International Journal of Information Management xxx (xxxx) xxx

Contents lists available at ScienceDirect

International Journal of Information Management

journal homepage: www.elsevier.com/locate/ijinfomgt

Research Article

What do growing early-stage digital start-ups look like? A mixed-methods approach

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ARTICLE INFO

Keywords:
Entrepreneurship
Start-ups
Growth
Capabilities
Culture
Digital innovation
Mixed methods

ABSTRACT

Digital entrepreneurship is one of the most important and impactful forms of entrepreneurship. However, the majority of digital start-ups fail to scale, despite their potential to achieve growth. Moreover, what constitutes growth is significantly different for start-ups as compared with established firms: they have limited financial performance, and their growth cannot be accurately measured by metrics such as customers, revenues, profits, and turnover at the early stages of the new venture creation process or before the start-up has reached sustainability. Therefore, the first objective of this research is to contribute to the definition of growth by examining less tangible dimensions of growth. Moreover, the second objective is to identify the characteristics of early-stage digital start-ups experiencing growth. Based on a mixed-methods approach, which combines an adapted Delphi study, a questionnaire-based survey, and a comparative case study, our results suggest that growing digital start-ups exhibit a set of characteristics that include: an agile culture combining clan with adhocracy; the ability to nurture their absorptive, innovative, and adaptive capabilities effectively; and a human capital with adequate entrepreneurial skills, emotional attachment to and fitness with the start-up.

1. Introduction

Recent advances in digitalization and globalization have profoundly reshaped traditional businesses, providing exceptional opportunities for spawning new forms of entrepreneurship (Markus and Loebbecke, 2013). Arguably, one of the most important forms of entrepreneurship is that of digital entrepreneurship (Kraus et al., 2018; Nambisan, 2017). Digital ventures (i.e., start-ups) go beyond simply adopting and using digital technologies. To them, the role of the technology has transformed as an inherent part of the value proposition (Oestreicher-Singer and Zalmanson, 2012). Digital start-ups can be deemed as a critical pillar that can significantly boost economic growth and job creation (Chae, 2019).

Despite the potential unleashed by these ventures, the majority of them fail to grow (Nummela et al., 2016). They face the liability of newness (Cafferata et al., 2009), where the absence of growth may threaten their survival. Firm growth is a multidimensional and complex phenomenon (Davidsson et al., 2010). What constitutes growth is significantly different for new digital ventures as compared with established firms. The dimensions of established firms' growth cannot help us fully understand new venture growth for the following main reason: young firms have limited financial performance and their growth cannot easily be measured by actual metrics such as customers, revenues, profits, turnover. Since detailed data on these metrics are not easily available, researchers have focused on studying other outcomes, such as survival, funding, resources, and capabilities as measures of new venture growth (e.g. Audretsch, 2012; Coad et al., 2016; Patil et al., 2019). Against this background, the starting point of this research is to *contribute to the definition of growth by looking at the early stages of the new venture creation process*; meaning before the new venture is well established or has reached sustainability, the so-called nascent entrepreneurship context (Tuazon et al., 2018).

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https://doi.org/10.1016/j.ijinfomgt.2021.102427
Received 22 March 2021; Received in revised form 13 September 2021; Accepted 13 September 2021

Table 1
Growth definitions in the existing literature.

Definitions that qualify growth
Growth is seen as an organizational outcome that derives from effectively combining firm-specific resources, capabilities and routines (Nelson and Winter, 1984).
Corporate growth depends on interrelated factors: the firm's external context and internal context, the business concept, its resources and capabilities, and the strategic decisions and choices about growth (Canals, 2001).
Growth is what happens when a firm does things in a new and better way and the main determinants of growth are knowledge and innovation capability (Romer, 1989).
Corporate growth performance refers to corporations' potential for expansion and development (Yang, 2012).
"The growth of an enterprise is generally deemed an expression of successful action enabling it to achieve competitive advantages over its competitors" (Zimmermann, 2017).
The growth of the company depends on the entrepreneur's traits, such as their growth motivation, competencies and background, which will influence how and whether the company will grow or not (Shane et al., 2003).
Definitions that quantify growth
Firm growth is conceptualized as having several indicators (e.g., employment growth, sales growth, profit growth, labour and productivity growth), which are interdependent and co-evolving (Coad, 2010).
Firm growth is a multifaceted phenomenon, and its indicators may be: employment growth, sales, and productivity (Coad et al., 2016).
Growth is a dependent variable, with different antecedents: based on a literature review, 30.9% of the studies use turnover/sales, 29.1% use employment, 18.2% use multiple indicators, 12.2% use performance (Delmar, 1997).
Firm growth is defined as Growth = Ln [St,/SJI/[t'- t] where S is employment size, t' is the date to which the end date data apply, t is the date to which the start date data apply, t'- t is the number of years between these two dates (Evans, 1987).
High growth suggests average annualised growth of more than 20% per annum over three years. It can be measured by the number of employees or by turnover (Audretsch, 2012).
Growth is measured through absolute employee growth, absolute sales growth, employee growth rate, sales growth rate, profit, ROE, ROA, growth in firm value, sales from new customers, sales from new products/services, sales from new markets (Achtenhagen et al., 2010).
Corporate growth is defined as the percentage increase in the total assets of a corporation (Berry, 1971).
There are "various approaches to growth: expanding geographically, adding more establishments, targeting new markets and customers, adding products/ services, or mergers and acquisitions" (Brush et al., 2009).
Mixed approaches to growth
"Growth can be defined in terms of revenue generation, value addition, and expansion in terms of volume of the business. It can also be measured in the form of qualitative features like market position, quality of product, and goodwill of the customers" (Gupta et al., 2013).
Entrepreneurial growth indicates the organization's plans to achieve growth and expand the business via quality, quantity, and turnover (Patil et al., 2019).
From a resource-based view, firm-specific resources, i.e., a combination of financial and human capital resources, may be the most important indicators for firm growth. For a smaller firm, in particular, a high-quality workforce and human resource development are even more critical (Zhou and de Wit, 2009).

While research on entrepreneurship has begun to investigate growth, empirical studies have generally reported mixed results: some studies describe early-stage digital ventures that did not survive and grow, while others describe cases that made similar innovations and turned out highly productive (e.g. Sarto et al., 2020; Korshunova et al., 2021). Nascent digital start-ups are characterized by higher variance in growth rates (Eliakis et al., 2020; Gilbert et al., 2006). There are various explanations for this phenomenon. The question should change from 'whether did a start-up survive or fail to grow' to '*what are the characteristics of growing digital start-ups*'. Within this domain, this research suggests a complementarity relationship between early-stage digital start-ups' growth and various characteristics. While research has investigated these factors individually (e.g. Cameron and Quinn, 2011; Calantone et al., 2002; Guenzi et al., 2016), the extant studies direct attention to large, well-established firms. Identifying a sort of factors belonging to those digital early-stage start-ups able to growth is far from being an accomplished task. The list of these characteristics does not claim to be exhaustive; it is rather intended to direct attention to understand how the inherent characteristics of the early-stage digital start-ups can be translated into growth. These characteristics have a profound link with the company's "DNA"; meaning characteristics that are driven by the founders' vision and values at conception; characteristics that cannot easily be changed but can adapt and evolve. Within this context, the specific objectives (O) that motivate this work are:

- O1: To propose a definition of growth for digital start-ups at the early stages of the new venture creation process.
- O2: To examine the inherent characteristics of digital start-ups that are experiencing growth at the early stages of the new venture creation process.

To address these objectives, we designed a mixed-methods approach. More specifically, in order to understand the perceptions of experts and entrepreneurs with regards to the dimensions of growth at the early stages of digital start-ups and formulate a growth definition, we conducted an adapted Delphi study combined with a quantitative survey. Moreover, to identify the most important characteristics of digital start-ups that are experiencing growth, we conducted a questionnaire-based survey, combined with a qualitative study that is served by in-depth interviews in two case-studies/start-ups. Our results suggest that a set of characteristics drive new venture growth, discernible to three categories: (1) characteristics that concern the company culture; (2) characteristics that concern a digital start-up's ability to effectively and competitively conserve and renew its capabilities and (3) characteristics that concern the human capital skills.

2. Background

2.1. Firm growth at the early stages of the new venture creation process

To understand the concept of growth, we reviewed existing definitions considering entrepreneurial, firm and corporate growth (Table 1). We focused on influential studies that have shaped the entrepreneurship literature and studies that concern start-up entrepreneurship (e.g., studies on growth-oriented enterprises, young enterprises experiencing high growth). We identified studies from several disciplines (e.g., human resources, entrepreneurship, finance), that define growth explicitly or implicitly, without controlling for a particular time frame, methodology, or discipline. Our review identifies three major categories: (i) descriptions that qualify growth, (ii) descriptions that quantify growth, and (iii) descriptions that follow a mixed approach. The identified definitions, irrespective of whether they attempt to qualify or quantify growth, exhibit some commonalities. In their majority, directly or indirectly, all definitions indicate the importance of resources and capabilities (e.g., Canals, 2001; Zhou and de Wit, 2009), as well as those traditional financial measures (e.g., turnover, profit etc.), sales, number of customers and employees, are growth dimensions (e.g., Audretsch, 2012; Coad et al., 2016; Patil et al., 2019). They further indicate that processes and routines are also critical for growth by supporting the expansion of the business (e.g., Brush et al., 2009). At the same time however, the majority of definitions contain dimensions that are not always objective (e.g., Delmar, 1997; Shane et al., 2003; Miller et al., 2013).

Understanding growth to ensure the start-ups' continued survival is important (Lai and Lin, 2015) but produces a lack of consensus. A definition that captures growth in the early entrepreneurial phase has yet to be offered. Our review indicates that such a definition should gauge growth by investigating not only actual metrics e.g., sales, number of customers, etc but also non-financial dimensions such as skills and capabilities, since including only objective measures may lead to false results (Achtenhagen et al., 2010). Interestingly, in the early stages of digital start-ups, financial data are not easily available. The characteristics of the entrepreneurs and the human capital have been found to affect growth in digital ventures (Aspelund et al., 2005; Colombo and Grilli, 2005). Moreover, organizational culture is also considered crucial in the context of a new venture (Fuller and Unwin, 2005). Therefore, to

understand the mechanism of digital start-up growth, while keeping in mind the financial data availability limitations, we aim to articulate a definition that reflects their human capital profile, as well as company culture and capabilities. These aspects can overall influence firms' innovative capabilities, and in turn sales and profits (Selvarajan et al., 2007).

2.2. Characteristics of growing digital start-ups

2.2.1. Company culture

Company Culture can be defined as a system of shared values and beliefs (Cable et al., 2000). The Competing Values Framework (CVF) (Cameron and Quinn, 2011) identifies four types of a company's culture that may co-exist to a degree within a company in a perpetually competing manner: (i) *The Clan Culture*, manifested in organizations that focus on "internal maintenance with flexibility, concern for people, and sensitivity to customers", (ii) *The Adhocracy Culture*, strong in organizations that focus on "external positioning with a high degree of flexibility and individuality", (iii) *The Hierarchy Culture*, strong in organizations that "focus on internal maintenance with a need for stability and control", and (iv) *The Market Culture*, manifested in results-oriented organizations that focus on "external positioning with an emphasis on competition and fast decision making". According to the specific stage and situation in each firm, a different mix of cultures is adopted (Yu and Wu, 2009). Start-up companies have been found to exhibit an agile culture that integrates Clan and Adhocracy (fusing Clan and Adhocracy into a new agile culture), which enables them to experience continuous growth in innovation (Goncalves et al., 2019; Steiber and Alänge, 2013).

Apart from its broad culture orientation, companies in our context of study should adhere to additional characteristics and capabilities. *Innovativeness* signifies "an openness to new ideas as an aspect of a firm's culture", as expressed through "the rate of adoption of innovations", and its "willingness to change", and is considered a very important feature for start-ups (Calantone et al., 2002), as well as one of the main drivers for growth and competitive advantage (Patterson, 1998; Yang, 2012), especially in smaller firms (Rubera and Kirca, 2012). As contemporary organizations need to adopt a "learning culture" to gain competitive advantage, they need to exhibit a strong *Commitment to Learning* – defined as "the degree to which an organization values and promotes learning" – encouraging the development of knowledge by employees (even outside the immediate scope of their work) (Calantone et al., 2002; Schein, 2010). Finally, start-ups should also adopt a culture that emphasizes customer service and quality, since it can lead to superior performance (Papadimitriou and Kargas, 2012). Therefore, an additional facet of company culture in this context is *Selling Orientation*, which indicates a focus on selling activities and "getting the sale", and *Customer Orientation* that indicates a focus on understanding customer needs and helping them to identify and evaluate alternatives, towards selecting the best solution and increasing their long-term satisfaction (Jaramillo et al., 2007).

2.2.2. Company capabilities

Both the concepts of "core competence" and "dynamic capabilities" point to a firm's ability to conserve and renew its capabilities effectively and competitively (Dosi et al., 2001). An organization's core competencies are difficult to imitate, and thus a potential source for competitive advantage (Prahalad and Hamel, 1990; Wang et al., 2012). At the same time, an organization's capabilities directly influence its effectiveness (Gold et al., 2001), involve repetitive organized activity and explain and fill the gap between its intention and outcomes (Dosi et al., 2001). However, capabilities need to be appropriately contextualized to become a source of sustainable competitive advantage (Augier and Teece, 2009). Therefore, building on its culture, a company needs to develop and foster different capabilities, that will enable it to successfully develop and flourish in its field of application. In our context,

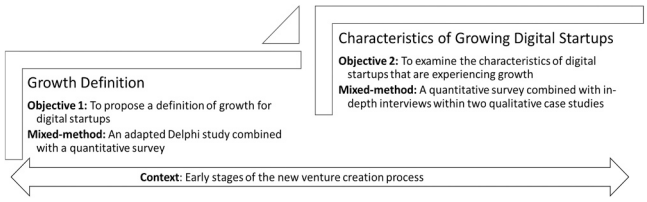

Fig. 1. Methodological approach to address the research objectives.

Absorptive Capacity – a firm's dynamic capability to create and utilize knowledge that enhances its ability to gain and sustain a competitive advantage (Zahra and George, 2002) – is considered an essential element for innovation, as well as adapting to changes in the competitive environment (Camisón and Forés, 2010; Upadhyay and Kumar, 2020). Moreover, identifying, building and, benchmarking a firm's marketing capabilities can be key towards attaining sustainable competitive advantage (Vorhies and Morgan, 2005). They are mainly expressed through a firm's *Customer Satisfaction Capability* (the ability to satisfy customers' needs) and *Selling Capability* (the ability to sell products and services) (Guenzi et al., 2016; Vorhies and Morgan, 2005).

2.2.3. Human capital profile

A firm's members' skills are considered as building blocks of its organizational capabilities (Dosi et al., 2001). Moreover, human capital is considered as the most important factor affecting the growth of SMEs (Zhou and de Wit, 2009), while qualified and motivated employees are "the difference between a good idea that never goes anywhere and a billion-dollar firm" (Blank and Dorf, 2012). At the same time, a good match between the members of the organization and the organization itself, otherwise called "*Organizational fitness*" (Cable and DeRue, 2002), can significantly influence performance can influence performance (Meyer et al., 2020). At the same time, within a new-venture context, *Entrepreneurial Self-Efficacy (ESE)* – the degree to which people perceive themselves as having the ability to successfully perform the various roles and tasks of entrepreneurship (Hmieleski et al., 2008) – can have a significant positive effect on firm growth (Hmieleski and Corbett, 2008). ESE is not an exclusive characteristic to the entrepreneurs in a company, as "intrapreneurship", which is also positively associated with firm growth, can be enacted within an organization by all its members (Antoncic and Antoncic, 2011; Stull and Singh, 2005). Moreover, the organizations' members' *Affective Commitment,* i.e., their emotional bond to the organization that is accompanied by a sense of belonging, willingness to pursue goals, and desire to remain with the organization (Rhoades et al., 2001) – also directly affects their performance, especially in start-ups (Yang et al., 2019).

3. Materials and methods

This research applies a mixed-methods approach (Fig. 1) to propose a definition of growth and examine the characteristics of a digital start-up that experience growth at the early stages of the new venture creation process. Following the principles for conducting mixed-methods research (Harrison and Reilly, 2011; Venkatesh et al., 2016), we adopted the following research methodology:

- **To define growth in digital startups (O1):** *An adapted Delphi study combined with a quantitative survey.* The objective was to understand the perceptions of experts and entrepreneurs with regards to the dimensions of growth at the embryonic stages of business and formulate a growth definition.
- **To assess the characteristics of digital start-ups (Q2):** *A quantitative study that is served by a questionnaire-based survey,* combined with *a qualitative study that is served by in-depth interviews in two case-studies/start-ups.* Both studies tried to identify the most important characteristics of digital start-ups that are experiencing growth. In

Table 2
Self-reported dimensions of growth.

Category		N of statements	%
1. Sales	Customer Engagement & Loyalty (e.g., customer acquisition cost, churn rate, satisfaction, engagement, loyalty, lifetime value)	39	14.29%
	Sales & Market Penetration (e.g., sales, market share, brand recognition, social media presence, website organic traffic, exports, partnerships)	38	13.92%
	Customers/Clients/Users (e.g., active users, conversion rate, user traction)	22	8.06%
	Product/Service Portfolio (e.g., number of new products/services, product/service portfolio, product fit, value-adding services)	21	7.69%
	Total (Sales)	**120**	**43.96%**
2. Financial (e.g., ability/evidence to attract funds, revenue & profit growth)		**51**	**18.68%**
3. Human Capital (e.g., number of employees, personnel growth, highly skilled talent, motivation, persistence, retention, skills development and training, teamwork)		**47**	**17.22%**
4. Company Culture (e.g., culture, adaptability, trust, commitment, competitiveness, efficiency, adaptivity, flexibility, scalability, vision)		**41**	**15.02%**
5. Innovation/Innovation capacity (e.g., knowledge, use of new technology, patents)		**14**	**5.13%**
Total (all statements)		**273**	**100.00%**

addition, the findings from the quantitative study informed the interview guide utilized in the qualitative study. Our growth definition assisted us in filtering the digital start-ups that participated in the survey and selecting the case studies to inform the identity of the characteristics of growing digital start-ups.

The mixed-methods approach brings together the strengths of both qualitative and quantitative methods (Venkatesh et al., 2016). Quantitative methods provided a useful way to examine the characteristics of digital start-ups by collecting data from founders, entrepreneurs and employees and then generalize those results to explain the phenomenon of growth at the early stages of the new venture creation process. The main reason for using case studies was that this approach is ideal for answering the "how" and "why" questions (Yin, 2003), allowing for a richer knowledge of issues associated with the digital start-ups' growth. Given the pre-mature level of growth entrepreneurship research, case studies are also suitable for research in areas where theory is not yet well developed (Eisenhardt, 1989) and thus enhance the external validity of this research design.

4. Defining growth at the early stages of the new venture creation process

Drawing upon existing literature (as reported in Section 2.1), we articulated a working definition for growth in early-stage digital start-ups. Using an adapted Delphi study, we asked for experts' views on this definition. Following the collection of expert's perceptions on the dimensions of growth, we designed and employed a questionnaire that was distributed to entrepreneurs of growing early-stage start-ups, in order to understand whether our definition also reflects their views on growth.

4.1. Adapted Delphi study: experts' view

We articulated a working definition for early-stage start-up growth as follows: *"Within the early-stage entrepreneurial start-up setting, growth is a direct descendant of a venture's founders' entrepreneurial skills, innovation capability, absorptive capacity, and potential to expand its volume of business* via *product-market fit, partnerships, and client base"*.

To assess the working definition and collect the subjective judgements and perceptions from a panel of experts (Flostrand et al., 2020), we designed an adapted Delphi study. Delphi studies typically follow a quantitative approach, where consensus is reached when variation (e.g., standard deviation) among panel members decreases (Wu and Chen, 2021). However, we aimed to develop a definition underpinned by the literature, and informed by current practice and expert insights, capturing the essence of early-stage start-up digital entrepreneurship. We thus followed the adapted Delphi study approach (Kraines et al., 2020) to develop a definition for the subsequent mixed methods study.

We first identified a panel of 15 experts from VC funds, incubation centres, academia, practitioners, and well-established start-ups (3 per each category), with knowledge on digital entrepreneurship. During the first round, we consulted independently with each of them to avoid the possibility of bias (Hasson and Keeney, 2011), on the relevance of a working definition of growth. The experts were asked to consider the constituting components of the definition, the relationships amongst them, and whether there are any prerequisites for these. They were also asked to offer alternative wordings for any of the components of the definition if they identified inaccuracies.

We aggregated the data, and based on the analysis, we developed two alternative definitions for the second round. Their major difference was on whether growth "is a result of" or "depends on" the given components, as based on their previous feedback this was not clear. During the second round, the expert panel evaluated the alternative definitions individually via an online form. Experts were asked to rate (on a scale from 1 to 10) the components that constitute the new definitions. According to their rating, all given dimensions were rated with more than 7.3/10. Based on their answers and feedback comments, we determined that they reached a consensus, the resulting definition was acceptable and could be used for the ensuing study. Therefore, the final definition is:

> *In early-stage entrepreneurial start-ups, growth is the result of the company's sales capability, ability to scale-up, entrepreneurial skills, adaptability skills, innovation capacity, absorptive capacity, and ability to attract funds"*

4.2. Survey: early-stage growing entrepreneurs' view

Following the Delphi study, we designed and employed a survey to understand whether the proposed definition reflects the views of the actual entrepreneurs, who are part of early-stage growing start-ups. In more detail, we asked 75 entrepreneurs from early-stage growing start-ups to note down, via an open-ended question included in an online survey, important dimensions that result in and indicate growth. The survey participants offered 273 statements in total. Examining the answers, we identified 5 prevailing topics i.e., sales, financial, human capital, culture, and innovation dimensions, as shown in Table 2. For instance, sales (e.g., including customer engagement and volume, market penetration, product fit) are perceived as dimensions of growth in 43.96% of the collected statements. Entrepreneurs agree with existing literature that financial dimensions are important growth dimensions. However, they mostly pinpoint the ability to attract funds as an important growth dimension, rather than revenue. This is a finding that is in-line with the input we received during the Delphi study, and we incorporated in the second and final growth definition. In addition, human factors such number of employees, skills etc. are important growth dimensions. However, they add that innovation and culture (e.g., adaptability, trust, scalability), are also crucial. Their view is hence overall in-line with the final growth definition we articulated during the adapted Delphi study.

Table 3
Company and human capital profile – scale reliabilities (Cronbach α) and descriptive statistics (N = 75).

	Scale	Construct description & main characteristics	Source	Rating	# items	α	Mean	S.D.
Company Culture	Clan Culture	Internal maintenance with flexibility, concern for people, sensitivity to customers, high cohesion, commitment, and morale (Cameron and Quinn, 2011)	Organizational Culture Assessment Inventory (OCAI) (Cameron and Quinn, 2011)	Comparative numeric assessment. Each of 4 competing values rated in comparison to the other 3, so that they add up to 100.	6	0.880	39.68	14.94
	Adhocracy Culture	External positioning, increased flexibility and individuality, growth-orientation (Cameron and Quinn, 2011)			6	0.661	27.98	8.26
	Hierarchy Culture	Internal maintenance with stability and control, along with performance, efficient and smooth operations, and predictable employment conditions (Cameron and Quinn, 2011)			6	0.819	17.50	9.03
	Market Culture	Results-orientation, external positioning with an emphasis on competition and fast decision making, market share and penetration (Cameron and Quinn, 2011)			6	0.786	14.84	7.30
	Sales Orientation	Focus on selling activities and "getting the sale" (Jaramillo et al., 2007).	Selling Orientation – Customer Orientation (S.O.C.O.) scale short form (Thomas et al., 2001)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	5	0.728	3.15	1.12
	Customer Orientation	Focus on understanding customers' needs, helping them select the best solution, and increasing their long-term satisfaction (Jaramillo et al., 2007).			5	0.875	6.07	0.89
	Commitment to Learning	Focus on learning and encouraging the development of employees' knowledge (even outside the immediate scope of their work) (Calantone et al., 2002; Schein, 2010).	Commitment to learning scale (Calantone et al., 2002)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	4	0.889	5.80	0.96
	Innovativeness	Openness to new ideas, as expressed through "the rate of adoption of innovations", and "willingness to change" (Calantone et al., 2002).	Innovativeness scale (Calantone et al., 2002)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	5	0.749	5.46	1.03
Company Capabilities	Absorptive Capacity	Capability to create and utilize knowledge that enhances the ability to gain and sustain a competitive advantage (Zahra and George, 2002).	Absorptive Capacity scale (Flatten et al., 2011)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	14	0.912	5.58	0.84
	Selling Capability	Capability to sell products & services, expressed through personal selling and sales force management processes (Guenzi et al., 2016) – compared to competitors' capabilities	Selling Capability scale (Guenzi et al., 2016)	1–7 scale (−3 = "much worse than", … 0 = "just like", … +3 = "much better than" competitors)	8	0.909	0.91	1.09
	Customer Satisfaction Capability	Capability to satisfy customers' needs (Vorhies and Morgan, 2005) – compared to competitors' capabilities	Customer Satisfaction Capability scale (Vorhies and Morgan, 2005)		4	0.913	1.58	1.14
	Perceived Fitness with the organization	Person-organization, needs-supplies, and demands-abilities fitness (Cable and DeRue, 2002)	Perceived Fit scale (Cable and DeRue, 2002)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	9	0.950	5.79	1.00
Human Capital	Entrepreneurial Self-Efficacy (ESE)	Degree to which people perceive themselves as having the ability to successfully perform the various roles and tasks of entrepreneurship (Hmieleski et al., 2008)	ESE questionnaire (Mcgee et al., 2009)	Rating: 1–5 Likert (1 = very little confidence – 7 = very much confidence)	19	0.925	3.69	0.67
	Affective Commitment	Employee's emotional attachment to, identification with, and involvement in their organization (Rhoades et al., 2001)	Affective organizational Commitment (Rhoades et al., 2001)	1–7 Likert (1 = strongly disagree – 7 = strongly agree)	6	0.887	5.82	1.03

5. Identifying the characteristics of growing start-ups

To identify the characteristics of early-stage digital start-ups that experience growth, we employed a mixed-methods approach: a quantitative study that is served by a questionnaire-based survey combined with a qualitative study that is served by in-depth interviews of two case studies.

5.1. Quantitative study

Having developed a definition of growth, we designed a questionnaire instrument, spanning two pillars: Enterprise Profile and Human Capital of a start-up. These two pillars reflect the components of the definition of growth, enriched with factors adapted to the context of our study. We employed established scales for each of the parameters we measured. Further details on the items can be found in Table 3, while sample items can be found in more details in Appendix A (Table A1).

Data collection followed purposive sampling to ensure that we collect responses from early-stage start-ups that experience growth. Specifically, we identified and selected start-ups which were members of the Greek national start-up repository that includes all the companies of the Greek start-up ecosystem. As such, we disseminate the questionnaire online either directly to these start-ups, or through the corresponding Greek VC funds and incubation centres they are supported by. The questionnaire was administered online during November 2nd and December 14th, 2020. In total, we collected 75 complete questionnaires. The majority of respondents were aged between 18 and 34 (69.4%), while the rest were aged 35–44 (25.0%), and 45–64 (5.6%) years old. Most were male (71.4%), where only a little over one fourth of the participants were female (28.6%). Our sample was also highly educated, as 30.6% had a university degree, 41.7% a postgraduate degree, 18.1% a doctoral degree, with only 9.7% of the participants not having received university education. Interestingly, their education was also related to their company's product service for most of the participants (69.5%). The vast majority (83.3%) had not worked in another position before their current employer.

All statistical analyses were conducted using SPSS Statistics v.23. We employed descriptive statistics to perform comparisons between the measured variables and explore the general trend in the sample's characteristics. Scale reliability and consistency were assessed using Cronbach's alpha. All scales featured satisfactory reliability (Cronbach's $\alpha > 0.70$), except for the Adhocracy scale, which scored slightly lower ($\alpha = 0.661$). However, we considered this score to be acceptable for two reasons. First, it is only slightly below the.700 threshold, and at the same time the scale featured acceptable levels of average corrected inter-item correlation (CITC:.302 –0.531), and mean item-total correlation (0.209 –0.277) (Michalos, 2014). Second, the validity and reliability of this scale has been confirmed and recorded by the authors of the scale (Cameron and Quinn, 2011), as well as in numerous published studies in the past (Kwan and Walker, 2004), including empirical studies in international contexts – from Australia (Lamond, 2003), to Greece (Belias and Koustelios, 2013) where our study took place.

Table 3 summarizes the results for the recorded Company Profile, Company Capabilities, and Human Capital Profile in our sample of companies. With regards to the competing values framework (Cameron and Quinn, 2011), the mapping of responses indicates that the start-ups exhibit a culture mix that draws particularly high from Clan culture characteristics (39.7/100) and Adhocracy culture characteristics (28/100), and much less from Hierarchy culture (17.5/100) and Market culture (14.8/100) characteristics. At the same time, based on the mean scores recorded, we find that the companies' culture is also complemented by a strong customer orientation (6.1/7.0), together with a relatively weak sales orientation (3.2/7.0), as well as a strong commitment to learning (5.8/7.0), and high innovativeness (5.5/7.0). As per their inherent capabilities, on average we find that our sample features a strong self-assessed absorptive capacity (5.6/7.0). Moreover, they admitted to featuring relatively better customer satisfaction capability (1.6/3.0) and selling capability (0.9/3.0) than their competitors. Finally, with regards to their human capital, our sample on average featured high perceived fitness (5.8/7.0), and affective commitment (5.8/7.0), to their respective organization. Moreover, they self-rate their entrepreneurial self-efficacy as adequate (3.7/5.0).

Table 4
Characteristics of the two cases.

	Case 1	Case 2
Description	A digital start-up launched in 2017 following the commercialization of a research idea.	A digital start-up launched in 2016.
Participants in study	5 out of 14 employees (35.7%)	5 out of 15 employees (33.3%)
Main activity	Offers two Internet of things-enabled products – B2C app: outdoor tracking & rewarding – B2B platform: indoor tracking & insights	Offers a platform to assist young students and graduates in finding their first job. Via this platform medium and large enterprises can locate and recruit ideal candidates.

5.2. The qualitative study

To better understand and deep-dive in the characteristics of early-stage digital start-ups, we designed a qualitative comparative case study (Yin, 2003) around two start-ups (Table 4). The two cases share a number of similarities. For example, the founders of both start-ups share a similar educational background, having graduated from a Business School, and both start-ups operate in Europe. They have both participated and profited by the services of the same start-up incubator and received mentoring and training. In addition, they have both been successful in receiving venture capital funding. However, they also exhibit some differences. Chief among them is how they use technology. Case 1 uses advanced digital technologies throughout their processes and has built its business model around innovative technologies since they launched, whereas Case 2 uses digital technologies only as a facilitator for their products and services. Next, Case 1 is a research commercialization effort and started having developed a deep-tech digital solution, whereas Case 2 started as a consulting company, with exceptional customer relationships, and it developed only later a digital solution to assist them in their operations. In addition, since its launch, Case 1 has been operating virtually without physical headquarters, whereas Case 2 recently moved its operations online due to Covid-19.

These two cases were purposefully selected. Both cases meet the requirements of our operational definition of growth, i.e., they have sales capability, they have scaled up their products and business model, their founders have entrepreneurial skills, both have adapted to market requirements even before the Covid-19 pandemic, they exhibit high innovation capacity and have attracted significant funds through venture capital. As such, because they share a sufficient number of characteristics, their differences allow us to conduct a cross-case analysis and draw useful analytical findings (Eisenhardt, 1989).

The interviews followed the approach of a semi-structured interview, where we used a set of predefined questions solely for probing purposes, i.e., to trigger the discussion. This allowed the interviewees to freely unpack and explain their line of thinking and helped us to pick up interesting themes as they emerged during our conversation with them. For data analysis, we adopted the thematic analysis approach because it provides a flexible but rigorous set of procedures, for identifying patterns within and across the empirical material in relation to participants' perspectives, practices, experiences, and behaviours (Braun and Clarke, 2006). We specifically followed the thematic analysis approach as applied by Papazafeiropoulou and Spanaki (2016), which is summarized in six phases:

Table 5
Participants details.

Pseudonym	Job role	Main duties	Years in start-up	Duration
Case 1				
Polly	Head of Business Analytics	Founder - Coordination of the Business Analysts, client identification, funding, product development, pricing.	2 years (+1,5 years before launch)	56 min
Tommy	General Director	Founder - Coordination, high level marketing, business planning, recruitment, sales, pricing.	2 years (+1,5 years before launch)	42 min
Grace	Content Manager	Content identification and input in the B2C app.	1 year	36 min
Arthur	Data analyst	Location analytics and localization, data analysis, Machine Learning	2 years (+1,5 years before launch)	61 min
Ada	Data Scientist	Data analysis and insights generation	1 year	45 min
Case 2				
Freddie	Chief Executive Officer	Founder – Business Development, Account Manager, Project Manager for service delivery (selective)	4 years (+1 year before launch)	45 min
Charlie	Chief Commercial Officer	Founder - B2B sales, Finance and Accounting, Reporting, Strategy	4 years (+1 year before launch)	46 min
Alfie	Product Growth Manager	Managing the technological product and the Developers' team	4 years	41 min
Lizzie	Business Development Manager	Supporting and supervising the development and progress of the start-up on behalf of the venture capital.	2,5 years	40 min
Esme	Marketing and Growth Specialist	Communications, Event planning and coordination, Digital Academies, Design and Coordination of Online/Offline publishing and content.	3 years	36 min

Phase 1 – Familiarisation: we transcribed the interviews, read them closely, while making notes regarding initial ideas.

Phase 2 – Generation of initial codes: we identified emerging ideas and developed the initial coding scheme by examining and comparing our data.

Phase 3 – Searching for themes: Comparing our initial coding scheme to literature, we reduced the number of initial codes by grouping them together into broader areas.

Phase 4 – Reviewing themes: We critically examined our data to check whether it supported the resulting themes, and whether our themes were clearly distinct from each other.

Phase 5 – Defining and naming themes: we defined the themes and the subthemes, and decided on their final form; and.

Phase 6 – Write up: this includes the analysis of the results, the write up of the study and the data extraction to formulate the chains of evidence.

The analysis and coding were conducted by two of the authors during Phases 1–3. During Phase 4, the other two authors were consulted for the purposes of confirming the analysis and the resulting coding book. This did not result in major disagreements; any minor differences were addressed via consultation among all co-authors. We note that despite our small sample overall, the analysis achieved core code saturation, as the interviewees were largely homogeneous, we had a thick data set and concrete codes, which were quickly identified (Hennink et al., 2017).

Table 5 provides the profile of the interviewees. The individuals who we interviewed did not participate in the Delphi Study, nor in the survey. Fig. 2 outlines the result of the thematic analysis, and the following paragraphs present our results in more detail.

5.2.1. Company culture

Both cases focus on empowering staff, recognizing achievements, avoiding micro-management, and addressing customer needs. However, the relative importance they place on each of these themes and the way they implement them result in a somewhat different culture mix.

Case 1. puts centre stage technological excellence and is highly customer oriented. The focus on technological excellence means that Case 1 leverages the IT skills of their Tech Team to develop its customer orientation capabilities:

> *Arthur: "It's part of culture. Innovate or die. We use digital technology and analytics to do this, and it is this culture that helped us sign our biggest contracts, developing innovative tailor-made and customer-oriented projects." (Case 1)*

Being customer-oriented indicates paying close attention to customers' needs and developing products that address their business' needs. Quite often this translates into offering extra services to support a sale:

> *Tommy: "We listen to them, we adapt to their needs, and they value this [the clients]. We see what their needs are, their goals, their insecurities, and uncertainties… we may offer them extra (and sometimes pro-bono) services, to support them with their processes in their organisation. And this good relationship translates into sales." (Case 1)*

Customer-orientation may also impact the pricing of products:

> *Polly: "Our largest client reduced our price several times. In response to their request for offering our proposal for a huge project, we had bid much higher, but our solution was more advanced than other bidders'. Before winning the bid, [the Client] requested to reduce our price. After winning the contract, we entered another negotiation phase, and they pressured us to reduce the price once again. We had to agree because we want [the Client] to become a long-term client." (Case 1)*

Case 2, while also solution-focused, explicitly discourages a market-culture environment of increased competition. Instead, they focus on creating an HR-focused and nurturing environment:

> *Charlie: "I'm focused on bringing the clients in and keeping my people happy. To pay them well, to make sure they have a good time, to give them perks. (…) The Sales Team is now at a point where employees start thinking 'I achieved my selling targets, you didn't'. Fair competition is healthy, but we don't like intense competition. (…) It often becomes more intense between new staff and old staff. It's similar to when a family has a new-born." (Case 2)*

Within this HR focused-environment, Case 2 manages to build up their staff's confidence and creates a stable environment despite operating within a highly turbulent environment. In turn, this allows staff to focus on continuous improvement.

> *Alfie: "This is part of the culture. It helps us think about what else we can do. (…) We have been changing the entire business model again and*

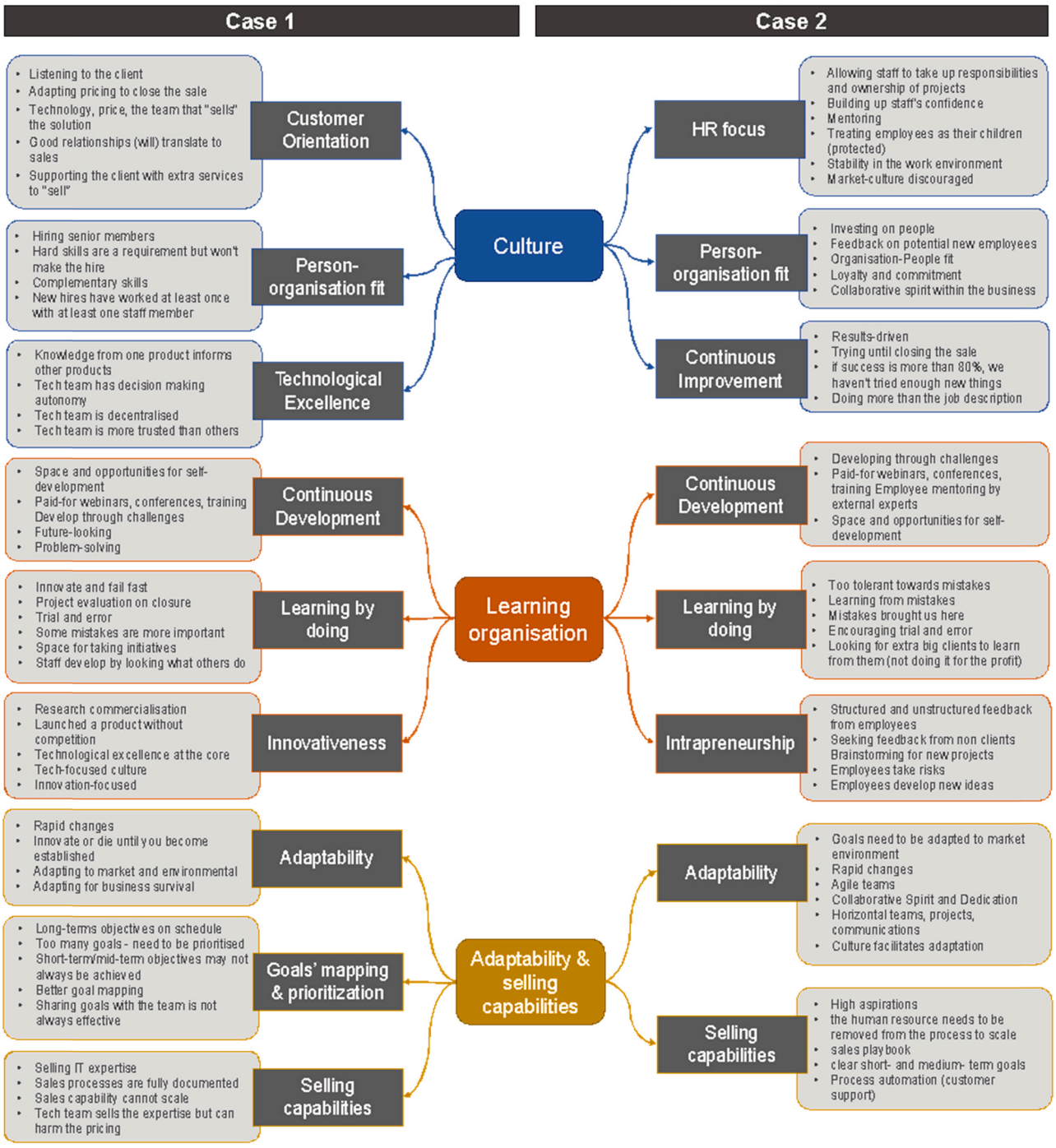

Fig. 2. Emerging themes from the thematic analysis.

again, even before Covid-19, to see what works and what doesn't." (Case 2)

In both start-ups, staff are seen and treated as their most important asset and person-organization fit is crucial for them. While this is one of the drivers of success, it is also part of their culture. Case 1 has been hiring primarily senior staff. For the Tech Team in particular, they hire exclusively via recommendations, with the requirement being that the recruit has collaborated in the past with at least one current staff member. This allows them to bring in significant experience, expertize, and complementary skills. However, they are also interested in hiring staff who is aligned with the culture and the values of the start-up:

Ada: "We look for hard skills, these are important, but when we're hiring, we're looking for team players. They need to be able to be part of the team. They need to share our business values. Hard skills without a good fit are of no use." (Case 1)

Case 2. places the focus on their existing staff. They offer financial support for personal and professional improvement, opportunities to explore different roles within the company:

Alfie: "When I joined, Charlie and Freddie told me: 'You can join us as a developer, and if you don't like it, you can tell us in which role you want to move.' Investing on people is very crucial for our start-up. So, I started

moving horizontally, seeing how the other teams work, what their product needs. After a couple of years, I became product lead and I have my own team now." (Case 2)

Contrary to Case 1, Case 2 hires exclusively people who fit with the culture of the start-up, which means paying less attention on job specifications, because staff can freely move across departments. Most importantly, their approach to hiring is highly participatory, where existing staff are consulted on their opinion on candidates:

Esme: "We are very careful as to who we hire, not so much about their skills. We pay attention to the character of the person. The whole company participates in this process." (Case 2)

All in all, both cases draw elements from the clan-culture and the adhocracy-culture, whereby Case 1 draws from market-culture, too, whereas Case 2 actively discourages it. Besides this difference, Case 1 places innovativeness and technological excellence at the core of their activities, whereas Case 2 emphasizes on creating a more HR-focused environment.

5.2.2. Being a learning organization

The start-ups' culture mix allows them to establish a learning organization environment, where learning takes place at the individual, the team and the organizational level, to achieve growth.

At the individual level, continuous development is emphasized. Development opportunities may be top-to-bottom (senior management proposes a relevant opportunity to an employee) or bottom-up (the employee identifies an opportunity and puts in a request). Case 2, however, has adopted a more rigorous approach by establishing a network of mentors and coaches:

Freddie: "We seek coaching, in both IT and business, for us and the employees. There is a network of people who help us. They may be on the Fund's Board, personal mentors, or mentors for the company, external collaborators and consultants, and, in part, we develop [personally and professionally] through this network." (Case 2)

Learning at the team level takes place via collaboration on projects where team members learn from each other. They are encouraged to take initiatives and to learn by doing for identifying potentially new and improved solutions. Learning by doing at Case 1 can be seen in how they draw lessons learned from one product to develop and improve the other. One of the main activities they implement is the evaluation of a project during project closure:

Arthur: Based on the lessons learned we gathered from Product1 and the feedback we had, we developed Product2 for [the Client], tailored entirely for them. Essentially, the main features are the same and the product still delivers location analytics, but there is a high degree of differentiation involved. So, what we learned from Product1 helped us build Product2 and through it we opened up a new and more profitable market for ourselves" (Case 1).

While for Case 1 team learning is confined within each team, in Case 2 it is horizontal thanks to the cross-team collaboration and knowledge exchange:

Alfie: When I need to talk to Marketing, I will talk to Esme directly, to the Marketing Team. (…) We continuously improve our communication channels, especially now during Covid-19. We are in frequent communication with the person doing the event coordination, with Esme from Marketing, Charlie, and Freddie, on a project that feeds from all departments." (Case 1)

At the organizational level, being a learning organization is supported by innovativeness, which allows them to experiment with novel ideas. In Case 1, innovativeness is technology-driven:

Polly: "We are in fact quite innovative, we started off by exploiting Pokemon Go's hype. We built on that logic and said 'Ok, what could happen if you start unlocking rewards throughout the city?' We borrowed this hype, and we combined it with our research and tech experience to build a new product. (…) We then integrated features that our clients asked for, such as during Covid-19 where we implemented the queue feature… This found a fruitful market and we now have Product2 for indoor environments." (Case 1)

For Case 2, the innovation is enabled by their high degree of openness to feedback and new ideas. They act like intrapreneurs having the freedom to develop new ideas and having access to the company' capabilities and clients' feedback:

Lizzie: "They seek feedback for our products even from those clients who refuse to become customers. The same happens for the new ideas developed by our employees. (…) Overall, feedback, people, and new ideas is how we run the company" (Case 2)

5.2.3. Adaptability and selling capabilities

Adaptability is seen as a prerequisite for both start-ups' survival and growth, as it allows them to detect and respond to changes in the external environment:

Grace: "Start-ups in general need to be adaptable. We have been adapting from day one. Even before Covid-19." (Case 1)

Although, Case 1 is a growing start-up, their growth is not always translated into traditional financial indicators (e.g., profit and sales) and they find it a challenge to scale up their sales. They do well with once-off sales, but not as well with recurring revenues and mass sales. They leverage their technological excellence for closing sales, but they consider that the Tech Team have fewer sales capabilities:

Grace: "We have very senior Tech Team members, very capable tech-wise. But none of them, or maybe one of them knows what happens outside the tech, at the client side. They may think that a sale is easy, or they may not understand what is needed to close the sale during a meeting. (…) They don't always understand what it takes to build a relationship with a client." (Case 1)

They are on schedule with long-term goals, but turbulence in the external environment poses hurdles to achieving short- and medium-term goals. Not clearly communicating goals with staff is another obstacle for this, because staff cannot get a complete picture:

Ada: "What's missing is mapping our goals, to have an overview. It would be useful to have annual, semester, or monthly goals. [Talking about sales and sales capabilities] I don't have a clear picture about this, and this relates to what I said about the goals. I believe we do well, but we could do better." (Case 1)

The point where the two start-ups seem to diverge is with regards to setting clear targets, that feed into their sales capabilities. This has allowed Case 2 to be even more growing. They achieve this by clear short-term and medium-term target-setting and working based on a sales playbook they have created with the support of their mentors. Until recently they were unable to scale up their sales capabilities to cover big enterprise contracts, partially due to their culture mix. Placing emphasis on their human resources has meant that they were unable to automate several aspects of the business:

Lizzie: " (…) the way they used to operate wasn't providing them with a scalability potential, they couldn't achieve the scale of sales required. And that was because the consulting element was very strong, with the human resources element overly intervening into the process." (Case 2)

They have managed to overcome this by building on their innovativeness, which allowed them to automate processes in how they offer

their product to their clients, and therefore they did not have to sacrifice aspects of their culture mix:

> *Freddie: "Our product initially was simply recruitment services; it had no digital in it. We needed a product with a faster and higher ROI to be cash flow positive, gain traction and grow. We automated 50% of it, which took us about nine months. It's still a recruitment product, so we want part of it to still require human involvement, because the human touch is crucial for our offering." (Case 2)*

The main emerging themes from the thematic analysis can be reviewed in Fig. 2.

6. Discussion and conclusions

Based on a multi-methods approach, this research aims to propose a definition of growth and identify the characteristics that allow digital start-ups to grow at the early stages of the new venture creation process.

6.1. Definition of growth in early-stage digital startups

Existing definitions include dimensions such as team's capabilities and resources, and there is an obsession with actual metrics such as number of customers, revenues, turnover, and other financial indicators (e.g. Cavallo et al., 2019). Recognizing the lack of a corresponding definition, we conducted an adapted Delphi study with experts combined with the quantitatively ascertained perceptions of actual participants in such ventures. These approaches allowed us to formally define growth in the context of early-stage digital entrepreneurship as follows: *"At the early stages of the new venture creation process, growth is the result of the company's sales capability, ability to scale-up, entrepreneurial skills, adaptability skills, innovation capacity, absorptive capacity, and ability to attract funds"*.

Based on the adapted Delphi study, experts reached a consensus that when we talk about growth in early-stage start-ups we should focus on human capital, their abilities, culture etc., and not that much on the financial indicators and other actual metrics, as these are difficult to be defined in the early stages of a start-up. This is in line with the fact that extant research has shown that a start-up's growth may extend beyond financial performance (Steininger, 2019). For instance, a start-up might be growing and attracting funds and customers, but in the early stages this might not be reflected in their revenue, flow, ROI etc. Entrepreneurs shared the same opinion with the experts, and this is something that is confirmed in the qualitative study. However, a major difference between entrepreneurs and experts, is that a few of them identify innovation as an important growth dimension. This might sound strange, but it can be explained by the fact that entrepreneurs take innovation for granted. Therefore, the definition we offer was found to be compatible with both the experts', as well as the entrepreneurs' view on growth in the context of early-stage digital start-ups.

6.2. The profile of growing early-stage digital start-ups

Taking a step forward, we designed and executed a quantitative survey with 75 participants, with the aim to assess the profile of early-stage digital start-ups in terms of company culture, company capabilities and human capital profile. Then, we proceeded to corroborate, as well as expand-upon, the quantitative findings, by conducting qualitative interviews with a sample of $> 1/3$ of the employees in two growing early-stage start-ups. Although an exact one-to-one mapping between the constructs used in the quantitative research and the themes that emerged from the qualitative study is not possible, below we articulate a set of propositions by discussing the combined acquired insights from both the qualitative and qualitative lenses.

Proposition 1. : "Early-stage digital start-ups that experience growth adopt an "agile" culture mix characterized by "Clan" and "Adhocracy" characteristics".

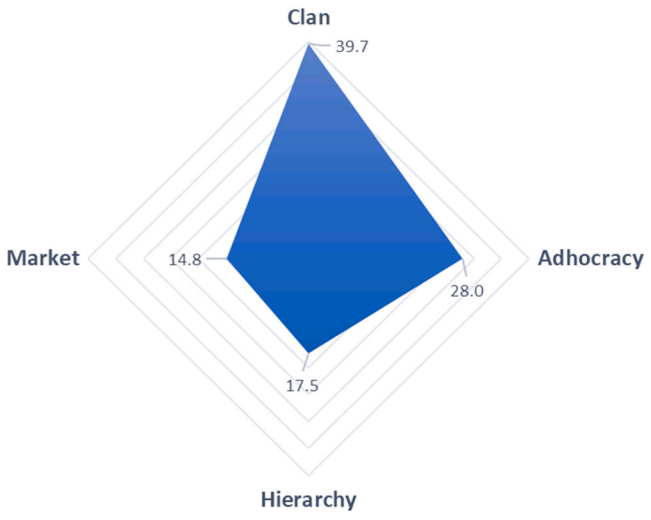

Fig. 3. Competing values in participating start-ups' culture mix.

The findings in the quantitative study indicate that the early-stage digital start-ups feature a predominantly (67.7%, or >2/3) "agile" culture which, in accordance with the competing values framework (Cameron and Quinn, 2011), is characterized by 39.7% "Clan", and 28.0% "Adhocracy" characteristics. On the contrary, based on our results, the "Hierarchy" (17.5%), and Market (14.8%) characteristics (the other two competing values in the CVF) in turn account for much less in their culture profile (<1/3 combined). Amplified clan and adhocracy characteristics are confirmed in the qualitative phase, as well. Both the start-ups exhibit a nurturing behaviour to their employees, paying attention to organizational fitness, and keeping to a looser style of organization. These findings build upon extant research that has shown start-ups generally tend to exhibit an agile culture that integrates Clan and Adhocracy (Goncalves et al., 2019; Steiber and Alänge, 2013), while agility has been identified as an important asset for hardware start-ups (Berg et al., 2020). The average situation in our sample of start-ups with regards to the competing values framework is visually presented in Fig. 3.

Proposition 2:. "Early-stage digital start-ups that experience growth embed high levels of innovativeness and commitment to learning, and make targeted use of their digital capabilities".

The 75 participants of our quantitative study sample reported high innovativeness (rated 5.5/7.0 on average), as well as high commitment to learning (5.8/7.0). Similarly, innovation and learning commitment in the forms of learning by doing, and openness to new ideas were among the characteristics that arose as important through the qualitative study. These characteristics present a pattern of commonly held values that enable start-ups to face and overcome obstacles, while effectively growing their business. Therefore, our quantitative findings confirm previous research that has shown that innovativeness is an important feature for start-ups (Calantone et al., 2002) and smaller firms (Rubera and Kirca, 2012), and a main driver for growth and competitive advantage (Yang, 2012). Further, we extend current knowledge regarding commitment to learning (Calantone et al., 2002; Schein, 2010), and show that this can support competitive advantage in start-ups, too.

At the same time, our qualitative findings shed light on the role of the digital capabilities. Specifically, Case 1 focuses on technological excellence that may lead to other areas being overlooked or dismissed as secondary or of lesser importance, while Case 2 makes targeted use of digital technologies where these can create greater value (e.g., for scaling up their sales and automating processes), thus attaining superior

results. This finding expands the recognized importance of optimized resource allocation according to goal prioritization for companies (Greve and Teh, 2018), that has been stressed in the past e.g., in the context of hardware start-ups (Berg et al., 2020).

Proposition 3:. ″Early-stage digital start-ups that experience growth build absorptive and adaptive capabilities″.

The start-ups in the quantitative study sample presented a very interesting profile in terms of their capabilities. Firstly, we found that they recorded high scores in absorptive capacity (5.6/7.0). These findings build upon the extant research that has shown that absorptive capacity enhances firms' ability to gain and sustain a competitive advantage (Zahra and George, 2002), and is considered essential for innovation. In the qualitative study, entrepreneurs exhibit and enhance this ability via seeking external knowledge (e.g., seminars, training etc.) to achieve continuous development and improvement. Secondly, we found that at the same time, they exploit the new knowledge and their existing technological excellence to innovate and adapt to the demanding market and environmental changes. Again, these results confirm existing literature which states that adapting to changes is an essential ability for firms in the competitive environment (Camisón and Forés, 2010).

Proposition 4:. ″Early-stage digital start-ups that experience growth enhance their selling capabilities and exhibit high empathy to their customers″.

The start-ups in the quantitative sample also exhibit enhanced selling capabilities (on average 0.9/3.0 which corresponds to "somewhat better") compared to their competitors (on a scale between -3 = much worse and $+3$ = much better). Both the start-ups interviewed in the qualitative phase also identify the importance of selling capabilities, pinpoint the need to improve them, and describe ways they follow to enhance it (e.g., via training services from experts, or via using sales playbooks). The qualitative study also highlights that clear goal setting and mapping is important to assist companies in improving their selling capabilities. Existing literature also reports that selling capability in firms overall, is considered as a key towards attaining sustainable competitive advantage (Guenzi et al., 2016; Vorhies and Morgan, 2005).

Customer satisfaction is an additional important capability for the start-ups according to our quantitative results (1.6/3.0 equals "better" out of a scale ranging from -3 to 3). This is further corroborated in the qualitative study, as both start-ups exhibit high empathy to their customers and are willing to even reduce their prices to support and satisfy them. They can act quickly and efficiently towards satisfying their customers' needs and "closing the sale". Our findings confirm and expand upon existing literature that suggests that large firms should adopt a culture that emphasizes customer service quality, and a customer-centric orientation, since it can lead to superior performance (Jaramillo et al., 2007; Papadimitriou and Kargas, 2012).

Proposition 5:. ″The human capital, in early-stage digital start-ups that experience growth, perceive themselves as having the ability to successfully perform the various tasks of entrepreneurship; become emotionally attached to the start-up; and they experience a good fit with the organization″.

The human capital in the quantitative sample of start-ups is characterized by high levels of perceived fitness with (5.8/7.0 on average) and affective commitment (5.8/7.0) to their organization, indicating that they see themselves as particularly apt in their assigned position and are very loyal to their company. In both cases of the qualitative study, the employees also show loyalty and commitment to the organization, they pinpoint how important the fit of a new employee to the organization is and describe that it even affects their hiring strategy. These findings extent existing literature which suggests that organizational fitness influences firm performance (Meyer et al., 2020; Sarta et al., 2020), while the affective commitment to the firm directly affects employees' performance in start-ups (Yang et al., 2019).

In addition, the participants in the quantitative study also rated their entrepreneurial self-efficacy highly (3.7/5.0). This is also confirmed in the qualitative study and is expanded to describe the existence of intrapreneurship, indicating that employees have the abilities needed to operate independently towards satisfying their firms' customers' needs with limited need for supervision. These findings confirm and expand existing literature which states that within a new-venture context, Entrepreneurial Self-Efficacy has also been identified as having a significant positive effect on venture growth (Hmieleski and Corbett, 2008), especially when exhibited and enacted within an organization by all its members and not just the entrepreneurs (Antoncic and Antoncic, 2011; Stull and Singh, 2005).

6.3. Theoretical contribution and implications

Our findings bear both theoretical and practical implications. First of all, we contribute to the digital entrepreneurship literature by offering a definition of growth that focuses on early-stage digital start-ups. While research on entrepreneurship has begun to investigate growth, work on this topic has focused on growth, either after a successful venture has reached sustainability or after a venture has failed (e.g. Sarto et al., 2020; Korshunova et al., 2021). This research directs attention to growth within the early stages of the new venture creation process; meaning before the new venture is well established and has reached sustainability, the so-called nascent entrepreneurship context that is regarded as an under-researched context (Tuazon et al., 2018). We consider this an important addition to existing literature, since existing research and practice indicate that traditional growth definitions cannot accurately capture the particularities of such firms (Achtenhagen et al., 2010). Indeed, prior studies tend to define growth in terms of revenues (e.g. Cavallo et al., 2019). However, such an understanding may lead to misleading or inconclusive results, especially when used for benchmarking and funding decisions. Therefore, our definition offers a different perspective since financial data may all too often be limited or non-existent, while revenues do not always reflect performance.

Our second research contribution is that we shed light and explicate on the characteristics of early-stage growing start-ups, in terms of their culture, capabilities, and human capital. While research has investigated these factors individually, the extant studies (e.g. Cameron and Quinn, 2011; Calantone et al., 2002; Guenzi et al., 2016) focus on large firms. Identifying a sort of factors belonging to those digital early-stage start-ups able to growth is unproven. We try to contribute to the prospected discussion through presenting these factors from a holistic view; meaning that all these characteristics are expressed in concert and emerge as an important composite set of attributes that such firms have embedded in their "DNA", towards achieving and sustaining growth. Specifically, we found that growing digital start-ups exhibit an agile culture mix that combines clan and adhocracy characteristics; they can nurture absorptive, innovative, and adaptive capabilities that are complemented by their members' entrepreneurial skills, emotional attachment to and fit with the firm. Earlier studies (e.g. Zahra and George, 2002; Camisón and Forés, 2010) show that absorptive capacity supports firms towards their innovation and entrepreneurial efforts, because it allows them to adapt to the competitive environment. In our findings, this is further enhanced by the agile culture mix that draws from clan and adhocracy characteristics. Contrary to previous studies (e.g. Liao, 2018), we also found that a market culture is actively discouraged but clan and adhocracy are pursued, and it is through the staff's commitment and loyalty that a start-up manages to achieve customer satisfaction.

Our third contribution relates to the role of 'digital' in the context of early-stage entrepreneurship. Over the recent years, there has been an increased attention around the 'digital' as part of entrepreneurial efforts, processes, and outcomes. Research tends to emphasize how digital technologies, such as artificial intelligence and big data may pave the

way for venture creation (von Briel et al., 2018) and other business opportunities (Papadopoulos et al., 2020). Our findings show, however, that the 'digital' can also be an inhibitor, and that a targeted use of digital technologies where these can create greater value may be wiser (e.g., to use the digital for scaling up sales and automating processes, thus allowing them to direct human resources to tasks that require human creativity). This is of increased importance for start-ups and smaller companies, because they often find themselves operating at the verge of existential threat, within a highly turbulent and competitive environment (Zamani et al., 2021), and thus the targeted use of resources and goal prioritization can prove to be critical both for their profitability and for business continuity (Papadopoulos et al., 2020). We hence posit that holistic digital-based approaches that allow the development of crucial business areas are more conducive to entrepreneurship.

6.4. Implications for practice

Apart from its theoretical contribution, our study also bears implications for practice. Firstly, the growth definition we offer resolves the long existing disparities among researchers, practitioners, and digital entrepreneurs with regards to perceptions as to which of the metrics and characteristics a start-up exhibits may indicate growth. Our findings provide a holistic approach to digital entrepreneurship growth and can help entrepreneurs clearly evaluate their start-up's position and future steps towards achieving growth.

In addition, the practical value of our study is further stressed when considering the totality of stakeholders within the start-up ecosystem. Start-up ecosystems typically comprise by the entrepreneurs themselves (who may or may not be start-up founders), incubation centres, venture capitalists, research organizations and government organizations, to name only a few (Deeb, 2021). We consider that the characteristics of early-stage growing digital start-ups, as identified from our study and reflected in our propositions, can be considered by incubation centres when assessing their portfolio and can help them identify the start-ups' pains and gains, ascertain which areas they wish to focus on and which issues they wish to address, and thus offer more targeted support. In addition, incubation centres can leverage our findings with the view to suggest the inclusion of additional members towards addressing skill gaps in start-ups, and thus form teams that can better support towards a given start-ups' growth. In the same vein, start-ups may utilize our findings in order to set-up their internal benchmarking tools, design their playbooks and inform their processes by choosing where and how they can improve their team, and even determine staff recruitment criteria more clearly for developing business areas.

However, besides providing insights for already established start-ups, our study can support the digital start-up ecosystem during the stage prior their official launch. Funding agencies may use the identified start-up characteristics as a checklist to inform and support their decision-making on whether they will invest in a start-up (or not). Moreover, universities and research organizations with an entrepreneurial focus can build on our propositions and use them as a roadmap for developing modules, training sessions and material, as well as more hands-on sessions (e.g., hothouse workshops and ideathons) to nurture entrepreneurship. This will allow them to offer support to entrepreneurs who exhibit such characteristics, as well as those who may struggle, to develop the necessary skill-set or pitch.

Our qualitative findings further enrich the study's contributions for practitioners. Our findings can become valuable learnings for other entrepreneurs in similar industries, i.e., digital entrepreneurship in general, across the range of different growth stages. Practitioners, such as entrepreneurs and consultants, can utilize the acquired knowledge to identify some 'do's' and 'don'ts' practices during their initial growth stage (e.g. indicatively, learning by doing and continuous development are crucial factors for a start-up). Equally, our quantitative findings can be utilized towards formulating a scorecard for the self-assessment of start-ups and digital entrepreneurship endeavours in general (e.g. for instance, a start-up may assess whether they score as expected in relation to hierarchy culture, and decide on what they can do to adjust the company's culture accordingly). We consider that such tools can be particularly helpful to entrepreneurs, especially if used alongside similar tools, as for example the Digital Balanced Scorecard (Yamamoto, 2020). Such a combined approach can provide better insights for developing digital business processes, new markets and products, and thus achieving better results.

Along these lines, the definition of Growth we offer, which has been developed specifically for early-stage digital entrepreneurship, can be used as the baseline for understanding start-ups' efforts and prospects. In turn, this definition can be used to support similar assessments in the industry, as well as by and for government bodies, in order to assist them in distinguishing, and ranking growing from non-growing early-stage start-ups and forming corresponding national catalogues as well as identifying areas that need to be cultivated further. We draw attention, for example, to the UK's Digital Strategy 2017 report (DCMS, 2017), in which the UK Department for Digital, Culture, Media & Sport had identified the need to create the right requirements and conditions for growth, announcing among other measures a new Industrial Strategy Challenge Fund. Our work can complement similar strategies and initiatives by providing a robust, research-informed, industry-focused instrument for informed decision-making.

Closing, the propositions we formulate can constitute important learnings from a practical perspective for C-level executives, managers and founding members or the start-up to shape the business strategy and development of their team. Indicatively, the founding team should organize team building activities such as travels, nights out, dinners, games, excursions etc. to cultivate team spirit, bond with each other and form a "clan". New coming employees should be selected carefully to fit with the current company culture, as described above, so that in essence they experience a good fit to the organization and become emotionally attached to it. Similarly, the managers should boost freedom to operate and adhere to more unstructured operations for both their employees and the company as a whole. This way, they will cultivate adaptive capabilities and move from a traditional stricter organizational structure and operating procedures to an open and agile organization. Likewise, they should boost and commend employees to participate in intrapreneurship activities, innovate and take things to their own hands when the opportunity arises, without the need to seek confirmation from the supervisor. Seminars, training, dedicating time to research about cutting-edge solutions and activities of the competition, and performing other self-learning activities, are the necessary tools to cultivate absorptive capabilities. Apart from the internal operations of the organization, the companies should also improve their interaction with the external environment i.e., the market, by focusing on building better and long-lasting relations with their customers. This can be achieved by nurturing their selling capabilities and exhibiting empathy towards their customers via continuously engaging with them, taking into account their feedback, and reacting accordingly.

6.5. Limitations and future research

Although this research provides valuable findings concerning the characteristics of growing digital start-ups at the early stages of the new venture creation process, it is nevertheless subject to a number of limitations. Firstly, this research was conducted with start-ups located in the same geographical context (Greece), whereby the sample for the quantitative study was limited to 75 participants, and the qualitative study was performed in two selected start-ups / case-studies. Additionally, our study was conducted on a set point in time, thus presenting a snapshot of the observed phenomena.

Based on the aforementioned limitations, opportunities for future research arise. Researchers interested in expanding on our findings are encouraged to comparatively investigate the characteristics of early-

stage digital start-ups internationally, using a larger sample to compare, and contrast, on our results. This could be coupled with theoretical sampling of cases of early-stage digital start-ups, with the view to either minimize or maximize the differences between concepts and/or cases (Urquhart, 2012), and thus support the generalization of our findings and fuel theory development around digital entrepreneurship. For example, we observe many potential linkages between our findings and the Dynamic Capabilities perspective; we thus invite scholars to explore how our findings could potentially be seen through the lens of sensing, seizing, and transforming capabilities of start-ups in relation to growth and the utilization of digital and emerging technologies. Additionally, future studies may focus on start-ups in other domains to examine their characteristics that lead to growth e.g., software (Berg et al., 2018), hardware or even social start-ups, and compare these findings with those of our study.

From a more practical perspective, in addition, future studies may focus on the funding of these start-ups, and how the identified characteristics affect positively or negatively the decisions of e.g., a VC fund. We consider that a longitudinal study can be particularly relevant for allowing the interpretation of the impacts of contextual and temporal parameters, and how start-ups may progress from infancy to maturity, while their characteristics evolve. Given that this study is focused on early-stage growing start-ups, and given the fact that start-ups scale fast, a longitudinal analysis that traces their evolution and changes in the company and human capital profile from early-stage, to expansion, maturity stage and exit, can be of high interest. In the same vein, future research may focus on the nascence and seed-stage of the start-ups before they experience growth, to investigate their characteristics and how these evolved over time.

In closing, we highlight that our study was conducted during the Covid-19 pandemic and under social distancing restrictions. Therefore, working-from-home arrangements and virtual teams, may bear influence on some of our findings in relation to e.g., ability to innovate, continuous improvement (Chamakiotis et al., 2020) (particularly for Case 2 in the qualitative part who has been working on premises prior to Covid-19). We thus join our voice with Giannakos et al. (2021) as far as e-learning capabilities are concerned, as one of the many ways for overcoming barriers and harnessing opportunities for remote collaboration, which is set to increase in the post Covid-19 world of work (Pandey and Pal, 2020; Hern, 2020).

7. Conclusions

In this paper, we focused on early-stage digital start-ups, aiming to understand the perceptions and expectations of experts and entrepreneurs regarding a start-up's characteristics that help it grow. To the best of our knowledge, this is one of the first studies that provides a holistic approach to studying early-stage digital entrepreneurship, and the first one to provide a robust, research-informed, and industry-focused definition for understanding growth at the early stages of entrepreneurship. Based on our findings:

> *"In early-stage entrepreneurial start-ups, growth is the result of the company's sales capability, ability to scale-up, entrepreneurial skills, adaptability skills, innovation capacity, absorptive capacity, and ability to attract funds"*

Using this definition as our baseline, we further explored digital start-ups, to identify and understand the most important characteristics, their interactions, and their relative relationship to growth. Overall, our findings show that growth is driven by the company culture, the start-up's ability to conserve and renew its capabilities and human capital skills. More specifically, we emphasize that according to our findings, early-stage digital start-ups should adopt an "agile" culture (incorporating clan and adhocracy), embed high levels of innovativeness and commitment to learning, make targeted use of their digital capabilities, build and enhance absorptive, adaptive and selling capabilities, empathise with their customers, cultivate employees' intrapreneurship activities, and overall recruit employees fitting their existing culture.

This study contributes significantly to the current discourse regarding digital entrepreneurship and start-ups, providing a critical and analytical discussion with regards to the necessary skills for digital entrepreneurs, and a roadmap for practitioners within contemporary start-up ecosystems.

CRediT authorship contribution statement

Anastasia Griva: Writing – original draft, Writing – review & editing, Conceptualization, Formal analysis, Data curation, Project administration. **Dimosthenis Kotsopoulos:** Writing – original draft, Writing – review & editing, Conceptualization, Formal analysis, Data curation. **Angeliki Karagiannaki:** Writing – original draft, Writing – review & editing, Conceptualization, Methodology. **Efpraxia D. Zamani:** Writing – original draft, Writing – review & editing, Conceptualization, Methodology. All authors contributed equally.

Acknowledgements

Dr. Griva received funding for this research from the European Union's Horizon 2020 research and innovation programme under Marie Skłodowska-Curie grant 754489 and from the Science Foundation Ireland grant 13/RC/2094_2.

Appendix A

See Appendix Table A1.

Table A1
Company and human capital profile – scales and sample items.

	Scale	# items	Source	Sample item	Rating
Company culture	*Clan Culture*	6	Organizational Culture Assessment Inventory (OCAI) (Cameron and Quinn, 2011)	Each question includes 4 alternative phrases that correspond to the different culture types – e.g. "The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves." (Clan)	Comparative numeric assessment. Each of 4 competing values rated in comparison to the other 3, so that they add up to 100.
	Adhocracy Culture	6			
	Hierarchy Culture	6			
	Market Culture	6			
	Sales Orientation	5	Selling Orientation – Customer Orientation (S.O.C.O.) scale short form (Thomas et al., 2001)	"Our company tries to figure out a customer's needs"	1–7 Likert (1 = strongly disagree – 7 = strongly agree)
	Customer Orientation	5		"In our company we try to sell as much as we can, rather than satisfying customers"	
	Commitment to Learning	4	Commitment to learning scale (Calantone et al., 2002)	"The basic values of this organization include learning as key to improvement"	1–7 Likert (1 = strongly disagree – 7 = strongly agree)

(*continued on next page*)

Table A1 (*continued*)

	Scale	# items	Source	Sample item	Rating
Company capabilities	*Innovativeness*	5	Innovativeness scale (Calantone et al., 2002)	"Our company frequently tries out new ideas"	1–7 Likert (1 = strongly disagree – 7 = strongly agree)
	Absorptive Capacity	14	Absorptive Capacity scale (Flatten et al., 2011)	Acquisition (3 items, e.g., "The search for relevant information concerning our industry is every-day business in our company"); Assimilation (4 items, e.g., "In our company ideas and concepts are communicated cross-departmentally"); Transformation (4 items, e.g., "Our employees have the ability to structure and to use collected knowledge"); Exploitation (3 items, e.g., "Our management supports the development of prototypes")	1–7 Likert (1 = strongly disagree – 7 = strongly agree)
Human capital	*Selling Capability*	8	Selling Capability scale (Guenzi et al., 2016)	Personal selling (five items, e.g., "Building customer relationships") and sales force management (3 items, e.g., "Segmenting customers")	1–7 scale (−3 = "much worse than", … 0 = "just like", … +3 = "much better than" competitors)
	Customer Satisfaction Capability	4	Customer Satisfaction Capability scale (Vorhies and Morgan, 2005)	"Delivering value to your customers"	
	Perceived Fitness with the organisation	9	Perceived Fit scale (Cable and DeRue, 2002)	Person-organization fit (3 items e.g., "The things that I value in life are very similar to the things that my organization values"); Needs-supplies fit (3 items e.g., There is a good fit between what my job offers me and what I am looking for in a job"); Demands-abilities fit (3 items e.g., "My abilities and training are a good fit with the requirements of my job")	1–7 Likert (1 = strongly disagree – 7 = strongly agree)
	Entrepreneurial Self-Efficacy (ESE)	19	ESE questionnaire (Mcgee et al., 2009)	Searching (3 items, e.g., "Identify the need for a new product or service"); Planning (4 items, e.g., "Estimate customer demand for a new product or service"); Marshalling (3 items, e.g., "Get others to identify with and believe in my vision and plans for a new business"), Implementing-people (6 items, e.g., "Supervise employees"); Implementing-financial (3 items, e.g., "Read and interpret financial statements")	Rating: 1–5 Likert (1 = very little confidence – 7 = very much confidence)
	Affective Commitment	6	Affective organizational Commitment (Rhoades et al., 2001)	"I feel a strong sense of belonging to my organization"	1–7 Likert (1 = strongly disagree – 7 = strongly agree)

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