Exploring Resource Synergies: Strategic and Versatile Resources in Venture Growth

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Abstract

This study advances resource-based theorizing of venture growth by examining how strategic resources, particularly intellectual property (IP), interact with versatile resources like human and financial capital across different environments. Using a configurational approach and fuzzy-set qualitative comparative analysis (fsQCA) on a four-year longitudinal dataset of 825 ventures, the research identifies four distinct pathways to growth, demonstrating that IP alone is insufficient for success. Instead, growth depends on the complementary use of strategic and versatile resources. The study also highlights the critical role of environmental munificence, such as the support provided by accelerators, which can compensate for a lack of internal resources, particularly financial capital. This research reconciles inconsistencies in prior studies by showing that the interaction between different types of IP and versatile resources is essential for venture growth. It also contributes to the understanding of how environmental factors influence the effectiveness of resource portfolios. These findings offer significant implications for both entrepreneurs, who must strategically combine resources; educators, who should emphasize the importance of these resource interactions and environmental contexts in entrepreneurship curricula; and accelerator managers, who should assess ventures based on their resource portfolio and tailor support based on their specific resource needs.

Keywords Resource-based view · Intellectual property · Human capital · Financial capital · Founding team · Configurational analysis

JEL classification O34, L26, M13, O15, L25

1. Introduction

Venture performance has long been a central research topic, with resource-based theories being dominant in trying to explain the phenomenon (D'Oria et al., 2021; Crook et al., 2008). Despite extensive research on the role of resources for performance, results remain inconclusive (Nason & Wiklund, 2018). One problem is that scholars have treated growth and profitability as interchangeable performance measures despite them representing different strategic orientations (Zhou & Park, 2020). However, when it comes to understanding a venture's resourcing behaviour, growth is a more relevant measure as it directly reflects the value created by the venture (Crook et al., 2008). In other words, growth indicates how well ventures leverage their resources to create value, whereas profitability indicates how well they distribute value amongst different stakeholders. Growth is, therefore, a distinct performance measure that requires specific theorizing (Zhou & Park, 2024) to better understand the relationship between resources and growth.

Another problem is that prior research has tended to conflate resources that reflect different theoretical mechanisms. In their meta-analysis, Nason and Wiklund (2018) highlight the critical difference in resource characteristics in Barney's (1991) resource-based view (RBV) and Penrose's (1959) theory of the growth of the firm. In the RBV, *strategic resources,* i.e. resources that are valuable, rare, and difficult to imitate or substitute (VRIN), allow ventures to efficiently implement strategies that protect them from imitation to secure and sustain competitive advantage (Barney et al., 2021; Crook et al., 2008; Barney, 1991). However, the inimitability of strategic resources can limit growth by creating path dependency and reducing the flexibility needed to respond to changing external circumstances. Inimitability makes it difficult for ventures to reconfigure their resources to put them to new or alternative uses (Nason & Wiklund, 2018), making them prone to losing value over time (Karadag & Poppo, 2023). By contrast, in Penrose's theory, *versatile resources,* i.e. resources that offer a broad range of potential services to ventures (Penrose, 1995), have lower transaction costs than strategic resources, allowing ventures to flexibly shift to different strategies and quickly adapt to changing external circumstances (Nason & Wiklund, 2018). This flexibility, however, might encourage a short-term focus on immediate opportunities, which in turn might create ambiguity regarding strategic direction. As versatile resources are also less venture-specific than strategic resources (Zhou & Park, 2024), ventures might see their competitive advantage diluted. In sum, it seems that the two types of resources have the potential to complement each other, but the interaction between strategic and versatile resources has not yet received a lot of scholarly attention (Zhou & Parker, 2024). This is problematic because ventures are bundles of resources (Barney et al., 2021), and resources often create value in combination with other resources (Linder et al., 2020; Clarysse et al., 2011).

In this study, we argue that ventures need *resource portfolios* (Standaert et al., 2022) comprising strategic *and* versatile resources. In dynamic and increasingly unpredictable environments, combining strategic and versatile resources allows for complementary and potentially reinforcing interaction between different resource characteristics. While strategic resources protect the venture's existing advantages, versatile resources allow for agility and adaptation. Specifically, in this study, we focus on the potential complementarity between *intellectual property* as a strategic resource and *human and financial capital* as versatile resources.

Intellectual property (IP) is a central strategic resource as it allows ventures to protect their intellectual capital from imitation (Barney, 1991). Different IP types, namely patents,

copyrights and trademarks, represent different mechanisms of how ventures can secure and sustain competitive advantage, but these different IP types have only recently started to be explored in combination with each other (Power & Reid, 2021). Prior research has predominantly focused on single IP types, most notably patents (Kato et al., 2021; Maresch et al., 2016; Helmers & Rogers, 2011). This is problematic, however, particularly in the context of early-stage ventures. Patents protect technological innovations (Blind et al., 2006), but these ventures often need more immediate and flexible protection that supports their evolving business models and helps them build brand recognition and customer loyalty (Block et al., 2015; Mendonça et al., 2004). In this study, we focus on all three types of IP that, on their own or in combination with each other, might need to be complemented with different versatile resources to realize their value. Specifically, we reason that human and financial capital expand the combinative possibilities and range of strategic actions (Nason & Wiklund, 2018) that ventures with IP can take to achieve growth. For example, the literature suggests that human capital in combination with IP represents the venture's intellectual capital, allowing it to create value (Edvinsson & Malone, 1997; Subramaniam & Youndt, 2005) and improve its performance (Youndt et al., 2004).

However, the resources ventures can utilize depend on environmental munificence, which refers to the extent to which resources are available to ventures in their environments (Castrogiovanni, 1991). Consistent with Penrose's theory, ventures not only need to rely on their internal resources, but can also utilize resources available in their external environment (Nason & Wiklund, 2018). We consider ventures affiliated with an accelerator as operating in a munificent environment that is likely to create permeable boundaries through which ventures can leverage additional human as well as financial capital. Accordingly, the aim of this study is to explore *how strategic resources (intellectual property) interact with versatile resources (human capital and financial capital) to explain venture growth in different environments*.

We adopted a configurational approach because "resources create value through their interactions with other resources in appropriate configurations" (Linder et al., 2020, p. 921). Specifically, we applied fuzzy-set qualitative comparative analysis (fsQCA) to a 4-year longitudinal dataset consisting of 825 ventures. FsQCA, a method that has attracted increasing attention in business and management research (for recent reviews see Di Paola et al., 2025; Kumar et al., 2022), allows us to examine strategic and versatile resources holistically and identify the pathways sufficient to explain venture growth. It can thus help to uncover potential resource interdependencies and environmental contingencies that affect venture growth. Importantly, fsQCA can reveal potential equifinality such that different pathways may explain the same outcome (Schneider & Wagemann, 2012; Ragin, 2008). Given that ventures differ in their resource base (Zahra, 2021; Barney, 1991) and the environment in which they operate, it is thus imperative to identify the different pathways to growth.

Our study contributes to the resource-based theorizing of venture growth (Zhou & Park, 2024) in two ways. First, we demonstrate that intellectual property as a strategic resource on its own is not sufficient to explain venture growth. While prior research suggests that versatile resources explain venture performance better than strategic resources (Nason & Wiklund, 2018), our findings show that strategic and versatile resources complement each other to explain venture growth. Specifically, we identify four pathways, each representing a distinct resource portfolio (Standaert et al., 2022) that shows that different types of IP require different combinations of human and financial capital. As such, we reconcile inconsistencies in prior research examining the performance implications of strategic resources in general (Nason & Wiklund, 2018; Crook et al., 2008) and intellectual property in particular (Power & Reid, 2021;

Helmers & Rogers, 2010; Suh & Hwang, 2010). Second, our study advances theorizing by revealing the environmental contingency that influences the value of resources such that environmental munificence can compensate for a venture's lack of versatile resource concerning financial capital. By considering accelerators as munificent environments that are particularly relevant for early-stage ventures, we contribute to a growing stream of research on the role of accelerators for venture outcomes (Assenova, 2020; Moritz et al., 2022). Given that firms differ in their resource base (Zahra, 2021), our findings offer important implications for entrepreneurs, entrepreneurship educators, and accelerator managers.

2. Theoretical background and configurational framework

Resource-based theorizing has long highlighted that resources often create value through their combinations with other resources (Linder et al., 2020; Clarysse et al., 2011). As Clarysse et al. (2011, p. 139) pointed out, "resources tend to be interrelated and act as bundles or configurations rather than individual subcomponents". In other words, the *resource portfolio* determines whether the potential value of different resources is realized or not (Standaert et al., 2022). As such, research that examines strategic resources alone provides only a partial picture of their impacts on venture growth. We argue that it is imperative to consider strategic and versatile resources together because the combination of these two types of resources might create more value than each of the resources operating independently. Specifically, strategic and versatile resources can create synergies that enhance overall venture growth. For example, a venture might use its strategic resources to secure a strong market position and then leverage versatile resources to innovate and expand into new markets. This combination can lead to sustained growth. Strategic resources might also provide the foundation upon which versatile resources can be effectively deployed. For instance, as in our study, ventures with strong IP (a strategic resource) can more effectively introduce new products or enter new markets (using versatile resources) due to the credibility and trust already established with customers. As such, different types of resources can complement each other, leading to synergistic effects (Gerhart & Feng, 2021). However, research on the potential interdependencies between strategic and versatile resources remains underexplored. Hence, we integrate strategic (intellectual property) and versatile resources (human and financial capital) to explore how they might interact with each other to explain venture growth in different environments. In doing so, we aim to uncover the potential interdependencies between different resources, as well as the environmental contingencies that affect the value of resources.

2.1 Strategic resources and venture growth

We consider a venture's intellectual property, namely patents, copyrights, and trademarks, as strategic resources (Crook et al., 2008; Nason & Wiklund, 2018). Intellectual properties are valuable and can be protected from imitation via law. Intellectual property can influence venture growth in several ways. *Patents* allow a venture to protect its innovations, maintain operational freedom, generate revenue (e.g., licensing), and enhance its reputation (Graham & Sichelman, 2008; Greenhalgh & Rogers, 2007). Patents also serve as a quality signal that can help the venture obtain investment (Zhou et al., 2016; Hoenig & Henkel, 2015), which can be used to fund venture growth initiatives. However, research on the impact of patents on venture outcomes has generated mixed results. Some studies found that patents contribute to venture survival (Kato et al., 2021), venture performance (Maresch et al., 2016; Andries & Faems, 2013) and growth (Helmers & Rogers, 2011). By contrast, other studies found that the relationship between patents and venture performance is negative (Power & Reid, 2021; Artz et al., 2010) or insignificant (Suh & Hwang, 2010).

Copyright allows a venture to protect and benefit from its works (Bainbridge, 2012). Copyright is relatively easy to obtain compared to the costly process of registering for a patent (Greenhalgh & Rogers, 2007). For example, copyright is granted automatically by the act of creation of the work in the UK. Yet, enforcing the copyright tends to be expensive and legally complex in the situation of copyright infringement (Bainbridge, 2012). Moreover, copyright is more relevant to some industries than others due to the nature of the products or services involved. For example, industries such as software, publishing, sound recording, motion picture and video, among others, have been identified as copyright-intensive industries (Paulsen et al., 2021). Evidence suggests that copyright is positively associated with the venture's technical efficiency (Suh & Oh, 2015) and venture growth (Suh & Hwang, 2010) in software ventures.

Trademark can serve at least two roles: identification and differentiation (Castaldi, 2018). The identification role of a trademark allows a venture to build and protect its brand (Sandner & Block, 2011; Mendonça et al., 2004). Indeed, one of the key motives for trademarking is brand building (Castaldi, 2018; Block et al., 2015), which, in turn, contributes to venture growth through increasing marketing effectiveness and consumer loyalty (Keller & Lehmann, 2006). The differentiation role of a trademark allows a venture to differentiate its products and services in the marketplace (Mendonça et al., 2004). This is important given that new ventures tend to focus on differentiation or niche strategies due to liabilities of smallness and newness (Aldrich & Auster, 1986).

While each of the three types of IP has been examined in isolation, they have rarely been examined in combination despite the potential for synergetic effects (Power & Reid, 2021). Moreover, it should be noted that the three types of IP are likely to vary in their strategic value. For example, patents are more valuable for innovative ventures to protect their inventions (Graham & Sichelman, 2008), whereas copyrights are more valuable for ventures to protect their creative works (Bainbridge, 2012). This implies that the strategic value of patents and copyrights may depends on the sector in which ventures operate. Unlike patents and copyrights, trademarks may offer value to ventures irrespective of their sector because trademarking allows ventures to build and protect their brands and reputation (Castaldi, 2018).

2.2 Versatile resources and venture growth

We consider human capital and financial capital to be relevant versatile resources (Crook et al., 2008; Nason & Wiklund, 2018) to complement IP as a strategic resource. While IP can secure a competitive advantage by protecting unique innovations or brand elements, versatile human and financial resources help create and capture value from these assets.

2.2.1 Human capital and venture growth

The human capital literature distinguishes between specific human capital and general human capital (Canavati et al., 2021; Unger et al., 2011). *Entrepreneurial experience* represents specific human capital because it is specifically related to running a venture. Consistent with previous research (Nason & Wiklund, 2018), we consider entrepreneurial experience a versatile resource because the knowledge gained from such experience can be broadly redeployed in another venture. Previous entrepreneurial experience allows individuals to develop various skills and become "jacks-of-all-trades to some extent" (Lazear, 2004, p. 208). Entrepreneurs are likely to perform a variety of roles in their businesses due to resource constraints. The experience-based knowledge and skills developed from prior entrepreneurial experience are

highly relevant in the entrepreneurial context (Sardana & Scott-Kemmis, 2010; Cope, 2005), meaning they can be broadly redeployed in another venture thus making it a versatile resource. As a result, prior literature suggests that entrepreneurial experience can contribute to venture growth (Gifford et al., 2021; Colombo & Grilli, 2005). By contrast, education represents general human capital because it is not task specific. *Education* represents a broad scope of knowledge base that can be applied in different settings (Becker, 2009). Thus, we consider education a versatile resource (Nason & Wiklund, 2018). For example, high levels of education allow individuals to develop general and specialized knowledge, information-processing skills, and problem-solving skills that can be applied in different settings (Becker, 2009). The knowledge and skills developed through education can enhance individuals' ability to identify and exploit new opportunities (Shepherd & DeTienne, 2005; Shane, 2000), which in turn may contribute to venture growth. Indeed, individuals with higher levels of education are more receptive to innovative ideas and are more likely to launch ventures that are innovative rather than imitative (Koellinger, 2008). Moreover, evidence suggests entrepreneurs' levels of education are positively related to their aspiration for venture growth (Autio & Acs, 2010).

In addition to entrepreneurial experience and education, another resource of human capital available to a venture is the founding team. The *founding team* represents the collective knowledge base that a venture can draw on. We consider it a versatile resource because the collective knowledge possessed by founding members can offer a wide range of services for the venture (Nason & Wiklund, 2018). The founding team will likely influence venture growth because the presence of other founding member(s) can offer complementary skills and knowledge that, in turn, enhance the venture's capabilities to exploit new opportunities. This implies that the presence of other founding member(s) might compensate for the entrepreneur's lack of specific (entrepreneurial experience) or general (education) human capital. Indeed, the literature suggests that one of the team formation strategies used by entrepreneurs is to select founding members who can offer complementary knowledge and skills (Lazar et al., 2020). However, it should be noted that while a founding team offers resources (e.g., human, social, and financial capital) and support, it also entails coordination costs and might lead to conflicts between team members (Howell et al., 2022).

2.2.2 Financial capital and venture growth

Financial capital represents a versatile resource because it can be easily converted into other resources (Nason & Wiklund, 2018). Financial capital is essential to sustain the business operation, especially at the early stage of venture creation, because the cash flows are often negative during this stage (Scott & Bruce, 1987). It can also buffer management mistakes (Castrogiovanni, 1996; Chandler & Hanks, 1998) and allow ventures to mitigate challenges associated with the liabilities of smallness and newness (Aldrich & Auster, 1986), thereby reducing the chance of failure. Moreover, financial capital allows ventures to invest in innovation, which is resource-intensive (Wiklund & Shepherd, 2005). Research has shown that a lack of financial resources has a significantly negative influence on investment in innovation (Winker, 1999). Consequently, a lack of financial capital will likely hinder a venture's ability to develop new products or services and thus hinder growth.

2.3 The role of environmental munificence

We argue that the resources ventures can utilize to achieve growth depend on environmental munificence, which refers to the extent to which resources are available to ventures in their environments (Castrogiovanni, 1991). Consistent with Penrose's theory, ventures do not need

to only rely on their internal resources but can also utilize resources available in their external environment (Nason & Wiklund, 2018). We consider ventures affiliated with an accelerator operating in a munificent environment that is likely to create permeable boundaries through which ventures can leverage additional human as well as financial resources. First, accelerators provide ventures with access to human capital. For example, accelerators frequently offer entrepreneurship training and mentorship programmes (Avnimelech & Rechter, 2023; Cohen et al., 2019). The training and support provided by accelerators may compensate for the entrepreneur's lack of specific (entrepreneurial experience) or general (education) human capital. Indeed, evidence suggests the intensive and broad learning is one of the key benefits offered by accelerators (Hallen et al., 2020). Second, accelerators provide ventures with access to financial capital either directly or indirectly. Accelerators can directly provide funding in exchange for venture equity (Cohen et al., 2019). They can also serve as intermediaries that connect ventures with potential investors. For example, the extensive network provided by accelerators can often connect entrepreneurs to not only mentors and peer entrepreneurs, but also potential investors.

2.4 Configurational framework

Figure 1 shows the configurational framework for this study. We argue that although intellectual property, a strategic resource, represents a source of sustained competitive advantage, intellectual property on its own is not sufficient to explain venture growth. We contend that ventures need to complement strategic resources with versatile resources, such as human and financial capital, for venture growth. Specifically, the literature suggests that "the resources a firm possesses and the actions it takes to use them are jointly important determinants of performance advantages" (D'Oria et al., 2021, p. 3). Given that resources are often managed and deployed by people in charge of the venture (Finkelstein et al., 2009), the human capital of entrepreneurs and founding member(s) will likely influence the actions a venture takes to utilize intellectual property for venture growth. Similarly, the availability of financial capital can also influence a venture's ability to create and capture value from its intellectual property. For example, financial capital allows ventures to transform intellectual property as inputs (Suh & Hwang, 2010) into marketable products or services. We consider environmental munificence as the boundary condition that can influence the value of resources because ventures can leverage the resources available in their environment together with their own resources. By adopting a configurational approach, we aim to uncover the potential interdependencies between strategic and versatile resources, as well as the environmental contingencies that might influence the value of resources.

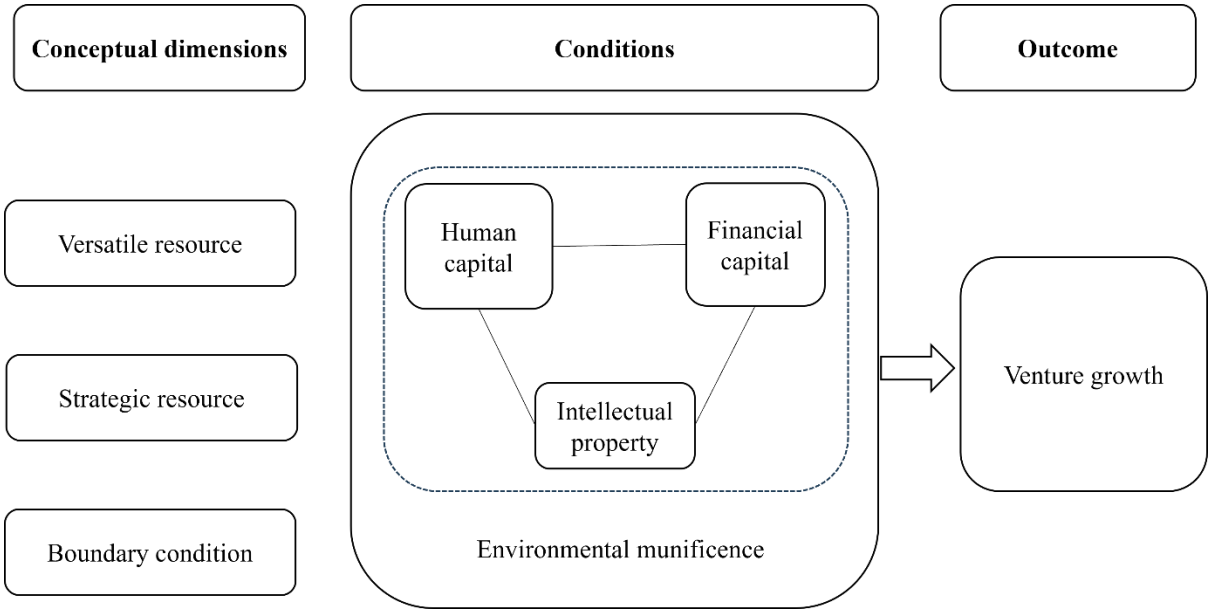

Figure 1: Configurational framework

3. Methodology

We applied fuzzy-set qualitative comparative analysis (fsQCA) to capture the interplay of causal conditions that explain venture growth. Research using a regression-based approach focuses on the net effect of the independent variable on the dependent variable (Ragin, 2008). While the regression-based approach can capture the potential interplay between different variables, it is often limited to two-way interactions because results based on more than two variables are challenging to interpret (Vis, 2012). The regression-based approach implies a symmetric relationship between the independent and dependent variables, meaning it cannot capture potential asymmetric relationships between variables (Woodside, 2013). Compared to the regression-based approach, fsQCA is particularly useful in capturing causal complexities concerning conjunction, equifinality, and asymmetry, key principles of configurational theorizing (Furnari et al., 2021). Conjunction focuses on how multiple causal conditions (e.g., strategic and versatile resources) may work together, rather than operate independently, to explain the outcome of interest (Ragin, 2008). Equifinality concerns how multiple pathways may explain the same outcome. Asymmetry concerns the potential asymmetric relationships between the causal condition and outcome, such that the pathways leading to the presence of an outcome may not mirror those leading to its absence. FsQCA has become a key method in business and management research (for recent reviews and best practices, see Di Paola et al., 2025; Kumar et al., 2022; Furnari et al., 2021; Greckhamer et al., 2018). However, it should be noted that this method is not well suited for standard hypothesis testing because the principles (e.g., equifinality) of the set-theoretic approach are incompatible with hypothesis testing (Di Paola et al., 2025).

3.1. Data

In this study, we used longitudinal data obtained from the Global Accelerator Learning Initiative (GALI). The GALI dataset builds on the Entrepreneurship Database Program at Emory University, which collects detailed information on early-stage ventures applied to

accelerator programmes around the world. The dataset contains 13,818 ventures that applied to accelerators between 2013 and 2017; we restrict our sample to ventures that completed *three waves of follow-up surveys* to capture performance at a relatively longer period because short-term performance measures are more likely to be biased by random fluctuations (Richard et al., 2009). The four-year longitudinal dataset contains 1408 ventures. We removed cases with missing data and nonprofit ventures. To ensure ventures are comparative in size, we also removed five cases that have 50 or more full-time employees, leading to a final sample of 825 ventures for data analysis. The average venture age is 3.57 years; 746 ventures have 0-9 employees, and 79 ventures have 10–49 employees. The ventures are from different industry sectors, which are summarized in Appendix A, Table A1.

3.2 Measurement

3.2.1. Venture growth as the outcome condition

Venture growth was measured based on the venture's revenue growth from the GALI dataset. We choose revenue growth over employment growth because the primary function of a venture is to use its resources to produce goods and services. Revenue growth represents the market acceptance of the venture's products, whereas employment growth implies growth in resources (Daunfeldt & Halvarsson, 2015; Amason et al., 2006; Delmar et al., 2003). We first calculated the average revenue for the first two years and the latter two years to smooth out the yearly fluctuations in sales. Revenue growth was calculated as the percentage change in the average revenue between the first and the latter two years. Comparing the percentage change in revenue allows us to compensate for potential factors such as venture size and industry sector that might influence the absolute values of the revenue (Carton & Hofer, 2006).

3.2.2. Causal conditions

Strategic resources concerning *intellectual property* was measured based on the survey items asking whether the venture has any types of intellectual property, including patents, copyrights, and trademarks. We coded each condition as "1" if the response is "Yes" or "0" otherwise. The number of cases with patents, copyrights, and trademarks are summarized in Appendix A, Table A2.

Versatile resources concerning human capital include entrepreneurial experience, education, and founding team. *Entrepreneurial experience* was measured based on the number of ventures the leading founder has launched before starting the current venture. Around half of the entrepreneurs (e.g., 430 out of 825 cases) do not have entrepreneurial experience. *Education* was measured using the items capturing the "highest level of education completed" for the leading founder. We coded the data into six levels, ranging from "1" (e.g., None/primary school/Middle school) to "6" (PhD), following Ozgen et al. (2021). The *founding team* was captured based on the number of founding members within the venture. Specifically, the survey asked participants to provide information about three founders and specify the number of additional founders. The sum was used to represent the founding team. In total, 673 ventures were started by founding teams. The average number of founding members is 3.18, with most ventures (e.g., 629 out of 673) having between two and five founding members. The remaining 152 ventures were started by solo founders, meaning the absence of a founding team.

Versatile resources concerning *financial capital* was captured in several steps. First, we calculated the financial capital based on the sum of owner investment, debt borrowed, and

equity financing invested in the venture, as a venture's financial resources can come from different sources (Robb & Robinson, 2014). Second, based on the venture financial capital data, we calculated the average financial capital for each industry included in the present study. The average financial capital for each of the industry is summarized in Appendix A. As a final step, we used the venture financial capital divided by the industry average financial capital to account for potential differences in capital requirements between different sectors.

Environmental munificence was measured using the proxy concerning whether the venture is affiliated with an accelerator. We coded ventures that are affiliated with an accelerator (e.g., through participating in the accelerator programme) as "1" or "0" otherwise. We used a venture's affiliation with an accelerator to represent environmental munificence because studies have highlighted that accelerators provide ventures with access to a wide range of resources such as finance, training, mentoring, and networks (Avnimelech & Rechter, 2023; Crișan et al., 2021; Cohen et al., 2019). This implies that ventures affiliated with an accelerator are likely to create permeable boundaries through which they can leverage additional human and financial resources for venture growth.

3.3 Data calibration

The fsQCA method requires data calibration, meaning transforming data into fuzzy membership scores ranging from 0 to 1, where 0 represents fully out, 0.5 represents the cross-over point, and 1 represents fully in (Schneider & Wagemann, 2012; Ragin, 2008). Data calibration is not required for binary conditions such as patent, copyright, trademark, and environmental munificence. Previous research suggests that high-growth ventures are those that achieved at least 50% sales growth in three consecutive years (Halabisky et al., 2006; Autio et al., 2000). This implies a compound growth rate of 125% comparing the average sales revenues between the first and the latter two years. Based on this substantive knowledge, we used 0 and 1.25 to represent fully out and fully in and the mid-point between them 0.63 to represent the cross-over point for the outcome condition.

Similarly, we calibrated entrepreneurial experience and founding team based on substantive knowledge. Specifically, we used 0, 0.5, 2 to represent fully out, cross-over point, and fully in for entrepreneurial experience such that entrepreneurs who have launched one previous venture are more in than out. We used 1, 1.5, 3 to represent the three thresholds for founding team such that a founding team that has two members is more in than out. Finally, we calibrated the data for education and financial capital into fuzzy membership scores based on the thresholds of 10th, 50th, and 90th percentile to represent fully out, cross-over point, and fully in, respectively, following previous fsQCA studies (Stroe et al., 2022; Huang et al., 2021). We used the sample statistics for education and financial capital due to the absence of a strong theoretical or empirical basis for adopting different thresholds. The calibration thresholds are shown in Table 1. Ragin (2008) recommended avoiding membership scores of exactly 0.50 for causal conditions as it signals maximum ambiguity. To avoid this issue and ensure all cases are included in the fuzzy set analysis, we follow Fiss (2011) by adding a constant of 0.001 to non-binary causal conditions below full membership of 1.

Table 1. Descriptive statistics and calibration thresholds

	Descriptive statistics				Calibration thresholds		
Conditions	Mean	SD	Min	Max	Fully in	Cross-over	Fully out
Patent	0.17	0.37	0.00	1.00	1.00	-	0.00
Copyright	0.14	0.35	0.00	1.00	1.00	-	0.00

Trademark	0.36	0.48	0.00	1.00	1.00	-	0.00
Entrepreneurial experience	1.03	1.79	0.00	13.00	2.00	0.50	0.00
Education	4.21	0.93	1.00	6.00	5.00	4.00	3.00
Founding team	2.78	1.74	1.00	20.00	3.00	1.50	1.00
Financial capital	1.00	3.00	0.00	33.71	2.55	0.08	0.00
Environmental munificence	0.36	0.48	0.00	1.00	1.00	-	0.00
Venture growth*	6.23	20.92	-1.00	207.06	1.25	0.63	0.00

* Note: One extreme outlier for venture growth was excluded to avoid biasing the statistics.

4. Data analysis and results

In line with fsQCA best practices (Douglas et al., 2020; Greckhamer et al., 2018), we performed the data analysis following three steps: a) necessity analysis to assess the necessity of the causal conditions; b) sufficiency analysis to identify configurations that are sufficient in explaining venture growth; and c) robustness test to evaluate the results.

4.1 Analysis of necessary conditions

Table 2 shows the results from the necessity analysis, which assesses whether any of the causal conditions examined in our study were necessary for the presence of venture growth (Ragin, 2008). As shown in Table 2, all consistency scores for each of the causal conditions are below the recommended value of 0.90 (Schneider & Wagemann, 2012). Moreover, the coverage scores are all below 0.65 (Muñoz et al., 2022). These results demonstrate that no causal condition emerged as a necessary condition for the presence of venture growth.

Table 2. Analysis of necessary conditions for venture growth

Causal conditions*	Presence		Absence	
	Consistency	Coverage	Consistency	Coverage
Patent	0.16	0.48	0.17	0.52
~Patent	0.84	0.50	0.83	0.50
Copyright	0.14	0.49	0.14	0.51
~Copyright	0.86	0.49	0.86	0.51
Trademark	0.38	0.51	0.35	0.49
~Trademark	0.62	0.48	0.65	0.52
Entrepreneurial experience	0.48	0.54	0.44	0.52
~Entrepreneurial experience	0.57	0.50	0.61	0.54
Education	0.66	0.54	0.62	0.52
~Education	0.41	0.52	0.44	0.57
Founding team	0.77	0.52	0.74	0.51
~Founding team	0.28	0.51	0.32	0.58
Financial capital	0.44	0.52	0.47	0.56
~Financial capital	0.63	0.54	0.60	0.53
Environmental munificence	0.38	0.52	0.33	0.48
~Environmental munificence	0.62	0.48	0.67	0.52

* ~ sign refers to the absence of the causal condition

4.2 Analysis of sufficient conditions

To perform the sufficiency analysis, we first constructed a truth table containing 256 possible configurations (2^8), where 8 refers to the number of causal conditions examined in this study. We adopted a frequency threshold of three cases because the sample size is large (Douglas et al., 2020). Specifically, we removed configurations containing less than three empirical cases, leading to 89% retaining cases, which is higher than the suggested minimum threshold of 75% (Ragin, 2008). Based on the consistency threshold of ≥ 0.90 and the proportional reduction in inconsistency (PRI) threshold of ≥ 0.70 (Douglas et al., 2020; Greckhamer et al., 2018), we coded the outcome of the individual configurations such that configurations meeting the threshold were coded as 1, otherwise 0. The truth table is shown in Appendix B. We used the fsQCA 3.0 software to perform the sufficiency analysis with eight causal conditions:

> *Venture growth = f (patent, copyright, trademark, entrepreneurial experience, education, founding team, financial capital, environmental munificence)*

The fsQCA software generates three types of solutions (parsimonious, intermediate, and complex solution) depending on how logical remainders or counterfactuals, which refers to configurations that contain no empirical cases, are handled (Ragin, 2008; Schneider & Wagemann, 2012). Specifically, the parsimonious solution considers all logical remainders, whereas the intermediate solution considers logical remainders that are consistent with prior empirical or theoretical knowledge. Our results are based on the complex solution where we made no assumption about the logical remainders because of a lack of empirical or theoretical knowledge on how the strategic and versatile resources may work together to explain venture outcomes. The complex solution is considered conservative because the results are derived based on empirical information without making assumptions about logical remainder (Schneider & Wagemann, 2012). Table 3 (left panel) shows the results of the sufficiency analysis with the presence of venture growth as the outcome condition. The right panel shows the results with the absence of venture growth as the outcome condition, which is discussed in the robustness checks section. As shown in the left panel, four pathways are sufficient to explain the presence of venture growth. The overall solution consistency is above the suggested threshold of 0.80 (Ragin, 2008), meaning the pathways identified in our study consistently explain the outcome. The overall solution coverage of 0.06 indicates the proportion of the empirical cases explained by the identified pathways.

Table 3. Analysis of sufficient conditions for the presence and absence of venture growth

		Presence				Absence	
Condition sets	Causal conditions	P1	P2	P3	P4	A1	A2
Intellectual property as strategic resource							
	Patent	○	●	○	○	●	●
	Copyright	○	○	●	●	○	○
	Trademark	●	○	●	○	○	○
Human capital as versatile resource							
	Entrepreneurial experience	●	○	●	●	○	●
	Education	●	●	●	●	●	●
	Founding team	●	●	●	●	○	●
Financial capital as versatile resource							
	Financial capital		○	●	●	●	○
Environmental context as boundary condition							
	Environmental munificence	●	●	○	●	○	○
Consistency		0.86	0.92	0.85	0.89	0.83	0.81

Raw coverage	0.04	0.01	0.01	0.01	0.01	0.02
Unique coverage	0.04	0.01	0.01	0.01	0.01	0.02
Overall solution consistency	0.87				0.81	
Overall solution coverage	0.06				0.03	

Note: ● (○) represents the presence (absence) of the causal condition; blank spaces indicate the condition is irrelevant in the specific pathway

For pathways explaining the presence of venture growth, P1 represents ventures that operate in a munificent environment, i.e. are supported by an accelerator and achieve growth through trademark protection combined with strong human capital (i.e., presence of entrepreneurial experience, education and founding team). We label this pathway "*Brand builders with versatile human capital*". P2 represents ventures that achieve growth through patents combined with some human capital (i.e., presence of education and founding team, but absence of entrepreneurial experience), but a lack of financial capital. Operating in a munificent environment, i.e. receiving support from an accelerator, compensates for the lack of entrepreneurial experience and financial capital. We therefore label this pathway "*Accelerator-supported tech-inventor*". P3 represents ventures in a non-munificent environment that achieve growth through copyright and trademark combined with leveraging all human and financial capital. As these ventures are not supported by an accelerator, we label this pathway "*Self-sufficient creators*". Lastly, P4 represents ventures in a munificent environment that achieve growth through copyright combined with – same as P3 – leveraging all human and financial capital. We label this pathway "*Accelerator-supported creators*".

For pathways explaining the absence of venture growth, A1 represents ventures that lack growth despite having patents and financial capital, but lacking entrepreneurial experience, a team, as well as a munificent environment due to a lack of support from an accelerator. This pathway points to ventures with solo founders who are tech-inventors with financial resources. With no entrepreneurial experience, no team and no support from an accelerator these ventures struggle to gain traction from their patented technologies. We label this pathway "*Struggling solo tech-inventors*". A2 represents ventures that lack growth despite having patents and strong human capital (i.e. entrepreneurial experience, education and a founding team), but lack financial capital as well as a munificent environment due to lack of support from an accelerator. Compared to A1, these ventures have entrepreneurially experienced founding teams. Given that they are underfunded and unsupported by an accelerator, these ventures struggle to realize the innovative potential of their patented technologies. When compared to P2, findings suggest that the lack of accelerator support is what limits these ventures. We therefore label this pathway "*Unsupported tech-inventor*". Table 4 summarizes the naming of the pathways.

Table 4. Naming of pathways

Pathway	Name
P1	Brand builders with versatile human capital
P2	Accelerator-supported tech-inventors
P3	Self-sufficient creators
P4	Accelerator-supported creators
A1	Struggling, solo tech-inventors
A2	Unsupported tech-inventor

4.3 Robustness checks

To scrutinize the results, we conducted a series of robustness checks. First, we conducted another set of sufficiency analysis to identify the pathways explaining the absence of venture growth (i.e., the negation of the outcome). The results in Table 3 (right panel) show that two pathways (A1 and A2) are sufficient to explain the absence of venture growth. Importantly, the patterns of the two pathways are distinct from the findings from our main analysis (P1 to P4), suggesting no contradictory configurations in our study.

Second, we adjusted the frequency cut-offs from three cases to four cases to enhance the parsimony of the solutions. The new frequency threshold results in 85% retaining cases, above the 75% minimum suggested by Ragin (2008). The results from this step show that three pathways are sufficient to explain venture growth. Importantly, the three pathways are identical to those identified in our main analysis. Third, we adjusted the calibration thresholds for entrepreneurial experience and founding team by using a higher value for the fully in anchoring point such that the fully in value is raised from 2 to 3 for entrepreneurial experience and raised from three to four members for founding team. The results remain identical to those identified in our main analysis.

As a final step, we selected a subset of the sample, 448 invention-based ventures, for further analysis. Invention-based ventures refer to those that build upon newly created technology owned by the ventures and/or their founders. We focus on invention-based ventures based on the consideration that the value of strategic and versatile resources may depend on whether the venture is invention-based or not. The results in Table 5 show that five pathways are sufficient to explain venture growth. Two of the pathways (R1 and R3) are identical to those identified in our main analysis, with another pathway (R2) largely consistent (i.e., the financial capital condition changes from absent to irrelevant) with the main results. The patterns of the remaining two pathways (R4 and R5) also align with our argument that strategic and versatile resources will complement each other to explain venture growth. Taken together, the results from robustness checks provide further support for our main findings.

Table 5. Analysis of sufficient conditions for venture growth (Invention-based ventures only)

		Presence				
Condition sets	Causal conditions	R1	R2	R3	R4	R5
Intellectual property as strategic resource						
	Patent	○	●	○	○	○
	Copyright	○	○	●	○	●
	Trademark	●	○	●	●	●
Human capital as versatile resource						
	Entrepreneurial experience	●	○	●	●	○
	Education	●	●	●		●
	Founding team	●	●	●	●	○
Financial capital as versatile resource						
	Financial capital			●	●	●
Environmental context as boundary condition						
	Environmental munificence	●	●	○	●	●
Consistency		0.89	0.88	0.85	0.85	0.82
Raw coverage		0.04	0.03	0.02	0.04	0.01
Unique coverage		0.01	0.03	0.02	0.01	0.01
Overall solution consistency		0.85				
Overall solution coverage		0.11				

Note: ● (○) represents the presence (absence) of the causal condition; blank spaces indicate the condition is irrelevant in the specific pathway

5. Discussion and implications

We advance knowledge of resource-based theorizing of venture growth by exploring how strategic resources (i.e., different types of IP) interact with versatile resources (i.e., human and financial resources) to explain venture growth in different environments. We first discuss the theoretical implications of our findings, then the practical implications, followed by a discussion of limitations and avenues for future research.

First, we identify four pathways (P1 to P4) that explain the presence of venture growth and two pathways (A1 and A2) for its absence. The results show that all pathways explaining venture growth contain at least one strategic resource, i.e. one intellectual property type, namely patent, copyright, and trademark. Given that ventures differ in their intellectual property strategies (Veugelers & Schneider, 2018), it is not surprising that they possess different types of intellectual property. Interestingly, patent occurs in only one pathway that explains the presence of venture growth (P2), but both pathways that explain the absence of venture growth. Two reasons might explain this pattern. First, patenting is more costly and complex to pursue than registering for copyright and trademark (Bainbridge, 2012). Second, the perceived difficulty in patent litigation (Graham & Sichelman, 2008) and a lack of understanding of the intellectual property system (Pitkethly, 2011) might also explain such a pattern. Findings suggest that operating in a munificent environment might help to overcome these two constraints as pathway P2 is supported by an accelerator, whereas pathways A1 and A2 are not.

Importantly, our results demonstrate that although intellectual property as a strategic resource is important, it is not sufficient to explain venture growth. Pathways P1 to P4 show that venture growth is explained by different types of IP complemented by human and/or financial capital as versatile resource. We reason that while intellectual property allows ventures to create value through exploiting such resources, the realization of their value relies on the availability of versatile resources. For example, human capital might influence how ventures leverage intellectual property for growth, whereas financial capital allows ventures to transform intellectual property as inputs (Suh & Hwang, 2010) into marketable products or services. These findings contribute to research on the knowledge-based view (KBV) of the firm, an extension of the RBV. The KBV suggests that differences in ventures' knowledge base can explain variations in venture performance (Eisenhardt & Santos, 2006; Pereira & Bamel, 2021). Supporting this view, we found that knowledge resources concerning intellectual property and human capital can help explain venture growth. Importantly, our findings suggest examining a venture's knowledge base in isolation provides only a partial picture of the impacts of knowledge resources on venture outcomes. Specifically, we provide evidence showing that knowledge resources tend to interact with other types of resources (e.g., financial capital) to influence venture outcomes.

We summarize these findings as follows:

Proposition 1a: Strategic resources OR versatile resources on their own are not sufficient to explain the presence of venture growth.

Proposition 1b: Strategic resources AND versatile resources complement each other to explain the presence of venture growth.

Our study advances resource-based theorizing of venture growth (Zhou & Park, 2024) by demonstrating that intellectual property as a strategic resource is a source of sustained competitive advantage, but that intellectual property alone is not sufficient to explain venture growth. Previous research found that versatile resources explain venture growth better than strategic resources (Nason & Wiklund, 2018). Findings from this study, however, reveal that strategic and versatile resources tend to complement each other to explain growth. Specifically, the pathways identified in this study represent distinct resource portfolios (Standaert et al., 2022). Each pathway or resource portfolio explains venture growth through a distinct combination of intellectual property as a strategic resource complemented by human capital and financial capital as versatile resources. The presence of such resource complementarities explains why previous research examining the performance implications of strategic resources in general (Nason & Wiklund, 2018; Crook et al., 2008) and intellectual property in particular (Power & Reid, 2021; Helmers & Rogers, 2010; Suh & Hwang, 2010) has generated inconsistent results. Previous research examined resources mostly in isolation, meaning the potential interdependencies between different resources remained underexplored.

Second, we also uncover the environmental contingency that can influence the value of versatile resources. P1 and P2 show that ventures can achieve growth when they are operating in a munificent environment, despite financial capital being irrelevant (P1) or absent (P2). By contrast, in A2 financial capital is also absent, but because ventures operate in a non-munificent environment, venture growth is absent. These results indicate that environmental munificence will likely compensate for the absence of financial capital. The literature suggests that accelerators, as a proxy of environmental munificence, often offer financial support, fundraising training, and access to wider networks, including potential investors (Avnimelech & Rechter, 2023; Crișan et al., 2021; Cohen et al., 2019). Ventures that operate in a munificent environment can thus compensate for their lack of financial capital by tapping into the resources that are potentially available from their environment.

However, the potential environmental contingency that might influence the value of human capital is less clear. The literature suggests that accelerators often provide entrepreneurship training and mentoring services (Avnimelech & Rechter, 2023; Cohen et al., 2019). Evidence has shown that entrepreneurs often benefit from the intensive and broad learning provided by accelerators (Hallen et al., 2020). We thus expect that environmental munificence will likely compensate for a lack of human capital. A1 shows that venture growth is absent when strategic resource and financial capital are combined with education alone, where environmental munificence is absent. Given that P1 to P4 in our main analysis all contain at least two human capital conditions, we are unable to assess whether environmental munificence can compensate for a lack of human capital, such as entrepreneurial experience and founding team. However, the results from our robustness tests focusing on invention-based ventures provide some support that environmental munificence will likely compensate for a lack of human capital, such as entrepreneurial experience and founding team (Table 5, R5). Given the tentative results, further research is still needed to examine the environmental contingency that might influence the value of human capital.

We summarize these findings as follows:

Proposition 2: The value of versatile resources is contingent on the environment in which ventures operate such that environmental munificence can compensate for a venture's lack of financial capital.

Our study, therefore, advances resource-based theorizing of venture growth by uncovering the environmental contingency that can influence the value of versatile resources. Specifically, our findings show that environmental munificence can compensate for the lack of financial resources. This is relevant as it highlights the need for researchers to consider a venture's resources and its environmental context holistically because resources can interact with each other, and the value of resources is contingent on the environment in which the venture operates.

Our study also offers important implications for entrepreneurs, entrepreneurship educators, and accelerator managers. Given that ventures differ in their resource base (Zahra, 2021) and intellectual property strategies (Veugelers & Schneider, 2018), there is unlikely to be a one-size-fits-all approach to venture growth. Each of the pathways identified in this study represents a distinct resource portfolio that helps entrepreneurs tailor their IP strategies to the resources and the environment in which they operate. Specifically, entrepreneurs need to be aware that possessing technological innovations protected by IP might not be enough to guarantee venture growth. As pathway A1 shows, solo tech-founders with financial resources but a lack of entrepreneurial experience, no team and no accelerator support are at high risk of struggling to grow. This implies that solo tech-founders with patents should seek co-founders with complementary skills or consider joining an accelerator to mitigate these challenges. The contrast between growth (P1-P4) and non-growth pathways (A1-A2) underscores the significant impact of the operating environment on venture performance. Entrepreneurs should be aware of their external environment and seek to position their ventures in more supportive ecosystems. For ventures operating in less munificent environments, entrepreneurs may leverage internal resources to compensate for the lack of access to potential support from accelerators. For example, our findings show that through leveraging available human and financial capital along with appropriate IP strategies (see P3), ventures operating in less munificent environments can also achieve venture success.

For entrepreneurship educators who integrate IP into their curricula, it is important to teach students not only the technical aspects of IP protection, but to make them aware of how to strategically use IP in combination with different human and financial resources. Using contrasting case studies, educators can encourage students to explore why ventures with similar IP strategies perform differently. For accelerator managers, our findings can help inform their decisions in the process of selecting and supporting ventures. Accelerators are often selective when choosing ventures (Yin & Luo, 2018). In the selection process, it is thus critical for accelerators to assess the potential of ventures based on their resource portfolio rather than the availability or lack of a specific resource. In the process of designing the support programme (Cohen et al., 2019), accelerators should also ensure the supports provided are aligned with and tailored to the venture's resource needs.

5.1 Limitations and future research directions

While this study offers useful insights into the resource interdependencies and environmental contingency for venture growth, we should also consider the limitations that provide opportunities for future research. We focus on strategic resources concerning intellectual property to uncover how they might interact with versatile resources to explain venture growth. However, some ventures might protect themselves through a combination of both formal (e.g.,

patent, copyright, and trademark) and informal (e.g., trade secrecy and speed to market) intellectual property mechanisms (Veugelers & Schneider, 2018; Lee et al., 2018; Thomä & Bizer, 2013). As such, future research might consider whether and to what extent the use of informal mechanisms might complement or substitute formal mechanisms to affect venture outcomes. Moreover, we examined the role of environmental munificence and uncovered that it can influence the value of versatile resources concerning financial capital. Future research might consider other types of environmental contingencies that affect the value of strategic resources. For example, the value of strategic resources concerning intellectual property might depend on the extent to which such resources are protected. As such, future research might assess how the resources for venture growth might vary between ventures that operate in different institutional environments concerning the extent of intellectual property protection in different countries.

Furthermore, our findings may be subject to self-selection bias because the dataset consists of ventures that applied to participate in accelerators. This implies that our findings may not be generalizable to ventures that chose not to participate in accelerators in the first place. Indeed, the literature suggests that "we do not know the ways in which accelerated ventures are systematically different from nonaccelerated ones" (Chan et al., 2020, p.236). Moreover, apart from accelerators, ventures may also obtain support from other entrepreneurial support organizations such as incubators, science parks, and co-working spaces (Bergman & McMullen, 2022). As such, we encourage future research to assess our configurational framework by considering ventures in other contexts, such as those that chose not to participate in accelerators or ventures that are supported by other entrepreneurial support organizations.

6. Conclusions

Building on RBV and using a configurational approach, this study explores how strategic resources (intellectual property) interact with versatile resources (human capital and financial capital) to explain venture growth in different environments. We show that strategic resources on their own are not sufficient to explain venture growth, and ventures need to complement strategic resources with versatile resources such as human and financial capital for venture growth. Our study also shows the value of versatile resources is dependent on the environment in which ventures are embedded, such that environmental munificence can compensate for a venture's lack of financial capital. Overall, our study expands resource-based theorizing of venture growth by demonstrating that it is imperative to consider a venture's bundle of resources and the environment in which the venture operates holistically. The reason is that resources often create value through their combination with other resources, and the value of resources is influenced by the environment in which the venture is operating within.

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Appendix A

Table A1: Industry Information

Industry	Number of cases	Average financial capital*
Agriculture	179	126,999
Artisanal	34	89,834
Culture	6	6,467
Education	93	185,098
Energy	55	95,661
Environment	50	68,986
Financial services	66	294,887
Health	75	256,654
Housing development	7	63,014
Information and communication technologies	49	84,658
Infrastructure/facilities development	16	43,349
Other	126	98,502
Supply chain services	23	37,553
Technical assistance services	11	52,686
Tourism	22	66,492
Water	13	14,136
Total number of cases	825	

*The average financial capital for ventures from the same industry sector. The numbers were used to calculate the industry adjusted financial capital for each venture, see section 3.2.2. Causal conditions for details.

Table A2: Intellectual Property Information

Type of intellectual property	Yes	No	Total cases
Patents	139	686	825
Copyrights	115	710	825
Trademarks	299	526	825

Appendix B. Truth Table for presence of venture growth

Patent	Copyright	Trademark	Entrepreneurial experience	Education	Founding team	Financial capital	Environmental munificence	Number of cases	Venture growth
0	0	1	1	1	1	1	1	13	1
1	0	0	0	1	1	0	1	4	1
0	1	0	1	1	1	1	1	3	1
0	1	1	1	1	1	1	0	7	1
0	0	1	1	1	1	0	1	10	1
0	0	1	1	0	1	1	1	4	0
1	0	0	1	0	1	1	0	3	0
1	0	0	0	1	1	1	1	7	0
0	1	1	0	1	1	0	0	3	0
0	0	1	1	1	0	0	0	4	0
0	0	1	0	1	1	0	0	13	0
0	0	0	1	1	0	0	1	8	0
0	0	0	1	1	1	0	1	17	0
0	0	0	1	0	1	1	0	5	0
0	1	1	0	1	0	1	1	3	0
0	0	1	0	1	1	0	1	10	0
0	1	1	1	1	1	1	1	3	0
0	0	0	1	1	0	0	0	12	0
1	0	1	1	1	1	1	1	5	0
0	1	0	0	1	1	0	0	3	0
0	0	1	0	1	1	1	1	19	0
0	0	1	0	0	1	0	0	6	0
0	0	1	0	1	1	1	0	30	0
0	0	0	1	0	1	0	0	6	0
0	0	0	0	1	1	0	1	34	0
0	0	0	0	0	0	0	0	4	0
0	0	0	0	1	0	0	1	7	0
0	0	0	0	1	1	1	1	20	0
0	0	1	0	1	0	0	0	5	0
0	0	0	1	1	1	1	0	36	0
0	0	0	1	1	1	1	1	20	0
0	0	0	0	1	1	1	0	35	0
0	0	0	0	1	0	0	0	13	0
0	1	0	1	1	1	0	1	3	0
1	0	1	0	1	1	1	1	6	0
0	0	0	0	1	0	1	0	12	0
0	0	1	0	1	0	1	0	6	0
1	0	0	1	1	1	1	0	17	0
1	0	0	1	1	0	1	0	5	0
1	0	0	1	1	1	1	1	7	0
0	0	0	1	1	0	1	0	5	0
1	0	0	0	1	1	0	0	5	0
0	0	0	0	1	0	1	1	4	0

0	0	0	1	1	1	0	0	55	0
0	0	1	1	1	1	1	0	23	0
0	0	0	0	0	0	1	0	3	0
0	0	0	0	0	1	1	1	8	0
0	0	0	0	1	1	0	0	48	0
0	0	1	0	0	1	1	0	4	0
0	0	0	0	0	1	0	0	7	0
0	0	0	1	0	1	0	1	6	0
0	0	1	1	1	1	0	0	17	0
0	1	1	0	1	1	1	0	9	0
0	0	1	1	0	1	0	0	9	0
0	0	0	0	0	1	1	0	10	0
0	0	1	1	0	1	1	0	9	0
0	0	0	0	0	0	0	1	3	0
0	1	0	0	1	1	1	0	7	0
1	0	0	0	1	1	1	0	11	0
0	1	0	0	1	0	0	0	5	0
0	1	1	1	1	1	0	1	5	0
1	1	1	0	1	1	1	0	3	0
1	0	0	1	1	1	0	0	8	0
0	1	0	1	1	1	1	0	5	0
1	0	1	0	1	1	0	0	4	0
0	0	0	0	0	1	0	1	5	0
0	1	1	0	1	1	1	1	6	0
0	1	0	0	1	1	1	1	5	0
1	0	0	0	1	0	1	0	6	0
1	0	0	0	1	0	0	0	4	0
1	0	1	1	1	1	1	0	8	0
0	1	0	0	1	1	0	1	3	0