

PAWEŁ MIELCAREK
MICHAŁ CYMERYS
KLAUDIUSZ KALISTY

Systematic literature review of start-up. What is the scope and key paths of development?

Abstract

Research background and purpose: The lack of a uniform definition of a start-up, together with the diversity of research scopes and methodologies adopted, creates an unclear image of the phenomenon, limiting the ability to identify the factors, regularities and processes that determine start-ups. The goal of this paper is to conduct a systematic literature review (SLR) to analyse, evaluate, and systematise knowledge about research on start-ups and the definitions used therein. The review will not only classify existing findings, but also identify areas for future research that could improve our understanding of how start-ups can thrive and achieve success.

Design/methodology/approach: This study includes a four-stage procedure covering a systematic literature review of start-up publications indexed in Scopus and Web of Science (WoS) from 2000 to 2025. The main analysis phase involves examining the co-occurrence and total link strength of keywords in 12 620 start-up publications in the fields of business, management, and accounting. Several cluster maps were created using the VOSviewer software. The next step will focus on evaluating the definition of a start-up and analysing the key findings from the most-cited publications.

Findings: Our study identified six clusters grouping 126 keywords with at least five time of occurrence. We also identified emerging trends from the analysed literature. Based on a review of various proposals, we have also identified common features of the start-up definition with use of 'Mentefacto Conceptual' model including superordination, exclusions, and infraordinations. This has resulted in the proposal of an original start-up definition.

Value added and limitations: This article makes an important theoretical contribution by offering a foundation for the reliable assessment of start-up research. It provides entrepreneurs, investors and decision-makers with guidance on understanding the phenomenon, its characteristics and the key findings about the development and survival of start-ups.

Keywords: *startup, start-up, systematic literature review, SLR, definition, keywords*

JEL Classification: L26, M13, O32, L25

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1. Introduction

In recent decades, the start-up phenomenon has gained recognition as a key driver of economic growth, stability and job creation around the world (Hormiga et al., 2010). Although start-ups are defined in various ways, some common characteristics of the phenomenon can be established, despite different theoretical backgrounds. One proposition is that start-ups are innovative ventures seeking a scalable, repeatable and profitable business model, often based on new technologies. They are typically young organisations in the early stages of development (Spiegel et al., 2015). In the context of sustainable development, start-ups play an important role in introducing and disseminating sustainable innovations (Horne & Fichter, 2022). Impact start-ups, for example, are innovative new ventures that scale up solutions that deliver net benefits for sustainable development. Despite their key role, these companies operate in an environment of high uncertainty and risk. The high mortality rate of start-ups (Ajah, 2023; Bethlendi et al., 2025; Keogh & Johnson, 2021), with only one in three surviving the first three years, highlights the critical need to identify success factors and understand the mechanisms governing their growth (Santisteban & Mauricio, 2017). However, the term 'start-up' has no uniform or universally accepted definition in the scientific literature (Yoon-Jun, 2010), and there is no consensus on the critical factors influencing their success or failure (Sulayman et al., 2014).

The definition of start-up success is subjective and can differ depending on the perspective. For example, an entrepreneur may define success as achieving higher revenues or personal fulfilment, whereas investors tend to focus on financial gains or an initial public offering (IPO). The common denominator is usually company growth and job creation. A successful start-up is typically a new company that offers well-received products or services, strives for a repeatable, profitable and scalable business model, generates jobs and/or changes the way people perform their daily activities (Santisteban & Mauricio, 2017).

However, definitional discrepancies and fragmentation of research are evident at many levels (Horne & Fichter, 2022; Kuester, Konya-Baumbach & Schumacher, 2018; Rizvanović et al., 2023; Tratwein, 2021). For instance, in papers by Horne & Fichter (2022) the main interest of analysis concern question: How to assess start-ups sustainability impact? While for Tratwein (2021), what is a contribution to the sustainability transition through growth?

The next group of research focus on innovations and ICT factors, i.e. Kuester, Konya-Baumbach & Schumacher focus on e-innovation (Internet-enabled service innovations) of start-ups and their adoption in perspective of high levels of uncertainty for potential customers. While Rizvanović et al. (2023) propose analysis of start-up growth drivers supported by digital marketing. In their research, Guckenbiehl et al. (2021) examine use of knowledge for innovation

purposes in start-ups. Santisteban & Mauricio analyse critical success factors of IT start-ups (2017).

Following perspective of SLR emphasize financial sources of start-ups, like venture capitals (VCs), business angels (BAs), banks, and crowd funders (Kaiser & Berger, 2020) or other specific aspects, like risk and resilience (Safari et al., 2023) or the interplay with competitors in terms of environment high uncertainty (Hatzijordanou et al., 2019).

There are some attempts of universal SLR of start-ups, but even them use specific search criteria of publications like emerging economics (Azeem & Khanna, 2023) or are limited in terms of analysed literature positions (Berre & Pendeven, 2023).

Considering this complexity and the gaps in the literature, the aim of this article is to conduct a systematic literature review to analyse, evaluate, and systematise knowledge about research on start-ups, and the definitions used therein. The review will not only classify existing findings but also identify areas for future research that could enhance understanding of how start-ups can flourish, achieve success, and contribute to broader economic, social, and environmental goals.

This study responds to the need to organize and structure knowledge about start-up provided by literature of the subject by formulating three questions:

- Q1. *What is the scope of start-up research presented in the business, management and accounting literature?*
- Q2. *What are the start-up definitions in business, management and accounting literature and according to this literature what is the proposal for a new, utilitarian start-up definition?*
- Q3. *What are the conclusions and future research directions regarding start-ups business, management and accounting literature?*

By providing this comprehensive overview and methodical framework of analysis, this article makes an important theoretical contribution, offering a foundation for reliable assessment of start-up research. This provides guidance for entrepreneurs, investors and decision-makers in terms of better understanding phenomenon, characteristics and key findings about the development and survival of start-ups.

The rest of the article is organized as follows. Section two presents the methodology for conducting a systematic literature review and other steps of procedure. Section three focuses on the analysis and synthesis of the scope of start-up research. The fourth section identifies and evaluates the definitions of start-ups. Section five presents key findings of start-up research, followed by discussion of the results. Last section contains a summary and final conclusions.

2. Method

2.1. Systematic literature review

The main method used in the paper is a systematic literature review. This is method defined as a review of an existing body of literature that follows a transparent and reproducible methodology for searching for, assessing the quality of, and synthesizing the literature, while maintaining a high level of objectivity. Unlike traditional or narrative reviews, it is distinguished by its structured approach, which includes pre-specified eligibility criteria and systematic search strategies for identifying and selecting studies, as well as critical appraisal of the included studies. This methodology is designed to make the review process replicable and ensure the findings are reliable and unbiased. (Kraus et al., 2020). The main purpose of a SLR is to: synthesize existing evidence to answer a specific research question in a transparent and reproducible way; minimize bias by using explicit, systematic methods for study selection, quality appraisal, and data synthesis; identify gaps, contradictions and inconsistencies in the literature to provide a foundation for future research; support evidence-based decision-making by offering a comprehensive and critical summary of the available evidence; guide policy, practice and further research by summarizing the state of the art and suggesting directions for new studies (Paul et al., 2021).

2.2. Research procedure

First step of this study was SLR of start-up literature based on PRISMA method (BMJ 2021). SLR procedure includes several phases (see Figure 1), aimed at review start-up publications indexed in Scopus and WoS. We applied several criteria for screening step: time period: from 2000 to 2025, language: published in English, reviewed publication: journals, book chapters and books and subject scope: business, management and accounting. The search phrase used in both databases was “startup*” and “start-up*”, and the search scope included the title, abstract and keywords of publication. Altogether, this search criteria result in 12 620 positions as for 11.02.2026.

In the next step, based on above results, we apply VOSviewer software version 1.6.20, released on October 31, 2023, to conduct co-occurrence and present total link strength of publication’s keywords. In this study the threshold of minimum number of keyword occurrences to include on the map was five. In result, maps cover: 6 clusters grouping 126 keywords that create 22 777 links, with total link strength of 4150. The rest of keywords in number 1983, that occur less than five times, were omitted by VOSviewer during creating cluster maps.

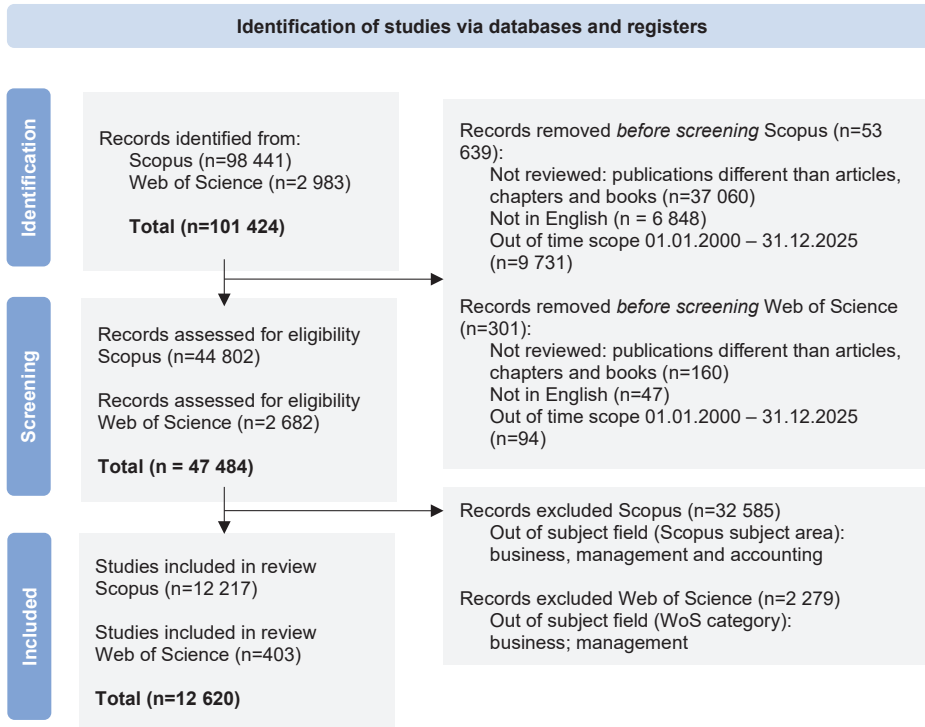


Figure 1. **Flow diagram for start-up systematic reviews based on PRISMA 2020 method**

Source: preparation based on BMJ (2021)

Total link strength in VOSviewer represents the sum of the strengths of all links for a specific node (item) to other nodes in a network. It measures the overall intensity of an item's connections – such as co-occurrence frequency of keywords – where a higher value indicates a more central, connected, or influential item (see Figure 2, 4).

Co-occurrence in VOSviewer refers to the analysis and visualization of the relatedness of keywords and is counted based on documents in which they occur together. It is a text mining technique used to map conceptual structures in scientific literature, where stronger links (closer distance) indicate higher co-occurrence frequency. In the result the cluster maps were created (see Figure 3, 5).

3. Analysis and synthesis of the start-up research scope

Analysis starts with the first research question: Q1. What is the scope of start-up research presented in the business, management and accounting literature? Figures 3 and 5 show the keywords co-occurrence network and its timeline visualization, while Figures 2 and 4 show total link strength for keywords and its timeline visualization. Both maps were created using the VOSviewer software based on an analysed research group of 12 620 publications related to start-ups. The analysis was conducted using the co-occurrence technique, applying the full counting method to all keywords. To construct the network, a minimum threshold of five keyword occurrences was applied in order to allow clear visualisation of the most relevant terms. Altogether 126 keywords were grouped into six clusters and create 22 777 links with total link strength of 4150.

In the network, node size is proportional to the frequency with which each keyword occurred, while links between nodes represent the strength of co-occurrence relationships. The different colours of the nodes indicate distinct clusters, grouping keywords that tend to appear together in the analysed literature.

The resulting network highlights the thematic structure of the start-up research field, revealing several interconnected clusters that reflect the diversity of research perspectives. The proximity of keywords and clusters suggests strong relationships between the identified themes, indicating that literature on start-ups encompasses multiple interrelated areas of investigation.

Thus, the network demonstrates that research on start-ups is characterized by a broad thematic scope and a high level of interconnectedness between topics. This map provides an overview of the research field and forms the basis for more detailed analyses of specific thematic clusters, which are presented in the following sections.

In below table each cluster is characterised by five most important keywords and their number of co-occurrence and link strength (see Table 1). The name of each cluster was proposed based on the thematic scope of the keywords that are contained within it.

The co-occurrence analysis presented in Table 1 identifies the core thematic boundaries and links within the start-up discourse. By examining the total link strength, we distinguish six primary thematic groups which can be summarized as follows:

Cluster 1 (Innovation and knowledge) focuses on knowledge sharing and networking mechanisms as key factors driving innovation and start-up creation. It is supported by the work of Winne and Sels, (2010) and Gimenez-Fernandeza, Sandullia and Bogers (2020).

Table 1. Cluster characteristics based on keywords co-occurrence and link strength

Keywords	Keywords co-occurrence	Keywords link strength	Keywords	Keywords co-occurrence	Keywords link strength
Cluster 1 (35 keywords) “Innovation and knowledge”			Cluster 4 (14 keywords) “Strategic management”		
Innovation	101	112	Model	59	22
Start-ups	83	105	Strategy	57	18
Startup	36	65	Resources	56	14
Knowledge	34	85	Market	46	12
Network	16	56	Capabilities	35	12
Cluster 2 (28 keywords) “Entrepreneurship”			Cluster 5 (12 keywords) “Performance and growth”		
Entrepreneurship	117	110	Performance	109	83
Start-up	48	85	Impact	78	36
Business	24	75	Growth	72	30
Success	22	55	Survival	41	17
Investment	14	44	R+D	31	12
Cluster 3 (26 keywords) “Technology and industry”			Cluster 6 (11 keywords) “Firm’s management”		
Startups	75	40	Management	83	40
Technology	72	27	Firms	65	30
Industry	50	15	Organizations	53	15
Incubators	45	11	Entrepreneurs	45	15
Future	39	12	SME	29	9

Source: preparation based on VOSviewer (11.02.2026)

Cluster 2 (Entrepreneurship) is oriented towards the fundamentals of entrepreneurship, emphasizing the relationship between business fundamentals, investments, and components of venture success. Key contributions in this area include Koe Hwee Nga and Shamuganathan (2010) and Cassar (2014).

Cluster 3 (Technology and industry) places great emphasis on the role of technological progress and support structures, such as incubators, that shape the future of sectoral development and industry landscapes. This cluster lines up with the findings of Colombo and Grilli (2010) and Hornuf, Klus, Lohwasser and Schwienbacher (2021).

Cluster 4 (Strategic management) focuses on the structural aspects of a company, specifically how to coordinate resources and capabilities through strategic models to achieve competitive advantage and market position. Research by Ghezzi and Cavallo (2020) and Hornuf, et al. (2021).

Cluster 5 (Performance and growth) is centred on measurable results, following the pathway from initial impact and R&D activities to long-term viability and scaling. Notable research includes Henry, Bauwens, Hekkert & Kirchherr (2020) and Gruber, MacMillan & Thompson (2013).

Cluster 6 (Firm's management) looks at the internal organizational dynamics and the key role of the management in the early stages of a company's lifecycle. It highlights how important it is to have the ability to adapt to the changing environment when leading a startup. This cluster is represented by Bergmann, Hundt and Sternberg (2016).

In literature there are many different propositions how to structure and assess results of start-ups research. First of interesting concept is work of Berre and Pendevan (2023) with a systematic literature review, examining 87 peer-reviewed studies, that were published between 1985 and 2020 in subject of relevant to "startup-valuation, venture capital, and price". They identify 36 startup-valuation drivers and cluster them into five macro-themes: Entrepreneur Characteristics; Firm Characteristics; Investor Characteristics; Market Conditions; and Deal Conditions. Other crucial paper by Da Silva et al. (2021) analyse 228 publications from Scopus and WoS from 1990 to 2019. Using VOSviewer software for co-occurrence of keywords, they indicated four clusters characterised by following keywords: 1) Innovation, performance and growth, 2) Entrepreneurship, startups, industry, 3) Knowledge, self-efficacy and behaviour and 4) Entrepreneurialism and liquidity constraints. The presented clusters resulting from the SLR of start-ups constitute a certain point of reference, however, due to the different scope of research (time, subjective, geographical) it would be questionable to draw final conclusions based on a reliable comparative analysis.

Figure 2 illustrates the hierarchical significance of keywords in the context of start-up research. This visualization provides a general overview of the significance of individual concepts, highlighting which concepts serve as the main points of reference in the literature.

highlighting the proximity and relationships between the most frequently analyzed terms. This structure reflects clearly differentiated research areas, including innovation, knowledge, entrepreneurship, performance, growth, technology, impact, and strategy. The network of links between nodes represents the strength of co-occurrence relationships. Overall, the dense network of connections highlights the interdisciplinary character of the field, combining approaches from management, economics, innovation, and entrepreneurship.

The structure of node distribution on the map indicates significant thematic stratification within the analyzed field. Significant distances between individual clusters suggest that the main research areas operate largely as separate streams of literature, with a low degree of direct integration. The distance between nodes functions as an indicator of conceptual proximity; the greater the distance between individual thematic groups, the less frequently they co-occur within the same publications. Such dispersion of the network, combined with the absence of a single dominant center integrating all threads, indicates a high degree of specialization within the research field. This suggests that start-up research is an evolving domain, where strategic and developmental aspects are often analyzed using different theoretical frameworks.

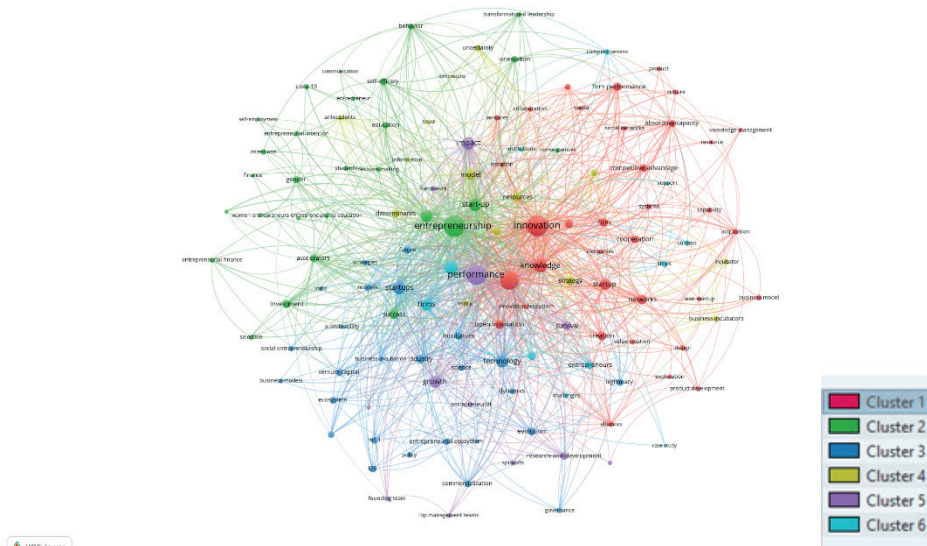


Figure 3. The structure of start-up research in the form of a keyword co-occurrence network

Source: created by VOSviewer (11.02.2026)

Figure 4 and Figure 5 present timeline visualizations of the total links strengths and the co-occurrence of keywords, respectively. Both perspectives provide a consistent chronological overview of the evolution of start-up research between 2019 and 2023, presenting trends in the research field. The transition from dark blue to yellow illustrates the evolution of academic interests over time, highlighting both key concepts and up-and-coming trends in the field.

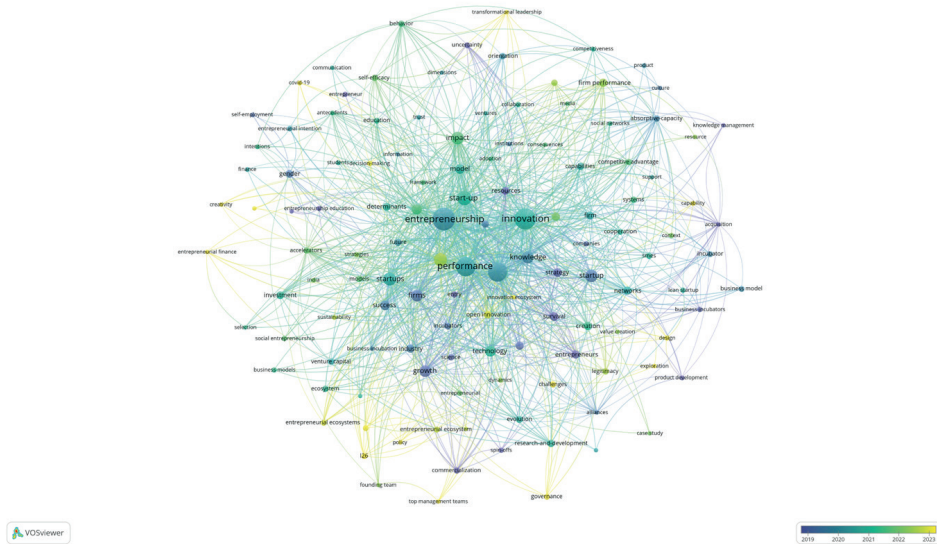


Figure 4. Total links strengths timeline visualisation

Source: created by VOSviewer (11.02.2026)

In 2019–2020, keywords highlighted in blue and purple, such as “entrepreneurship,” “innovation,” and “performance,” form the basis of the literature on the subject. These terms have maintained a high total link strength over the years, forming the theoretical framework of the field.

In 2021–2022, the transition to shades of green indicates a period of diversification. In this phase, the research focused on more specific operational aspects and environmental factors, considering issues of digital adaptation and organizational resilience.

The nodes marked in yellow represent the latest research trends. These topics, often located in various parts of the network, reflect the academic response to contemporary

global challenges. Concepts such as “Covid-19,” “Entrepreneurial and Innovation ecosystems,” “Open innovation,” and “Value creation” are highlighted as the most prominent in this timeframe.

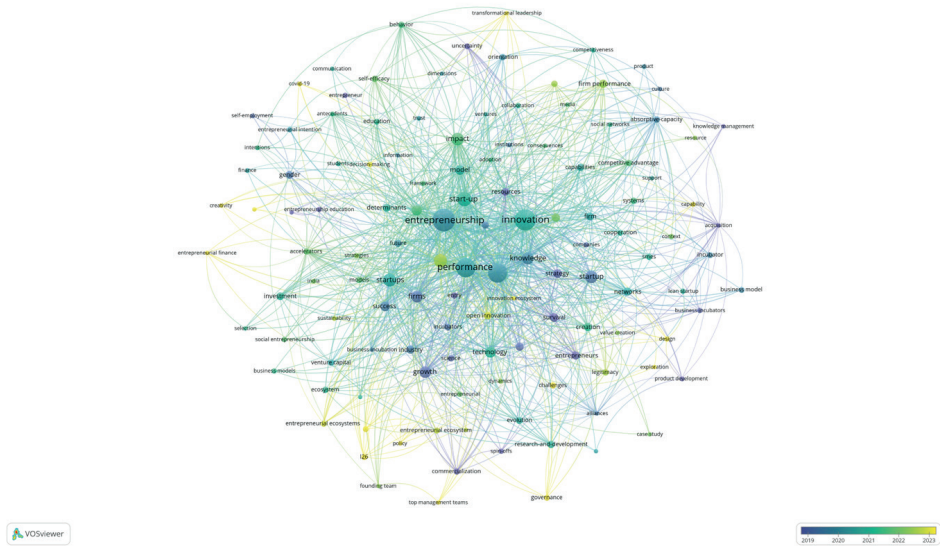


Figure 5. Co-occurrence of timeline visualisation

Source: created by VOSviewer (11.02.2026)

This distribution suggests that the field is entering a phase of transformation, in which the latest trends affecting start-ups are increasingly being studied. This situation suggests that academic debate is rapidly adapting to contemporary challenges, moving beyond traditional frameworks towards research adapted to the ongoing context.

4. Identification and evaluation of the start-up's definitions

This section refers to second research question: Q2. What are the start-up definitions in business, management and accounting literature and according to this literature what is the proposal of new, utilitarian start-up definition? In the table below there are presented several start-up definition proposals derived from the subject literature (see Table 2).

Table 2. **Scope of start-up definitions**

Author, year	Definition
M. Krejci et al., 2015	Startup is a new and temporary company that has a business model based on innovation and technology. In addition, these types of companies have a potential for rapid growth and scalability.
Horne & Fichter, 2022	Impact startups are innovative new ventures that diffuse solutions at scale that have a sustainability net benefit.
Kuester et al., 2018	[...] new business ventures that develop and launch innovations based on entrepreneurial ideas
Santisteban & Mauricio, 2017	Startup is a new and temporary company that has a business model based on innovation and technology.
Trautwein, 2021	[...] newly emerging, young ventures with innovative products and services
Rizvanović et al., 2023	[...] start-ups usually have limited resources and struggle with customer engagement, retention, and other growth challenges
Guckenbiehl et al., 2021	Start-ups are often more resource-constrained than larger and older firms, highlighting the importance of using knowledge sources from outside organisational boundaries
Hatzijordanou et al., 2019	A start-up can be defined as a “temporary organization in search of a scalable, repeatable, profitable business model”
Kaiser & Berger, 2020	1. New ventures are in desperate need of financial capital to realize their growth aspirations; 2. Relationship marketing is part of the entrepreneurial marketing (EM) tasks of startups
Safari et al., 2023	1. SMEs and startups usually have capacities, limitations, and priorities different from those of large enterprises, emphasizing different practices. 2. For startups, access to funds is the key factor; thus, limited access to funds is a major factor in their SC resilience.
Ries, 2011	Organisations that create new products and/or services in an environment of high uncertainty
Milian et al., 2019	[...] the term fintech refers to companies that are using technology to operate outside traditional business models for financial services, seeking to change the way these services are offered, using communication, the internet and the automated processing of information
Barbosa et al., 2019	Born Globals (BGs) are defined as “entrepreneurial start-ups that, from or near their founding, seek to derive a substantial proportion of their revenue from the sale of products in international markets.”
OECD, 2016	Innovative companies that provide solutions to emerging problems or create new demands by developing new business models.

Source: Krejci et al. (2015); Horne & Fichter (2022); Kuester et al. (2018); Santisteban & Mauricio (2017); Trautwein (2021); Rizvanović et al. (2023); Guckenbiehl et al. (2021); Hatzijordanou et al. (2019); Kaiser & Berger (2020); Safari et al. (2023); Ries (2011); Milian et al. (2019); Barbosa et al. (2019); OECD (2016)

The discussion of above overview was based on the ‘Mentefacto Conceptual’ model, which was proposed by Pablo Vicente Torres-Carrión and his team (2018). The model assumes that a concept is formed when four groups are considered together. These groups are:

1. Isoordination: necessary features.
2. Superordination: groups that include the concept.
3. Excluded: groups that do not belong to the concept, but are closest to it.
4. Infraordination: subclasses of the concept.

According to the analysed literature, the main characteristics necessary for creating a start-up are based on resources, the characteristics of the founding team, the business model, and the venture’s innovativeness. By definition, a start-up is an innovative new enterprise that introduces large-scale solutions (Horne & Fichter, 2022). They find answers to specific customer problems (Rizvanović et al., 2023). These enterprises are characterised by their potential for rapid growth and scalability, and their business model must be both repeatable and profitable (Santisteban & Mauricio, 2017). As start-ups are organisations that are still in the early stages of entering the market (Rizvanović et al., 2023; Santisteban & Mauricio, 2017), refining their market presence, value proposition and business model, these are not yet fully established and may change. This makes the search for a repeatable and profitable business model one of its defining features (Santisteban & Mauricio, 2017). Start-ups are organisations with limited resources (Hatzijordanou et al., 2019) that struggle to balance all the challenges of running a business. Shortages of resources often affect sales and branding teams (Rizvanović et al., 2023). Start-ups need financial capital to realise their growth aspirations. Investors provide start-ups with financial resources, technological support, social capital and mentoring, so this capital is essential (Kaiser & Berger, 2021).

The first superordinate group for start-ups is size. In this classification, start-ups are treated specifically, as they can be considered both small and medium-sized enterprises, as well as large enterprises (Safari et al., 2023). However, start-ups are specific in that their priorities and limitations differ from those of traditional enterprises (Hatzijordanou et al., 2019; Safari et al., 2023). The most common parent category is a new venture (Kuester et al., 2018). Start-ups belong to the group of young companies, which distinguishes them from those with an established market position (Safari et al., 2023).

Additionally, a start-up is defined as a temporary organisation (Hatzijordanou et al., 2019; Santisteban & Mauricio, 2017). This parent group characterises start-ups as entities created for a specific purpose: to find a scalable and profitable business model rather than continuing in their current form (Hatzijordanou et al., 2019). Start-ups are also a subcategory of new technology-based ventures (Santisteban & Mauricio, 2017). They also belong to a broader group of innovative new ventures whose goal is to introduce radical solutions to the market (Horne & Fichter, 2022). In the context of

market transformation, start-ups are classified as new market entrants that challenge established companies by introducing innovation (Horne & Fichter, 2022). Furthermore, start-ups are included in the general category of entrepreneurial ventures, linking them to literature on entrepreneurship and strategic management (Guckenbiehl et al., 2021; Krejčí et al., 2015).

The first group that does not fall under the concept of a start-up is that of established companies. Start-ups must be clearly distinguished from them, as they are not simply 'small big businesses' (Hatzijordanou et al., 2019). While start-ups operate in conditions of high uncertainty and are searching for a business model, established companies operate on the basis of stable, well-defined processes (Hatzijordanou et al., 2019; Kuester et al., 2018). Research on start-ups often deliberately excludes small, stable entities because they lack the key characteristics of a start-up: high innovation and a focus on rapid growth and scalability (Hatzijordanou et al., 2019; Horne & Fichter, 2022). Although start-ups may technically fall within the size categories of SMEs, sources indicate that their priorities and constraints are different (Safari et al., 2023). While traditional SMEs often focus on stable income, start-ups are temporary organisations in urgent need of capital to realise their growth aspirations (Kaiser & Berger, 2021; Santisteban & Mauricio, 2017). A start-up ceases to be a start-up when it reaches maturity and its sales and profits become stable, at which point it ceases to be a temporary organisation searching for a business model (Santisteban & Mauricio, 2017). Companies that merely transfer traditional services to the internet (e.g. online travel agencies) and whose value proposition did not originate online are also excluded from the definition of innovative digital start-ups (Kuester et al., 2018).

The reviewed literature distinguishes between several subcategories of the term 'startup'. The first of these are positive impact start-ups, which are defined in terms of sustainable development (Horne & Fichter, 2022). These are innovative new ventures that implement large-scale solutions which bring net benefits in terms of sustainability. They aim to replace less sustainable practices with new technologies or products. Sustainable, social and green start-ups are entities that pursue environmental, social and economic goals with equal priority. They focus on solving problems such as climate change, educational inequality, and environmental protection (Trautwein, 2021).

The second group consists of technology and digital start-ups. IT start-ups, also known as new technology-based firms (NTBF), are temporary organisations that create innovative products or services using advanced technology. They often operate in conditions of high risk and uncertainty (Santisteban & Mauricio, 2017). E-innovation start-ups introduce internet-based service innovations that offer unique value propositions which originally emerged online (Kuester et al., 2018). Software and hardware start-ups include companies involved in software development and distribution, as well as the creation and distribution of computer hardware (Krejčí et al., 2015). Digital-born start-ups are

companies for which the digital environment and social media have been a priority in building their brand and customer relationships since their inception (Rizvanović et al., 2023).

The third group consists of start-ups based on their origin and connections. University spin-offs are new companies established to commercialise knowledge and technologies developed at universities. Corporate spin-offs originate from existing corporations. CVC-backed start-ups are companies financed by corporate venture capital, which often facilitates the transfer of technological knowledge from the parent company (Guckenbiehl et al., 2021).

Additionally, start-ups can be assigned to specific market and status categories. ‘Unicorns’ are start-ups that have achieved an exceptionally high market valuation of 1 billion dollars, and they often use a combination of traditional and digital marketing strategies to maintain their leading position (Rizvanović et al., 2023). International Returnee Ventures are start-ups founded by entrepreneurs who have returned from abroad, influencing their networking capabilities and knowledge of international markets (Guckenbiehl et al., 2021). Artisan New Ventures are new craft-based ventures in which the founder’s expertise is a key driver of innovation (Guckenbiehl et al., 2021).

In summary, analysis based on the ‘Mentefacto Conceptual’ model indicates that a start-up is a specific, temporary organisational form whose essence is the search for an innovative, scalable business model. The clear distinction between start-ups and mature companies or traditional SMEs highlights the unique priorities of start-ups, such as striving for rapid growth despite severe resource constraints. The variety of subcategories identified, including advanced technological ventures and entities focused on sustainable development, proves that start-ups are a dynamic and key element of the modern economy. They only lose their temporary nature once they reach market maturity and achieve stable sales.

5. Key findings of start-up research

We also analysed most cited publications to answer third research question: Q3. What are the conclusions and future research directions regarding start-ups business, management and accounting literature? This analysis should create foundation for assessment of start-up research and provide guidelines for entrepreneurs, investors and decision-makers. Especially, in terms of better understanding of variables shaping development and survival of start-ups, and key findings about the possible future research directions.

In general, across 50 of most cited Scopus publications, 98% were journal publications and 2% is a monograph; 46% were quantitative methods, 22% qualitative methods, 12% mixed methods and the rest are theoretical research. In terms of

geographical scope 80% of research include one continent – mostly Europe or North America, 16% had global range and 4% cover two continents. As presented in the table below, most cited start-up research was sorted by number of Scopus citations, and present author’s keywords that refers analysed variables, describe applied method and scope or research and geographical scope (see Table 3). It is worth mentioning, that some publications lacked keywords, a precise scope of research, or a clearly described research method. Therefore, these publications were not included in the below summary. Furthermore, purely theoretical works were omitted due to the limited possibility to present research results and the difficulty in verifying the presented conclusions.

Table 3. **Subject, scope and key conclusions of selected start-up research**

Author, year (citations)	Variables (keywords)	Method, scope	Geographical scope
Nga & Shamuganathan, 2010 (522)	Entrepreneurship education; Personality traits; Social entrepreneurship; Social responsibility	181 students; Multiple Linear Regression	Malesia
Key finding: Social responsibility, sustainability and character development needs to be integrated within the business education to support entrepreneurs in realizing value and impact. Future business leaders need to be equipped with entrepreneurship skills, while exuding independent and reflective thinking in the pursuit life-long learning			
Ghezzi & Cavallo, 2020 (493)	Agile development, Business Model Innovation, Customer development, Digital startups, Lean Startup Approaches, Strategic agility, Multisided platform	3 exploratory multiplecase study based on digital multisided platform startups	Italy
Key findings: Lean startup approach can be employed as agile methods to enable Business Model Innovation in Digital Entrepreneurship. Lean startup approach and agile development can be used to orchestrate and manage existing resources or stimulate the creation of new ones by recombining resources differently.			
Colombo & Grilli, 2010 (485)	Growth; Human capital; New technology-based firms; Venture capital	439 new technology-based firms; econometric model	Italy
Key finding: In the case of non-venture capital-funded companies, the competency-based argument is confirmed, that the capabilities of technology-based companies match the skills of their founders.			
Weiblen & Chesbrough, 2015 (409)	Corporate Venturing; Innovation; Partnerships; Venture Capital; High Technology; Corporate Incubation; Spin-Offs	12 interviews with large corporations from the tech industry	USA, Europe, India

Key finding: Corporate equity is the key mechanism behind more established models; newer approaches replace equity with shared technology to connect both worlds with fewer organizational costs and greater speed and agility. Complementing the traditional equity-based approach, two new models were presented (outside-in and inside-out/platform) implement standardized practices. The support of startup ecosystem provides the missing pieces to help new ventures thrive.

Henry et al., 2020 (338)	Business model innovation; Circular business models; Circular economy nature-based solutions; Sustainable development	128 circular business models, documents, internet and interviews quantitative counts of the different codes	Holland, Germany, UK
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Key finding: Paper proposed five circular start-up archetypes: design-based, waste-based, platform-based, service-based and nature-based start-ups. The results show that circular start-ups tend to embrace strategies corresponding to higher levels of circularity than those used by incumbents. Circular start-ups can make contributions to transitioning towards circular economy

Paternoster, 2014 (287)	Software development; Systematic mapping study; Startups	43 primary studies of software development in startups with use of systematic mapping study	Global
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Key finding: Light-weight methodologies that allow companies to pick and tailor practices are preferred as they facilitate reactivity and allow rapid changes in the product. In this sense, processes in startups are evolutionary in nature, and the product is obtained by iterating and updating an early prototype driven by customer feedback. The architecture and design is often replaced by the use of well-known frameworks that facilitate maintenance and reduce documentation efforts. Startups mainly make use of simple tools to support and trace the knowledge-base and manage the workflow, often opting for open-source solutions that require little or no training and maintenance.

Nanda & Rhodes-Kropf, 2013 (255)	Venture capital; Innovation; Market cycles; Financing risk	12,285 firms based on data from Dow Jones Venture Source	USA
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Key finding: firms that are funded in hot times (high demand and growth rate) are more likely to fail but simultaneously create more value if they succeed. The same investors invest in more risky, innovative startups in hot times. There is relation between the level of patenting and the funding time of startup at different times in the cycle. In addition to being valued higher on the day of their IPO, successful firms that are funded in hot markets had more patents and received more citations in the initial years following their first funding than firms funded in less heady times.

Gruber et al., 2013 (247)	Choice sets; Diversification; Entrepreneurship; External knowledge sourcing; Market search landscapes; Organization habitat selection; Resource-based view	interviews with founders of 496 technology ventures	Germany, UK
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Key finding: Founding teams with more diverse industry experience and more diverse external knowledge sourcing relationships identify larger number and more varied (distant) market opportunities. However, the extent to which strategic variety of such opportunities is identified depends on the founders' technological expertise, whereas technological expertise is less relevant in identification of the number of opportunities. Initial constraints in founders' choice sets can have a lasting impact on the growth potential that the new firm exploits over time.

Bergmann, Cet al., 2016 (232)	University entrepreneurship; Students; Regional context; Organizational context; Multilevel analysis; Global University Entrepreneurial Spirit Students' Survey (GUESSS)	6 723 respondents from business and economics students, the study covered 41 universities located in 27 regions; binary multilevel logistic regression	Austria, France, Germany, Hungary, Luxembourg, the Netherlands, Switzerland
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Key finding: Individual and contextual determinants influence students' propensity to start a business. While peoples' individual characteristics are most important, the organizational and regional contexts also play a role and have a differentiated effect, depending on the source of the venture idea and the stage of its development. Organisational characteristics, like the prevalence of fellow students who have attended entrepreneurship education, influence whether students take action to start a new firm (nascent entrepreneurship) but do not seem to support the actual establishment of a new firm.

Winne& Sels, 2010 (218)	Human capital; Human resource management; Innovation; Start-ups	The survey generated data on 637 start-ups; path analysis with manifest variables	Belgium
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Key finding: Employees' human capital and HR practices have a positive effect on innovation. Yet, unless human capital is managed, it provides little benefit to start-ups, in terms of innovation. Moreover, a broad range of HR practices is more fruitful in start-ups with high human capital as compared to start-ups with low human capital. Second, the owners/managers' educational level and the consultation of external experts indirectly affect innovation, through the selection of highly educated workers and/or the development of HR practices.

Cassar, 2014 (209)	Bias; entry; Entrepreneur; Expectations; Experience; Forecasting; Growth; New firms; Technology	on the forecast performance of 2 304 entrepreneurs who have started new businesses; multinomial logit model OLS	USA
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Key finding: Entrepreneurs with greater industry experience have more realistic expectations. The benefit of industry experience on entrepreneurial expectations is present across various industry classifications, with the evidence suggesting the benefits of industry experience are greater in industries with greater uncertainty, such as high-technology.

Hornuf et al., 2021 (208)	Fintech; Strategic alliance; Make, buy, or ally; Entrepreneurial finance; Banks	100 largest legally independent banking institutions; regressions (Probit panel, Negative binomial panel, Standard probit)	Canada, France, Germany, UK
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Key finding: Entrepreneurs in need of capital may be more successful approaching large banks, because they are more likely to invest in fintechs; by contrast, fintech entrepreneurs who want to stay independent but need to reach new customers may favour smaller and specialized banks, which are more likely to engage in product-related collaborations. More generally, banks with a clearly defined digital strategy or a CDO are most likely to be receptive to entrepreneurs' request to collaborate or for investment.

Gimenez-Fernandez et al., 2020 (188)	R&D resources; Smes; Entrepreneurship; Spillovers; Public policy; Open innovation; External Knowledge Sourcing	37 655 observations, including 35 726 observations from SMEs and 1 929 from start-ups; Dynamic Tobit model, OLS regressions	Spain
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Key finding: Results show the limited effects of internal R&D investments and R&D policy instruments to promote the growth of innovative start-ups, while highlighting potential benefits of their openness to external sources of innovation. As such, these results have important implications for research, practices and policies that relate to innovation in new ventures and SMEs, while casting doubts on the effectiveness of some of the common strategy and policy instruments to stimulate performance in small innovative start-ups.

Source : Koe Hwee Nga & Shamuganathan (2010); Ghezzi & Cavallo (2020); Colombo et al. (2015); Henry et al. (2013); Bergmann et al. (2016); De Winne et al. (2021); Gimenez-Fernandez et al. (2020)

Below, there is sum up of above publications referred to identified six clusters described in section 3 (Innovation and knowledge; Entrepreneurship; Technology and industry; Strategic management; Performance and growth; Firm's management).

Innovation and knowledge - Start-up's innovation level depend on the market cycle, i.e. firms that are funded in hot times (high demand and growth rate) are more likely to fail but simultaneously create more value if they succeed (Nanda & Rhodes-Kropf, 2013). Also there is an important decision in terms of R&D source – there is evidence that limited effects of internal R&D investments and R&D policy instruments to promote the growth of innovative start-ups, while at the same time highlighting openness to external sources of innovation appears more beneficial for the growth of new ventures than relying solely on internal R&D investments or R&D policy instruments and incentives for start-ups (Gimenez-Fernandez et al., 2020).

Also applied framework can boost innovativeness. Lean startup approach (LSA) can be employed as agile methods to enable Business Model Innovation in digital entrepreneurship, especially by proper orchestrating and managing existing resources or stimulate the creation of new ones by recombining resources differently (Ghezzi & Cavallo, 2020).

Technology and industry – there are interesting findings from software start-ups, that apply light-weight methodologies to pick and adjust practices to facilitate reactivity and allow rapid changes in the product. The product is obtained by iterating and updating an early prototype driven by customer feedback. The architecture and design is often replaced by the use of well-known frameworks that facilitate maintenance and reduce documentation efforts. Startups mainly make use of simple tools to support and trace the knowledge-base and manage the workflow, often opting for open-source solutions that require little or no training and maintenance (Paternoster et al., 2014).

Also in terms of environment influence, founding teams with diverse industry experience and knowledge sourcing relationships tend to identify a greater number and more varied market opportunities (Gruber et al., 2013).

Strategic management -the approaches and methods of LSAs and agile development can be used to orchestrate and manage existing resources or stimulate the creation of new ones by recombining resources differently (Ghezzi & Cavallo, 2020). Whereas key role in identification of strategic variety of opportunities play founders' technological expertise. Authors also suggest that wrong initial choices can have lasting impact on the growth potential (Gruber et al., 2013). Beside negative consequences, employee human capital and human resource (HR) practices positively affect innovation, though human capital must be effectively managed to provide substantial benefit to the start-up (De Winne & Sels, 2010).

Performance and growth. Entrepreneurship – for enabling finance support, entrepreneurs from fintech seeking capital might find more success approaching large banks, while those aiming for independence might favour collaboration with smaller, specialized banks that offer product-related partnerships. While banks with a clearly defined digital strategy or a chief digital officer are most likely to be receptive to entrepreneurs' request to collaborate or for investment (Hornuf et al., 2021). Weiblen and Chesbrough describe the relations between large companies and start-up financing, suggesting that corporate equity is the key mechanism behind more established models, newer approaches replace equity with shared technology to connect both worlds with fewer organizational costs and greater speed and agility. Therefore, the support of the broader start-up ecosystem provides crucial missing pieces to help new ventures thrive (Weiblen & Chesbrough , 2015).

Firm's management - both individual characteristics and the organizational/ regional contexts influence a student's propensity to start a business, with the effects varying depending on the venture's source and stage of development (Bergmann et al., 2016). According to Cassar, the prior industry experience not only relates to more realistic performance expectations but also provides better results especially in more uncertain industries (2014). In the case of non-venture capital-funded companies, the founders' skills determine capabilities of technology-based firms (Colombo & Grilli, 2010).

6. Conclusions

The paper's main objective was to conduct a systematic literature review to analyse, evaluate and systematise knowledge about research on start-ups and the definitions employed therein. Based on the analysed publications, a picture emerges of start-ups as complex, multi-faceted phenomena that are the subject of consideration from many theoretical approaches, such as entrepreneurship, innovation theory, finance, technology

management, the network approach, sustainable development, resource management, capabilities, management psychology, and more.

The lack of uniformity in the definition of a start-up, together with the diversity of research methodologies adopted, creates a diverse landscape and significant challenges for researchers, practitioners and administrative organisations and government units responsible for proposing development policies. Therefore, it is useful to summarise the results from the perspective of individual interest groups.

In terms of its impact on theory, it is worth highlighting the growing importance and interest in start-ups as a research topic, particularly with regard to investigating the interdependencies innovation and knowledge; entrepreneurship; technology and industry influence. This may be related to rapid technological advancement and the need to redefine the roles of entrepreneurs and employees in conditions of high variability and the progressive development of concepts such as Industry 4.0 and 5.0 (Hein-Pensel et al., 2023).

Regarding the definition of a start-up, we propose that it is a specific, temporary organisational form characterised by the search for an innovative, scalable business model. The clear distinction between start-ups and mature companies or traditional SMEs highlights the unique priorities of start-ups, such as striving for rapid growth despite severe resource constraints.

Additionally, we recognise the insufficient number of global-scope research projects based on quantitative or mixed methods that can provide more reliable, objective and reproducible research results in terms of methodological restrictions.

For practitioners, several areas require special attention, including the role and importance of the entrepreneur's experience, skills, and knowledge sources. These factors can indicate more realistic performance expectations, provide better results in uncertain industries, and foster the identification of market opportunities and strategic decision-making. It is also crucial to support the appropriate organisation of human resources and practices, due to their positive influence on innovation.

Lastly, in terms of policy recommendations, it is worth mentioning that supporting openness and access to external sources of innovation is more beneficial for the growth of new ventures than relying solely on internal resources. Additionally, a bank's size and level of digitalisation determine its flexibility and responsiveness when providing financing to start-ups.

In conclusion, further directions for research can also be identified, such as including other publication databases, e.g., Google Scholar, etc., or deepening the analysis of keywords co-occurrence of specific clusters.

Authors' contribution

P.M. and M.C.: article conception, theoretical content of the article, research methods applied, conducting the research, data collection, analysis and interpretation of results, draft manuscript preparation. **K.K.:** article conception, theoretical content of the article, research methods applied, conducting the research, data collection, analysis and interpretation of results.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used DeepL and Google Translate in order to check language accuracy and support translation. After using these tools/services, the authors reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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