Foreign work experience* equal to zero) exhibits an absolute probability of NPD of 34.0%. The same individual with no specific work experience, and high generic work experience as an employee (at least in part) gained in a foreign country (i.e., *Specific work experience* equal to zero, *Generic work experience* set at its mean value plus one standard deviation, *Foreign work experience* equal to one) shows an absolute probability of NPD of 44.5%, for a relative increase of +30.7%.

Having inspected the multifaceted nature of “business acumen”, we also further analyze the “advantage of youth” effect. In fact, Columns III and IV of Table 3 report estimates of the model where the *Age* variable has been substituted by a series of dummies capturing different age ranges for entrepreneurs. The benchmark case includes entrepreneurs in the youngest class [19–24], the age range with the highest probability for entrepreneurs to engage in NPD. Then, probability weakly decreases for the immediately subsequent age classes, basically remaining unaltered until the age of 40, to then significantly decrease thereafter. Belonging to class [40–44] reduces the probability of NPD by 12% with respect to the benchmark case, while all other factors remain the same. The highest decrease is for the age classes [60–64], [65–69], and [70–74], with a marginal reduction of 28%, 22%, and 30%, respectively. Remarkably, results highlight what we could label as a *Benjamin Button* (Fitzgerald, 1922/2009) effect: the oldest age class of entrepreneurs [75–84] does not show any statistically significant

TABLE 3 Probit analysis on the introduction of a new product/service by entrepreneurs

| Columns      |  | I                 | II                | III               | IV                |
|--------------|--|-------------------|-------------------|-------------------|-------------------|
|              |  | Coefficients      | Marginal effects  | Coefficients      | Marginal effects  |
| $a_0$        | Constant                                   | 0.237 (0.229)     | –                 | 0.065 (0.257)     | –                 |
| $a_1$        | Age  | –0.012 (0.003)*** | –0.005 (0.001)*** | –                 | –                 |
| $a_2$        | Entrepreneurial experience                 | 0.007 (0.004)*    | 0.003 (0.001)*    | 0.007 (0.004)*    | 0.003 (0.001)*    |
| $a_3$        | Managerial experience                      | 0.005 (0.003)*    | 0.002 (0.001)*    | 0.005 (0.003)*    | 0.002 (0.001)*    |
| $a_4$        | Specific work experience                   | 0.005 (0.004)     | 0.002 (0.001)     | 0.004 (0.004)     | 0.002 (0.001)     |
| $a_5$        | Generic work experience                    | 0.013 (0.006)**   | 0.005 (0.002)**   | 0.013 (0.006)**   | 0.005 (0.002)**   |
| $a_6$        | Foreign work experience                    | 0.152 (0.071)**   | 0.059 (0.028)**   | 0.152 (0.071)**   | 0.059 (0.027)**   |
| $a_7$        | Graduate education                         | –0.006 (0.011)    | –0.002 (0.004)    | –0.005 (0.011)    | –0.002 (0.004)    |
| $a_8$        | International education                    | 0.060 (0.107)     | 0.023 (0.042)     | 0.066 (0.107)     | 0.025 (0.041)     |
| $a_9$        | Male                                       | –0.020 (0.061)    | –0.008 (0.024)    | –0.016 (0.061)    | –0.006 (0.024)    |
| $a_{10}$     | Incubation                                 | 0.049 (0.080)     | 0.019 (0.031)     | 0.047 (0.080)     | 0.018 (0.031)     |
| $a_{11}$     | VC-backed                                  | –0.002 (0.002)    | –0.001 (0.001)    | –0.001 (0.002)    | –0.001 (0.001)    |
| $a_{12}$     | TEA  | –1.511 (1.719)    | –0.587 (0.667)    | –1.467 (1.723)    | –0.569 (0.667)    |
|              | Industry Dummies                           | Yes               | Yes               | Yes               | Yes               |
|              | Age class                                  |                   |                   |                   |                   |
| $\beta_1$    | [19–24]                                    | Benchmark         | Benchmark         | Benchmark         | Benchmark         |
| $\beta_2$    | [25–29]                                    | –                 | –                 | –0.131 (0.176)    | –0.052 (0.069)    |
| $\beta_3$    | [30–34]                                    | –                 | –                 | –0.222 (0.173)    | –0.088 (0.068)    |
| $\beta_4$    | [35–39]                                    | –                 | –                 | –0.246 (0.175)    | –0.097 (0.069)    |
| $\beta_5$    | [40–44]                                    | –                 | –                 | –0.307 (0.177)*   | –0.121 (0.070)*   |
| $\beta_6$    | [45–49]                                    | –                 | –                 | –0.436 (0.181)**  | –0.170 (0.071)**  |
| $\beta_7$    | [50–54]                                    | –                 | –                 | –0.450 (0.186)**  | –0.176 (0.072)**  |
| $\beta_8$    | [55–59]                                    | –                 | –                 | –0.318 (0.195)    | –0.125 (0.076)    |
| $\beta_9$    | [60–64]                                    | –                 | –                 | –0.741 (0.215)*** | –0.279 (0.079)*** |
| $\beta_{10}$ | [65–69]                                    | –                 | –                 | –0.569 (0.226)**  | –0.220 (0.085)**  |
| $\beta_{11}$ | [70–74]                                    | –                 | –                 | –0.805 (0.280)*** | –0.299 (0.096)*** |
| $\beta_{12}$ | [75–84]                                    | –                 | –                 | –0.346 (0.337)    | –0.136 (0.131)    |
|              | N° of observations                         | 4069              |                   | 4069              |                   |
|              | Log pseudo likelihood function             | –2752.565         |                   | –2746.348         |                   |
|              | Wald test ( $\chi^2$ ): all parameters = 0 | 24.79 (15)**      |                   | 36.23 (25)**      |                   |
|              | pseudo $R^2$                               | 0.008             |                   | 0.010             |                   |

Note: Significance levels: \* >10%; \*\* >5%; \*\*\* >1%. Robust standard errors clustered at firm level in parentheses.

reduced inclination to NPD than the youngest one [19–24], revealing a sort of “entrepreneurial rejuvenation.”<sup>9</sup> Finally, results related to control variables do not reveal any

<sup>9</sup>However, this result should only be considered evocative and interpreted with caution, if not relegated to a mere curiosity, since there are only 22 entrepreneurs in the corresponding age class. Interestingly, Erasmus from Rotterdam was the very first to put forward the analogy between youngest and oldest individuals in terms of capabilities to engage in NPD (activity which assuredly requires a certain degree of recklessness). In fact, in his famous *In Praise of Folly* (1509/1876/2009, pp. 21–22), he writes (emphasis added):

remarkable effect, once again emphasizing the prominence of age and of professional experience in determining NPD

“[...] the farther they proceed in years, the more they grow backward in the enjoyment of themselves, till waspish old age comes on, a burden to itself as well as others, and that so heavy and oppressive, as none would bear the weight of, unless out of pity to their sufferings. I again intervene, and lend a helping-hand, assisting them at a dead lift, in the same method the poets feign their gods to succor dying men, by transforming them into new creatures, which I do by bringing them back, after they have one foot in the grave, to their infancy again; so as there is a great deal of truth couched in that old proverb, **Once an old man, and twice a child.**”



TABLE 4 Robustness checks: Probit analysis

| Robustness check                           | Columns              |  |   |                               |  |
|--|----------------------|--|---|-------------------------------|--|
|  | I                    | II   | III   | IV                            | V  |
|  | Quadratic effect—Age | Human capital—From continuous variables to dummies | (More) Objective NPD—Limiting the sample to R&D intensive firms | Firm level—Averaged variables | Firm level—Interaction effect between Specific and Generic work exp. |
|  | Coefficients         | Coefficients                                       | Coefficients  | Coefficients                  | Coefficients   |
| $a_0$                                      | 0.422 (0.386)        | 0.074 (0.229)                                      | 0.230 (0.380)   | 0.324 (0.254)                 | 0.318 (0.254)  |
| $a_1$                                      | -0.020 (0.015)       | -0.007 (0.003)***                                  | -0.015 (0.004)***   | -0.011 (0.004)**              | -0.011 (0.004)**   |
| $a_2$                                      | 0.001 (0.001)        | -  | -   | -                             | -  |
| $a_3$                                      | 0.007 (0.004)*       | 0.133 (0.073)*                                     | 0.012 (0.005)**   | 0.008 (0.005)*                | 0.008 (0.005)*   |
| $a_4$                                      | 0.005 (0.003)*       | 0.094 (0.068)                                      | 0.010 (0.004)**   | 0.004 (0.004)                 | 0.004 (0.004)  |
| $a_5$                                      | 0.004 (0.004)        | 0.031 (0.094)                                      | 0.013 (0.005)**   | 0.002 (0.006)                 | 0.003 (0.006)  |
| $a_6$                                      | 0.013 (0.006)**      | 0.194 (0.103)*                                     | 0.020 (0.009)**   | 0.014 (0.008)*                | 0.016 (0.008)**  |
| $a_7$                                      | -                    | -  | -   | -                             | -0.004 (0.002)   |
| $a_8$                                      | 0.154 (0.071)**      | 0.159 (0.071)**                                    | 0.108 (0.101)   | 0.179 (0.104)*                | 0.177 (0.104)*   |
| $a_9$                                      | -0.005 (0.011)       | -0.010 (0.011)                                     | -0.002 (0.016)  | -0.005 (0.013)                | -0.005 (0.013)   |
| $a_{10}$                                   | 0.058 (0.107)        | 0.062 (0.107)                                      | -0.102 (0.149)  | 0.074 (0.138)                 | 0.076 (0.138)  |
| $a_{11}$                                   | -0.020 (0.061)       | -0.017 (0.061)                                     | 0.019 (0.091)   | 0.051 (0.101)                 | 0.047 (0.101)  |
| $a_{12}$                                   | 0.046 (0.080)        | 0.047 (0.080)                                      | -0.011 (0.117)  | 0.043 (0.068)                 | 0.040 (0.068)  |
| $a_{13}$                                   | -0.002 (0.002)       | -0.002 (0.002)                                     | -0.003 (0.002)  | -0.001 (0.001)                | -0.001 (0.001)   |
| $a_{14}$                                   | -1.521 (1.719)       | -1.435 (1.720)                                     | 0.934 (2.619)   | -2.273 (1.489)                | -2.271 (1.488)   |
| Industry Dummies                           | Yes                  | Yes  | Yes   | Yes                           | Yes  |
| N° of observations                         | 4069                 | 4069   | 1844  | 1777                          | 1777   |
| Log pseudo likelihood function             | -2752.280            | -2753.882  | -1236.964   | -1200.925                     | -1200.092  |
| Wald test ( $\chi^2$ ): all parameters = 0 | 24.90 (16)*          | 23.43 (15)*  | 23.49 (15)*   | 21.17 (15)                    | 23.82 (16)*  |
| pseudo R <sup>2</sup>                      | 0.008                | 0.008  | 0.020   | 0.009                         | 0.010  |

Note: Significance levels: \* >10%; \*\* >5%; \*\*\* >1%. Robust standard errors clustered at firm level in parentheses.

dynamics. Similarly to the findings of Deligianni et al. (2019), this consideration also applies to the education variable.<sup>10</sup>

## 4.2 | Robustness checks

A series of additional analyses were run aiming at corroborating these findings and at gaining insights. The results of these analyses are reported in Table 4. First, we further investigate the presence of potentially relevant quadratic effects in the relationship between age and NPD. Results (Column I) reveal a rather insignificant coefficient for the squared *Age* variable, confirming the substantial linear nature of the relationship, already highlighted in the model specification with a series of dummies for different age classes (see Columns III and IV of Table 3).

Second, in the main analysis, “business acumen” was proxied with continuous variables, which quite naturally correlate with the age of the entrepreneurs. Potential multicollinearity (which does not seem to affect our data, that is, the mean Variance Inflation Factor is equal to 1.84, well below the common accepted thresholds, see Hair et al., 1998) would make our analysis a conservative test of the two relationships investigated herein, since it only inflates standard errors (Lindner et al., 2020). However, measurement errors in explanatory variables can still lead to attenuation or even bias the true regression values (Reeves et al., 1998). To eliminate any possible concern in this respect, the continuous variables related to “business acumen” (i.e., *Entrepreneurial experience*, *Managerial experience*, *Specific work experience*, *Generic work experience*) were all transformed into dummy variables by simply capturing the eventual possession of that given characteristic by entrepreneurs.<sup>11</sup> Results, exposed in Column II, are rather similar to the ones already presented in terms of sign and significance (apart from a small loss of statistical relevance for the variable *Managerial experience*, which passes from a *p* value of 0.078 to a *p* value of 0.166). Again, a chi-square test rejects the null hypothesis on the irrelevance of all “business acumen”-related variables at the 10% level ( $\chi^2 [5] = 10.25$ ). Marginal effects (available upon request)

<sup>10</sup>In unreported regression we also distinguished different vocational types of educational attainments (i.e., technical vs. economic degrees), but again, no significant effects were traced.

<sup>11</sup>The survey questionnaire asked respondents to categorize their previous professional conditions in several ways, including position, function and sector experience. In the first instance, the indicated variables related to business acumen were made continuous over the years by taking into account the age of the entrepreneurs at founding time, and considering the time of their (eventual) entry into the labor market.

too appear to reveal an economic magnitude, which is coherent with the picture illustrated before in the main analysis.

Third, our dependent variable is a subjective assessment by the respondent. Though the survey was designed to limit the risk of inaccurate answers, we also checked the robustness of results by limiting the sample to the entrepreneurs of the most intensive R&D companies included in the sample. Indeed, the probability of incorrectly considering an incremental improvement over an existing product/service as a substantial brand new item should decrease with the R&D intensity of the firm.<sup>12</sup> To this end, Column III reports the estimates of the core model by limiting the sample to the entrepreneurs of companies reporting investment in R&D compared with operating costs greater than the sample average (R&D percentage equal to 36.96). Results again confirm our main findings. The variable *Age* is negative and statistically significant at the 1% level, the “business acumen” variables overall confirm their importance, with the slight difference that now also *Specific work experience* turns out to be positive and statistically significant at the 5% level, while *Foreign work experience* slightly loses its explicative power. The impact of all other independent variables of interest remains almost unchanged. Thus, a chi-square test rejects the null hypothesis on the irrelevance of all “business acumen”-related variables at the 5% level ( $\chi^2 [5] = 12.00$ ).

Then, a fourth concern regards a possible mismatch in the level of analysis between the dependent variable, which refers by definition to the firm level, and the independent variables of interest, which are entrepreneur-specific. Although our main analysis at the entrepreneur level is already based on robust standard errors clustered at the firm level, to tackle this issue more directly, we re-estimate the model at firm level, recalculating all the variables as the mean between different members of the same founding team. Results highlighted in Column IV appear adherent to the dynamics already exposed and support both the “advantage of youth” and “business acumen” effects.

Lastly, we search for possible relevant interaction effects arising from the co-presence of entrepreneurs with specific and generic work experience in the same entrepreneurial team. The estimated interaction effect (Column V) and, following Ai and Norton (2003), the overall analysis on the whole domain of the interaction

<sup>12</sup>The use of other more objective measures for proxying NPD, like formal mechanisms of innovation protection (e.g., patents), was somehow prevented in our setting by the innovative nature of the sample, i.e., by firms not engaging in NPD but still carrying on other innovative activities (e.g., process innovation) and using these mechanisms to protect their innovation.

variable (Hoetker, 2007; Huang & Shields, 2000), reveal a negative, but most of the time statistically insignificant, impact of this term on a start-up's probability of introducing NPD.<sup>13</sup>

### 4.3 | Additional evidence

To complete our analysis we also investigate the relationship between NPD and (short-run) firm performance and the extent to which “youth” and “business acumen” may eventually moderate this relationship. In consideration of that, we conducted a supplementary data collection endeavor to collect, through secondary information from Orbis (source: Bureau Van Dijk), data on the survival and sales performance (updated at 2018) of 1326 out of the 1777 start-ups surveyed. Several analyses were run, ranging from basic regressions to more sophisticated methods, to duly take into account the endogenous nature of NPD (e.g., instrumental variables regressions, endogenous switching regression models). Results (available upon request) found, on average, an insignificant impact of entrepreneurial NPD on firm performance (whether measured in terms of survival or sales growth) and no statistically significant moderating action performed on that relationship by neither the “youth advantage” nor the “business acumen” factors. However, a more nuanced picture emerges once we take into the consideration the *variance* of the (sales) performance rather than its *mean* level. In fact, sales performance absolute deviation from the sample mean is found to be positively and significantly (at 5% level) correlated with NPD. This is suggestive of the disruptive power and, at the same time, of the risky and uncertain nature of entrepreneurial NPD. Furthermore, if NPD has, on average, a negligible impact on the mean yearly absolute sales growth experienced by the start-up during its life (see Column I of Table 5, and Colombo & Grilli, 2005, 2010; Westhead & Cowling, 1995 on the use of a similar performance measure), a quantile regression approach (see Columns II-VI of Table 5) reveals that entrepreneurial NPD turns out to be much more associated with the right tail of the sales growth performance distribution (the 0.75 and 0.90 quantiles), that is, the top performers, rather

<sup>13</sup>The average marginal effect is estimated as  $-0.0015$  with a standard error (computed with Delta Method) of  $0.0009$  for a  $p$  value of  $0.104$ . The estimated marginal effect is found to be negative and statistically insignificant at conventional confidence levels for 98.99% of observations, and negative and statistically significant for the remaining observations. These findings do not change, if the variables composing the interaction term are demeaned.

TABLE 5 Additional evidence on NPD and sales performance: Quantile regression

| Quantiles                              | Columns          |                      | III               | IV                | V                | VI               |
|--|------------------|----------------------|-------------------|-------------------|------------------|------------------|
|  | I                | II                   |                   |                   |                  |                  |
|  | OLS              | Coefficients         | Coefficients      | Coefficients      | Coefficients     | Coefficients     |
| $a_0$                                  | −0.256 (0.261)   | −0.356 (0.001)***    | −0.357 (0.002)*** | −0.441 (0.024)*** | −0.619 (0.110)   |                  |
| $a_1$                                  | 0.102 (0.065)    | 9.63e−18 (3.18e−17)  | 0.0002 (0.0006)   | 0.029 (0.010)***  | 0.071 (0.019)*** | 0.221 (0.070)*** |
| $a_2$                                  | 0.097 (0.030)*** | −1.05e−17 (1.69e−17) | 0.0002 (0.0008)   | 0.028 (0.005)***  | 0.105 (0.017)*** | 0.315 (0.035)*** |
| Industry Dummies                       | Yes              | Yes                  | Yes               | Yes               | Yes              | Yes              |
| N° of observations                     | 3024             | 3024                 | 3024              | 3024              | 3024             | 3024             |
| $R^{2(OLS)}$ /pseudo $R^{2(Quantile)}$ | 0.02             | 0.0001               | 0.0009            | 0.01              | 0.02             | 0.06             |

Note: Significance levels: \* > 10%; \*\* > 5%; \*\*\* > 1%. (Robust, clustered at firm level in Column I) Standard errors in parentheses. Column I shows OLS estimates, Columns II-VI Bootstrapped Quantile regression estimates at different quantiles, allowing for 100 repetitions. The dependent variable in all models is the standardized value of the sales of the start-up for each entrepreneur in the year 2018, where closed firms are included (before standardization) with sales equal to zero. Note that excluding closed firms or applying controls for potential survivorship bias in the sample lead to similar findings to those here presented. NPD is a dummy variable that takes 1 if the entrepreneur indicated that the start-up has introduced into the market a completely new product/service; 0 otherwise.

than with the left one (the 0.25 and 0.10 quantiles), that is, the low performers.<sup>14</sup> The moderating influence of the “youth advantage” and “business acumen” factors on these dynamics appears again limited. We also ran a series of t-tests based only on the sub-sample of entrepreneurs engaging in NPD and taking as reference the same performance indicator as before, again adjusted for company age and industry affiliation. The comparison between low performers (the 10<sup>th</sup> percentile of the performance indicator) and high performers (the 90<sup>th</sup> percentile) highlights that entrepreneurs in the latter category are only marginally older than in the former one (42.38 vs. 41.23 years), with one fourth of the top performers being <34 years old. All “business acumen”-related variables exhibit higher values for top rather than low performers, but these differences are never statistically significant at conventional levels, except for *Foreign work experience* (0.23 vs. 0.12, with a difference statistically significant at the 5% level).

To sum up, NPD is found to strongly distinguish top performers from middle-high performers, and much less middle-low performers from very low performers. At the same time, if both the “advantage of youth” and “business acumen” are relevant in explaining entrepreneurial NPD, they appear quite neutral in discriminating successful from unsuccessful NPD.

## 5 | DISCUSSION AND CONCLUSION

In principle, it is possible to identify two major, different (but non-clashing) views about the individuals' characteristics, which should be more conducive to new product/service development (NPD), precisely the “advantage of youth” and the “business acumen” perspectives (Liang et al., 2018). The former postulates a negative relationship between an individual's age and NPD, while the latter points to a positive impact of professional experience on NPD. In this respect, our study intends to provide, for the first time, a theoretical substratum and a joint empirical direct test of these two views in the entrepreneurship context and, more generally, to deepen our understanding of such dynamics.

<sup>14</sup>The dependent variable of the Model exposed in Table 5 is the standardized value of the sales of a start-up for each entrepreneur in the year 2018, where closed firms are included (before standardization) with sales equal to zero. Note that excluding closed firms or applying controls for potential survivorship bias in the sample lead to similar findings. NPD is a dummy variable that takes 1 if the entrepreneur indicated that the start-up has introduced into the market a completely new product/service; 0 otherwise.

Indeed, the results reveal the presence of both effects: “youth” and “business acumen” lead to a greater probability of entrepreneurs introducing new products/services to markets. At the same time, the analysis performed herein reveals additional interesting insights. First, findings point to a monotonically decreasing, rather linear negative, relationship between entrepreneurs' age and NPD, where the probability of NPD is found to sharply decrease for an entrepreneur only after the age of 40. Second, many human capital dimensions possessed by entrepreneurs contribute to their “business acumen”, but rather interestingly, some appear to impact new product development more than others. In particular, in the innovative context analyzed herein, entrepreneurial/managerial skills appear to be particularly conducive to NPD, while *breadth* seems to matter more than *depth* of work experience, with work episodes in different sectors and countries being more associated to entrepreneurial NPD than sector-specific work experience gained by entrepreneurs in their home country. Moreover, no super-additive effect in a start-up's probability of introducing a brand new product/service is found to stem from the concomitant presence in the same team of entrepreneurs with generic and specific work experience. Finally, NPD is, by its very nature, a risky and uncertain activity, and our additional evidence concerning its impact on firm performance totally corroborates this stylized fact, and expands it to the entrepreneurship domain. At the same time, our analysis also suggests that, if the “youth advantage” and “business acumen” do not necessarily translate into entrepreneurial NPD success, they are both still found to importantly characterize top performers among entrepreneurs engaging in NPD.

### 5.1 | Implications for theory and practice

This study provides new additions to the micro-foundations of the NPD process and delivers implications to those stakeholders, like (prospective) entrepreneurs, policy makers (including educators) and managers, who aim at favoring an entrepreneurial culture towards NPD in their respective domains of pertinence. Overall, the results exposed in this study are consistent with those acquired by several studies in different streams of literature on the links between individual's age, human capital, creativity and innovation performance (e.g., Azoulay et al., 2020; Giuri et al., 2007; Simonton, 2007). However, they also augment our information set on these links as to the domain of entrepreneurship and new product development.

In particular, they contribute to the upper echelons perspective (Hambrick, 2007; Hambrick & Mason, 1984)



in innovation management studies (e.g., Nasirov et al., 2021; Stock et al., 2019) by overcoming the typical reverse causality concerns of studies based on established companies (Hambrick & Mason, 1984, p. 197), where the documented links between individual characteristics and innovative activities may simply be generated by *endogenous matching*—“companies may appoint certain types of CEOs (Chief Executive Officers) in order to implement certain NPD strategies (Nasirov et al., 2021, p. 13)” —instead of stemming from a genuine impact of characteristics on conduct. In this respect, our focus on NPD at the inception of a firm life solves (or at least alleviates) this problem at its roots, since the firm is created by the entrepreneur, that is, the decision-maker. Thus, our analysis offers a solid account on the role of demographic traits and human capital factors as fundamental antecedents of the NPD process by also placing this investigation into the entrepreneurship arena, and thus responding to the call of Ardito et al. (2015) to deepen our understanding of the most relevant characteristics of entrepreneurs behind NPD. Consequently, this work generates interesting insights for existing bodies of research on innovation management and innovative entrepreneurship, and inserts itself in the recent set of studies that establish closer links between the two fields (e.g., Klenner et al., 2022; Mansoori & Lackeus, 2020).

First, our findings are not necessarily at odds with the idea that, at the individual level, innovation follows a curvilinear, inversely U-shaped functional form with age. However, they point to a notable difference, since they circumscribe the maximum plateau age interval well before the 35–50 years typically identified in the literature (Frosch, 2011, p. 415). New product/service development by entrepreneurs has been observed to occur especially when founders are in their 20s and 30s, significantly decreasing thereafter. In this respect, the tendency often detected (e.g., Henseke & Tivig, 2009) of relatively younger inventors in R&D-intensive rather than traditional sectors is confirmed by our analysis. Thus, this study corroborates the idea that the age of 40 is an ideal turning point in terms of innovative capabilities of individuals in knowledge-intensive contexts,<sup>15</sup> and extends this idea to the sphere of entrepreneurship and new product development.

Second, our study enriches the literature on the competence-based view of an entrepreneurial venture by emphasizing the importance of *breadth* of experiences within individuals rather than teams. In fact, many studies in this stream of literature have primarily focused their

attention on the founding team as a whole (e.g., Colombo & Grilli, 2005, 2010; Ganotakis, 2012; Ko & McKelvie, 2018), documenting how synergistic and complementary effects towards performance may arise from the combination of specific heterogeneous skills within a team (e.g., Colombo & Grilli, 2005; Ganotakis, 2012).<sup>16</sup> In this respect our study emphasizes that heterogeneity of (work) experiences could be beneficial for *each* member of the entrepreneurial team as it would broaden her individual *breadth* of knowledge and social contacts.

Third, our findings show that entrepreneurial alertness in terms of NPD can be solicited by prior knowledge at the individual level (Ardichvili et al., 2003; Shane, 2000) and, in this respect, they emphasize the importance of professional experience, and notably entrepreneurship and management experience, rather than of other types of human capital-enhancing activities (e.g., educational attainments). Notably, this relevance is found to hold irrespective of (i.e., controlling for) the age of the entrepreneur. In other words, there is a pure “human and social capital effect” underlying entrepreneurial NPD, which goes beyond the mere passing of time, and also interests young individuals, provided that they can access knowledge sources despite their youth. It is, therefore, the combination of “youth” with (and not at the expense of) “business acumen”, which may ensure an economic system the highest possible flow of new products and services into markets. The fact that both dimensions are found to be quite neutral to successful NPD does not lessen the normative power of the statement, since it indicates that the same dimensions, which are found to spur entrepreneurial NPD, are not found to depress the fraction of new products and services which are likely to succeed in markets.

Thus, this study is also capable of delivering precise practical implications insofar as it shows that young individuals are more inclined to NPD, and their propensity can be further increased by supporting their headship familiarity, and by favoring the *breadth* of their experience rather than by immediately searching for a *depth* in their competences. If extant research in innovation management has greatly illustrated the importance of methods, protocols and environments in the road to creative thinking and NPD (see Ardito et al., 2015 among others for a review), clearly this does not undermine the importance of the inherent qualities of the individuals who are an essential part of the NPD strategy. In this respect, the identification

<sup>15</sup>Incidentally, note that 40 is also the age limit established by many Scientific Associations to award scholars for their achievements: for example, the John Bates Clark Medal awarded by the American Economic Association and the Fields Medal conferred by the International Mathematical Union.

<sup>16</sup>Not all experiences are found to combine well together. Indeed, they are a minority. For example Colombo and Grilli (2005) document super additive effects on venture performance only for technical and commercial industry-specific work experiences among many other tested combinations of different human capital dimensions (see their Table 5, p. 811). The same applies to Ganotakis (Ganotakis, 2012, see Table 3, pp. 507–508).

of these specific “observable characteristics” (Hambrick & Mason, 1984) behind creative output clearly provides entrepreneurs with information about their peers, while also enlightening managers of established companies about the identikit of intrapreneurship teamers who are more naturally inclined to be engaged in NPD activities.

Second, these observable characteristics also identify actions that organizations may put in place to nurture NPD processes. At policy-level, all measures that favor the contamination of young individuals with different cultures and knowledge domains, especially when these activities are work-related and expose pupils to some leadership/management experience, should be particularly welcomed. Accordingly, initiatives/programs at the university-level, like “junior enterprise” non-profit organizations, which offer young affiliates opportunities to engage in consultancy activities over a wide range of industries (e.g., de Moraes et al., 2022), should be encouraged, stimulated and, when necessary, sustained. A similar rationale applies at the company-level, where “job rotation programs” at junior management level can leverage the NPD capabilities of firms.

Thus, these and other programs tailored for young individuals should ensure the economic institution of reference, whether it is the whole economic system or the single firm, the necessary preconditions for adequate flows of new ideas to emerge. At the same time, our study warns about the presence of strong automatisms when it comes to successful NPD. The drivers of the NPD phenomenon are not necessarily strong predictors of NPD success. Our focus on entrepreneurship in innovative sectors, where R&D intensity is high and so it is the level of complexity faced by founders, may even have strengthened our findings in this respect. However, our analysis quite clearly reveals how, in this specific domain, it is rather hard to ascertain a priori a single recipe that is always valid for NPD success. Concluding, we believe that the non-perfect match between enabling factors and success drivers, and the inherent non-deterministic nature of (entrepreneurial) NPD success call for the adoption of an “open” approach to the matter, more oriented to “create favorable conditions for” and then “tolerate failure” rather than to go searching for *ex-ante*, difficult to find, “picking (NPD) winners” strategies.

## 5.2 | Limitations and future research

Our study is clearly not devoid of limitations, which provide interesting avenues for future research. First, the empirical analysis is based on a single country. If the same institutional framework by construction controls for many unobservable factors at national level that may

influence the dynamics at stake, it also calls for replications in other national contexts to strengthen the generalizability of the findings. Second, NPD processes are strongly influenced by the local environment in which activities take place (e.g., Auernhammer & Roth, 2021) and their intended scope, where especially sustainability is of key importance, with an increasing need to integrate environmental issues into NPD (e.g., Dangelico et al., 2013). In this respect, a fruitful research avenue, among others, would be to explore how the relationships highlighted by our study are influenced by the fact that entrepreneurs are embedded in different innovation and entrepreneurial ecosystems and/or direct their effort towards sustainable products or not. Third, we do not perform an in-depth investigation of how entrepreneurs conceive new products/services, that is, we forcibly ignore the cognitive processes of entrepreneurs. In other words, for the sake of data availability, we have focused herein only on the observable characteristics of entrepreneurs. The upper echelons perspective privileges the latter (Hambrick & Mason, 1984, p. 196) but, at the same time, it still acknowledges that psychological traits (e.g., locus of control, tolerance of ambiguity) may jointly act with observable factors and guide the behavior of executives (Hambrick, 2007; Hambrick & Mason, 1984). Accordingly, an analysis of the mental processes characterizing entrepreneurial NPD, with field or experimental data, would enrich the upper echelons perspective in both the innovation management and entrepreneurship literature. Finally, our study reveals the importance of the “human factor” in entrepreneurial NPD. However, entrepreneurs may increasingly use new and sophisticated technologies, that is, artificial intelligence, to seize entrepreneurial opportunities through NPD (e.g., Garbuio & Lin, 2021). Theoretical and empirical investigations on the different ways humans, with their intrinsic characteristics, may interact with the different array of Industry 4.0 technologies to increase creativity and NPD in new ventures and established firms can greatly increase our comprehension of new product development processes in the near future.

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## CONFLICT OF INTEREST

The author declares no conflict of interest.

## ETHICS STATEMENT

The author has read and agreed to the Committee on Publication Ethics (COPE) international standards for authors.

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