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Analysing Startups Failure Factors: Evidence from CB Insights Tech Market Intelligence Platform

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ABSTRACT

Failure as a phenomenon is roughly inseparable from the startups subject in previous literature, causing a debate among scholars about the diagnostic of the reasons of this pathology, due to the large failure rates of startups that impose risks of ruling out the positive impact and added value they allow. Our paper attempts to contribute to this debate by analysing a database of 353 startups post-mortem reports from the CB Insights Tech Market Intelligence Platform using 65 failure factors based on 245 factors used in 13 prior studies. Results indicate that failure factors related to product/market misfit, lack of capital, great power of competition, law and regulation problems, and bad business model appear as the most important factors that lead startups to fail. Furthermore, findings emphasize that failure factors related to product/market misfit and the lack of capital appear actively in the early stages of the startup lifecycle, to decline gradually in the later stages leaving room for factors related to great power of competition and law and regulation problems, with relative stability of financial problems through the lifecycle of the startup.

1. Introduction

The world today stands on the cusp of the 4th industrial revolution in history which has dawned and its signs appeared in the last quarter of the 20th century. The increase in market competition, the tremendous cultural and creative developments, as well as the emergence of the knowledge economy and its role in transforming societies into knowledge societies, led to the overlapping of physical, digital, and biological worlds and blurring the boundaries between them, creating an important foundation for the Fourth Industrial Revolution. Perhaps the most important aspect of this revolution is the emergence of an exceptional type of companies called "startups" with a high capacity to create value and drive up the mechanics of economic growth. The successes achieved by Google, Facebook, Microsoft, and their peers have led researchers, entrepreneurs, and policymakers to focus on understanding the logic of these companies and the means for their success as a first step in the way of simulating these models. Statistics express well the reason for this, as the economic value of the global startup economy was estimated at $ 2.8 trillion in 2019, up 20% from 2017 [1]. Furthermore, there are 500 unicorns and 27 decacorns in the world, most of which are startups, with a cumulative value of $ 1.585 billion, besides the birth of hectocorns by the BiteDance startup, whose market value alone is $ 140 billion [2].

In spite of these astronomical figures, there is a dark side that statistics show, as 3 out of 4 of venture-backed startups fail [3], 9 out of 10 startups fail and only 40% of startups actually turn a profit [4]. Thus, this may cancel out the expected positive effects of these companies and impose consequences that may accumulate their negative effects to reflect the enormous wealth that modern economies can waste. In this aspec, Alon et al. (2018) [5] emphasise that the high rates

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of failure in the US business sector among startups in 1980-2014 have led to a drop in the overall productivity by 0.01% per year, the cumulative effect of which was 3.1% at the end of the period.

Giardino et al. (2015) [6] attribute these numbers to the exceptional characteristics that mark these companies, such as general lack of resources, high reactiveness and flexibility, intense time-pressure, uncertain conditions, and tackling fast-growing markets. Salamzadeh & Kawamorita Kesim (2015) [7] considers that these characteristics challenge startups during their lifecycle concerning funding aspects, human resources, support mechanisms, and environmental elements. Wang, Edison, Bajwa, et al. (2016) [8], on their part, weigh challenges related to product building and business model in the early stages versus those related to financing problems and customer acquisition in the later stages. But the term 'challenges' still does not reflect well the phenomenon or address it from an integrated perspective because it places the startup in a peer-to-peer position with the factors that lead to failure, while it is often unable to confront it entirely. For this reason, academic discourse tends to adopt the term 'failure factors'. Accordingly, the issue of startups failure is a new old topic of paramount importance, because the phenomenon is old, but it deals with a new type of companies, in which, researches that focused on their success factors will never be able to discuss unless they can analyse their failure factors, and this is what Krishna et al. (2016) [9] have termed 'less failure, more success'.

On grounds of this, our study falls within the literature that attempts to analyse the startups failure factors, but overstep that in relying on a large number of failure factors to go deeper than prior studies. Moreover, we aim to highlight some aspects that were not considered before, such as the gender of entrepreneurs and the startup life cycle. For this purpose, the paper was divided into three sections. Section two below deals with the review of the literature that was concerned with the topic and the background of our study. The third section is devoted to explaining the methodology adopted and the studied sample. The fourth section is dedicated to analysis and results. We seal our study with a conclusion that outlines the main deductions of the paper.

2. Review of the literature and background of the study

Failure as a phenomenon is almost inseparable from the startups topic in previous literature, and this close association is due to the large failure rates of this type of companies, which are close to 90% [10, 11–12]. In this aspect, prior research on startups failure factors did not only focus on analysing these factor, but also dealt with them with philosophy derived from cultural backgrounds, behavioral principles, and even emotional and sensory values stemming from psychological emotions linked to the human race. This has been reflected in the study of Cardons' et al. (2011) [13] who suggest that cultural sensemaking of failure varies by the geographical area where failure occurs, which negatively affects the entrepreneur and entrepreneurship in it, as well as on the individual entrepreneur's view of themselves following failure. Furthermore, Kims' et al. (2016) [14] agrue that fear of failure is negatively related to the attitude toward the behavior and subjective norm. Moreover, Fabrício et al. (2015) [15] confirm that the high dynamism and high degree of uncertainty of startups, especially in its early stages, and any funding problems and even teams training problems (when they exist) do not seem to make it viable to use rigid or "heavy" methods to support IT management and governance.

Morover, according to Ries (2010) [16], the entrepreneur is seen as one of the most important actors in startups failure, being the source of creative ideas and the center of value created by startups. Many studies focus on the entrepreneur's component in their attempt to understand failure causes. In this regard, we recall the study of Rogoff et al. (2004) [17], who amphasise the existence of a self-serving attribution bias in their samples of business owners, and that both biases described by attribution theory can be observed among entrepreneurs and can be relied upon in explaining how entrepreneurs perceive failure or success factors of their companies. In the same vein, Szathmari et al. (2020) [18] stress the absence of competencies related to information seeking and customer service orientation, which play a fundamental role in startups failures. Nam et al. (2019) [19], on the other hand, have expanded the circle of factors related to entrepreneur's personal characteristics information to factors related to information about their assets and those related to their credit position and their contribution to failure. Their results emphasise the importance of entrepreneur's personal credibility, experience, and assets in business management. From a more general and comprehensive perspective, Kalyanasundaram (2018) [20] tried to distinguish between failed and successful startups by analysing a number of factors and characteristics related to the startups failure event, concluding that factors such as the time to minimum viable product cycle, time for revenue realization, founders' complementary skillsets, age of founders with their domain expertise, personality type of founders, attitude towards financial independence and willingness to avail mentorship at critical stages, will decisively differentiate failed startups from the successful ones.

Another category of studies linked failure as an event with the Lean Startup Theory as an independent and modern approach of its owner Ries (2011) [21]. Unlike what requires failure to leave the entrepreneurial race track, Ries' theory deals with failure as a normal event and confronts it with a special mentality that necessitates entrepreneurs not to succumb to the negative impact of this failure, whether physical or moral based on its foundations related to pivoting and learning. This is what Bajwa et al. (2017) [22] rely on in their study that analyses 14 factors mentioned in Ries' book. The authors argue that negative customer reaction and flawed business model are the most common factors that trigger pivots in software startups. Considering that, Bajwa et al. [22] focus on pivoting as a process, while Wang et al. [8] emphasise the tools of this process, they argue that the most important difficulties that startups face in the early stages of their life cycle appear in building product, even that its significance decreases as the company progresses to later stages of its lifecycle to create further difficulties in acquiring and developing customers.

Macro factors are also an approach in addressing the failure phenomenon. In this aspect, Everett & Watson (1998) [23] argue that these factors are associated with failure cases of an estimated 30-50%, and that failure rates are positively correlated with interest rates (where failure was defined as bankruptcy) and unemployment rates (where failure was defined as discontinuance of ownership). Furthermore, Giardino's et al. (2014) [24] suggest that inconsistency between managerial strategies and execution can lead to failure by means of a behavioral framework. Moreover, Laitinen (2016) [25] focus on financial failure. His results strongly emphase the central role of internal rate of return in the likelihood of each type of failure, besides early generation of sales, fixed expenses, size of initial investment, and initial equity capital on failure likelihood.

Notwithstanding the significance of the results reached by all these studies, the holistic approach in dealing with startups failure appears to be the most effective in terms of analysis objectivity, as studies depend on a number of factors and study their effects on the failure event without focusing on a specific aspect. Table 1 depicts the most substantial of them.

Table 1. The holistic approach in dealing with startups failure and its results

Authors	***Factors used***	***Significant factors in the study's results***
Gelderen et al. (2005)[26]	Gender; age; push motivation; education; work experience; management experience; experience in setting up; business plan; information and guidance; start up part-time/full-time; industry experience; startup capital; third-party loan; risk of the market; dummy manufacturing; dummy trade; dummy business services; dummy consumer services; ambition becoming rich; ambition becoming large; techno nascent; solo/team.	Part-time startup; business model; the negative correlation between the high ambition of entrepreneurs and their push motivation.
(Richter et al., 2016) [27]	Core team; team skills; external support; general environment/ecosystem; finance; setup of business model; potential of growth; product; marketing; law and regulations; internal setup/processes.	Legal issues; business models; lack of funding, the ability of startups to convey the way they were going to generate revenues.
Bednár & Tarišková (2017) [28]	Lack of money for further development; no need for a product/service in the market; no investors; cost issues; not the right team; underdeveloped business model; lack of enthusiasm; ignoring customer's opinions; great power of competition; unattractive product; pivoting in the wrong way; burnout syndrome; product was created at the wrong time.	Lack of money for further development; No need for a product/service in the market; No investors; Cost Issues; Not the right team.

Foo et al. (2017) [29]	Operational inefficiency; product/market misfit; poor market understanding; poor product development; competition; misvaluation.	Operational failures; product/market misfit; managerial hubris.

As portrayed in table 1, studies output within the holistic approach does not allow for much analysis, and it is not surprising that the sample, methodology, and factors adopted differ from one study to another. However, the factors related to lack of financing, product/market misfit, and business model problems can be weighted against the rest of factors. However, the endeavors to stand on these factors more objectively are embodied in those studies that classified failure factors in dimensions because it is safer when dealing with a large number of factors to classify them within their dimensions with the purpose of facilitating the analysis and the understanding of the phenomenon. Table 2 includes some of these studies.

Table 2. Startups failure factors and their dimensions

Authors	***Dimensions: factors***	***Significant factors in the study's results***
Bruno & Leidecker (1988) [30]	- **Product/Market:** timing; design; distribution/selling; business defenition; overlliance on one customer. - **Financial:** initial under-capitalization; assuming debt too early; venture capital relationship. - **Managerial/Key Employee:** ineffective team; personal problems; one track thinking. - **Cultural/Social:** violated job; displacement norm.	Managerial dimension and market/product misfit; technology or product orientation that presupposes market acceptance.
Crowne (2002)[31]	- **Startup phase:** developers are inexperienced; product isn't really product; product has no owner; no strategic plan for product development; product platform is unrecognized. - **Stabilization phase:** founders won't let go; development team fails to gel; product is unreliable; requirements become unmanageable; product expectations are too high; service provision delays development. - **Growth phase:** skils shortage delays development; platform creep delays development; product pipeline is empty; no process for product introduction.	Failure is mainly centered on product development issues.
Tushabomwe-Kazooba (2006)[32]	- **Internal factors:** wrong pricing; negative cash flow; poor record keeping; domestic and family situations; management problems; faulty product concept; inadequate control of inventory; lack of planning; trouble among partners. - **External factors:** taxation; load shedding; lack of capital; poor market; high rent charges; delays in processing applications.	Sart-up phase factors mainly embodied in Lack of planning; taxation; lack of capital; poor market; wrong pricing; high rent charges.
Pride (2018)[33]	- **Founders failure:** founder(s) lack capacity; founder(s) lack capability; founder disharmony. - **Funding failure:** run out of cash; too much funding; investors-founder disharmony. - **Flawed business model:** solving an irrelevant problem; ineffective business model; poor execution; external threats/competition.	Startup's DNA related to its financing aspects; founders' characteristics; business model.
Triebel et al. (2018) [34]	- **Internal factors:** individual reasons/reasons within the team; development doesn't meet market demand; poor marketing. - **External factors:** lack of capital; wrong time for the product; overtaken in competition.	Authors emphasise the need to deal with failure through the principle of "Fault tolerance", which describes a

		process of recognizing, accepting, and learning from errors.
Calderón et al. (2019) [35]	- **Human capital:** lack of proper selection; lack of training; disarm in the team; a demotivated team; the team does not have what it takes; poor team management; compensation problems; individualism; staff turnover; theft by staff. - **Organizational factors:** quality and efficiency; innovation; lack of focus; strategy; knowledge management; planning; operation; lack of indicators; management practices; problems in the execution; accept disadvantageous contracts; inadequate organizational structure; conflict with shareholders. - **Market factors:** lack of market study; ignore consumers; problems with the product; lack of marketing strategy; bad location; target market poorly selected; market problems (customers); price problems; inadequate promotion/advertising; idea or business model. - **Personal factors:** personality and attitudes; lack of skills to sell; incorrect or non-existent leadership; risk tolerance; lack of skills to undertake; bad time management; lack of social skills; reasons to open the business; lack of social relationships; inexperience; fear to fail; schooling of the entrepreneur; age of the entrepreneur. - **Financial factors:** bad money management; excess of operating expenses; lack of economic resources; lack of credit with suppliers; delay of payments from your customers; access to resources; lack of investors. - **External factors:** Adaptability; Economic crisis and/or politics; changes in the market; problems with criminal groups; competition; problems with suppliers; culture (Mexican context); discontent of interest groups (nearby communities, media or authorities); appearance of new technologies; legislative reforms.	The human capital dimension; the market dimension; and the organizational dimension distributed as follows: lack of proper selection; lack of training; disarm in the team; a demotivated team; lack of market study; ignore consumers; problems with the product; lack of marketing strategy; personality and attitudes; lack of skills to sell; incorrect or non-existent leadership; risk tolerance; bad money management; excess of operating expenses; lack of economic resources; adaptability; economic crisis and/or politics; changes in the market.
Ahn & Kang (2020) [36]	- **Startup funding:** initial capital; operating fund; facility fund; investment attraction; technology development fund. - **business model establishment:** business feasibility; patent dispute; market information acquisition; technology development; technology commercialization. - **Business administration and management:** management mind; external market development; insuring professional manpower; network utilization; market development. - **Entrepreneurship awareness:** acquaintances detention (parents); negative social atmosphere; economic activity until success; fear of failure; lack of recovery. - **Entrepreneurial ecosystem:** required documents; existing activity constraints; technology valuation; various regulatory restrictions; inconvenient administrative procedure.	Business model establishment; business administration and management; startup funding dimensions including market information acquisition; technology commercialization; project feasibility; technology development; new market pioneering in descending order.

Table 2 decicts the lack of agreement about startups failure factors among researchers within the dimensional framework, with factors related to the business model, product/market misfit, and lack of financing as constant in the outputs of most of these studies. Morever, results suggest that the role of managerial aspects and entrepreneur's personal characteristics are very important additional factors in the total of startups failure factors.

Based on the discussed above, our study adopts a dimensional approach through the analysis of a database of 353 post-mortem reports of failed startups drawn from the CB Insights Tech Market Intelligence Platform for the period from 2014 to August 2020 with a sequential injection of reports each year. We stress that we do not have the primacy in using this database for this purpose as it was employed twice in a similar analysis by the corporation itself in 2014 [37], and then later by Cantamessa et al. (2018) [38]. For this purpose, we consider this paper an extension that takes into account the large size of this database, and attemps to address the issue with a deeper approach and a larger number of failure factors.

3. Methodology

3.1. Data

This study aims to uncover startups failure factors through analysing a database of 353 startups post-mortem reports from the CB Insights Tech Market Intelligence Platform that is concerned with variables related to high-growth private global companies. The platform has been monitoring and collecting these reports from various global sites and platforms since 2014, reaching 353 reports by the time of editing this paper. Table 3 presents the evolution of the number of reports within the studied database.

Table 3. Evolution of startups post-mortem reports database in CB Insights platform

Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Number of reports	100	45	39	58	45	36	31

The CB Insights Tech Market Intelligence Platform database was used for the purpose of analysing startups failure factors in two distinct studies as mentioned before. First, was an analytical study conducted by the CB Insight company itself in 2014 [37] when the database included 101 reports. That study adopted a holistic approach in dealing with the failure phenomenon based on 20 failure factors. The study by Cantamessa et al. [38] followed subsequently when the database had 166 reports, and the factors were classified within five dimensions (business model, consumer/user, product, organization, and environment), totaling 26 failure factors.

3.2. Definition of studied failure factors

Our study does not differ from the two mentioned above in terms of purpose. However, we use different methods and sample size. We suggest an enhanced analysis of failure factors through extending the dimension circle to eight dimensions defined as follows:

- **Entrepreneurs:** this dimension includes the founders' personal characteristics, whether related to psychological aspects or their own capabilities and complementary skills;
- **Management and organisation:** cover all factors related to organisational behaviour, management, and leadership methods and organisational structuring;
- **Product:** this dimension focuses on the product/service characteristics, actual or potential performance, and their reflection on startups failure or success;
- **Startup:** reflects the rest of internal failure factors since separating the previous dimensions from this dimension requires not neglecting some factors related to the startups' functional aspects and the path it will take during its life cycle, and this comes within the endeavours of a deeper analysis of these factors;
- **Finance:** contains all factors related to financial failure and investor failure. It has been separated from the external environment since prior studies do not segregate it.

- **Consumer/ user:** this dimension reflects customers behaviour and their reactions and everything related to it, considering that customer/ user is the first gain of the startup and its ultimate goal and because its growth depends on targeting a wide range of customers and meeting their needs [39]. Morover, previous research largely neglects this dimension in handling the failure phenomenon.
- **Ecosystem:** it is termed in many studies of the external environment, and it reflects the set of external factors remaining after separating those related to finance and consumers, which may hinder the work of startups that are mainly linked to competitors and macro variables.
- **Entrepreneurial process and business model:** previous literature in this regard focuses only on the business model and neglects the entrepreneurial process. All success factors may be available for the startup, but a defect in the latter can lead it to failure.

Furthermore, we rely with the same endeavour on a larger number of factors related to each of the previous dimensions which add up to 65 factors drawn from 245 factors used in 13 previous studies, after sorting and eliminating similarities and those that do not serve the study. Table 3 illustrates these factors according to their dimensions.

Table 3. Classification of the startups failure factors according to their dimentions

Dimension	*Failure factors*
Entrepreneurs	Lack of enthusiasm; Founders disharmony; Lack of skills; Incorrect or non-existent leadership; Lack of social relationships; Inexperience; Fear to failure; Low educational level.
Management and organisation	Operational inefficiency; One track thinking; Wrong pricing; Lack of planning; Inventory problems; Poor marketing; Lack of proper selection of team workers; Poor team management; Lack of knowledge; Inadequate organisational structure; Bad time management; Market information acquisition problem; Accept disadvantageous contract.
Product	Product/Market misfit; Wrong product timing; Poor product development; Product design problems; Product expectations are too high; No process for product introduction; Bad quality.
Startup	Teamwork problems; Developers are inexperienced; Staff turnover; Bad location; No/wrong scaling; Lack of business development; Theft by staff.
Finance	Lack of capital; Cost issues; Assuming debt too early; Run out of cash; High rent charges; Investors-founders disharmony; Bad money management; Lack of economic resources.
Consumer/ user	Overreliance on one customer; Ignore customers; Delay of payment from customers; Few customers; High cost of customer acquisition; Unfaithful customers.
Ecosystem	Changes of market technology; Lack of external support; law and regulation problems; Great power of competition; Cultural and social changes; Taxation; Poor market; Economic crisis and/or Politics; Problems with suppliers; Problem with criminal groups.
Entrepreneurial process and business model	Lack of experience in setting up; Bad business model; Pivoting in the wrong way; Ineffective; Lack of market study; Wrong positioning in the market; Startup part-time.

It should be noted at this point that the adoption of these dimensions does not indicate that they should be fully reflected in our results; a combination of factors may disappear and others may appear depending on the characteristics of the studied sample and the associated failure factors.

4. Results and discussion

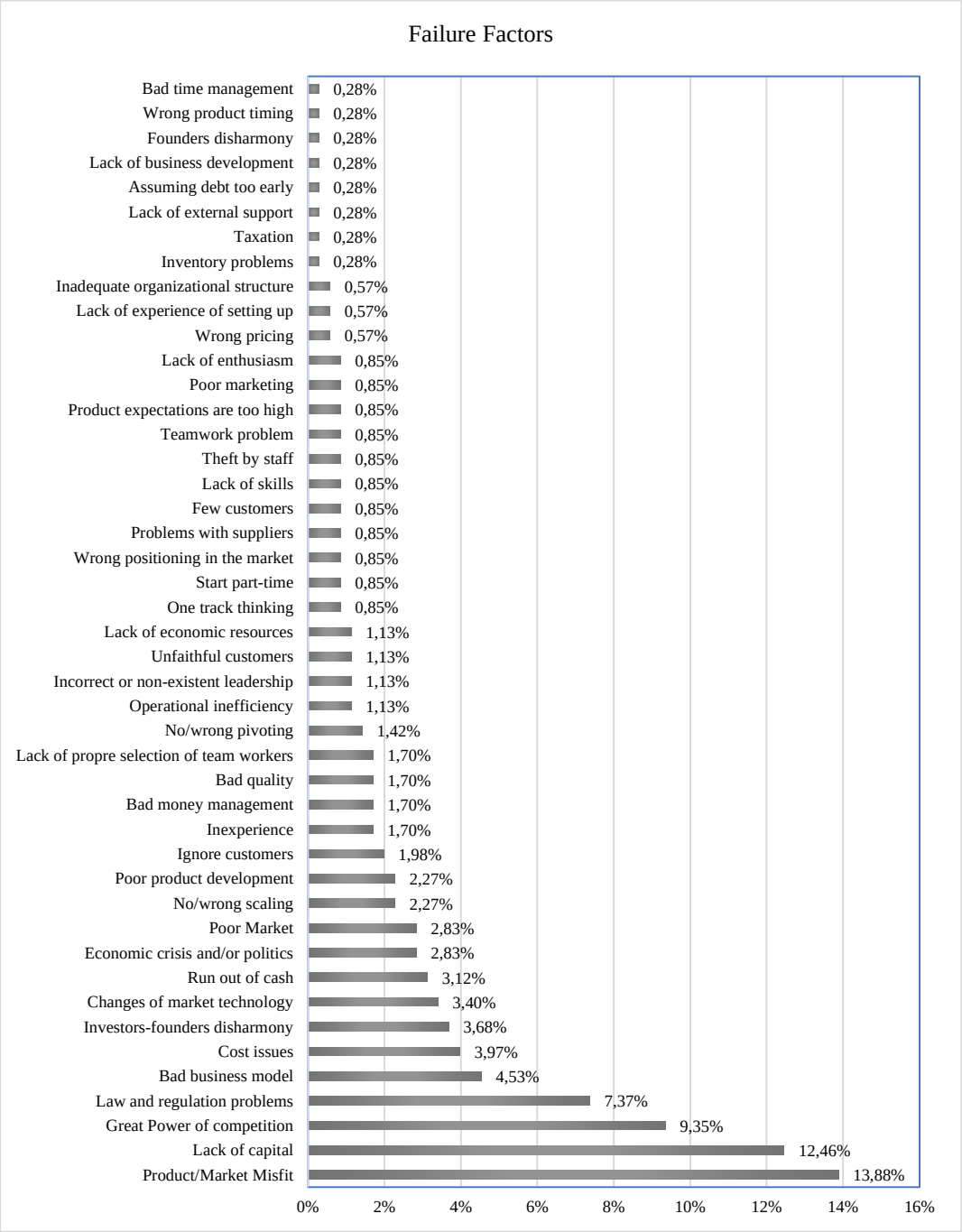
In this part of the study, we present the result of analysing the content of the 353 postmortem reports. Failure factors related to studied startups are extracted according to the classification that was illustrated in part three. One of the

difficulties that characterises this phase is that failure is often associated with a set of factors, not just one, rending the process of identifying the key factor a complicated one. We rely on analysing the tendencies of the content of these reports to one factor over another, or in the case of content neutrality (especially in very short reports) on the logical sequence of causation between factors. In contrast, the 65 failure factors we use, based on previous literature, include the general factorial needed for the studied sample, thus, we did not add other factors to our initial classification.

4.1. General perspective

The results of our study show from their general perspective that the most important failure factor in the studied sample is the product/market misfit with an estimated portion of 13.88% of the total failure factors, followed by the lack of capital with 12.46%, then comes factors related to the great power of competition with 9.35%, law and regulation problems with 7.37%, and bad business model with 4.35%. The remaining factors proportions are shown in Figure 1. We note that 20 factors were neglected from the total number of failure factors because they were not used in the studied sample analysis and did not appear in the figure.

Figure 1. Generale perspective of startups failure factors



Compared to Cantamessa's et al. findings, our results outweigh the percentage of failure related to these factors. Cantamessa's et al. percentages came as follows: no/wrong business model 35%, lack of business development 28%, Run out of cash 21%, no product/market fit 18%, bad organization 14%. In contracts, our findings are consistent with those of CB insights in terms of key failure factors related to the no market need (estimated at 42%) and differ relatively in the rest of the factors that came in the following order: run out of cash 29%, not the right team 23%, get outcompeted 19%, and pricing/cost issues 18%.

4.2. Dimensional perspective

This perspective addresses startups failure factors and their distribution according to the dimensional classification discussed earlier in this paper. Results show that the failure in the studied sample is concentrated within factors related to the ecosystem dimension in the first place with a proportion of 27.20%, followed by finance with 25.78%, and then product with 19.55%. The rest of dimensions ratios are shown in figure 2. Although Cantamessa et al.'s dimensional perspective has relied on the SHELL classification, which differs in the logic of dealing with failure factors from our classification, we can suggest that our results differed greatly from theirs outweighing the dimensions of the business model by 37%, then organisation by 30%, then competitors/stakeholders with 15%. Detail of failure factors in each dimension are shown in Figure3.

Figure 2. Dimensional perspective of startups failure factors

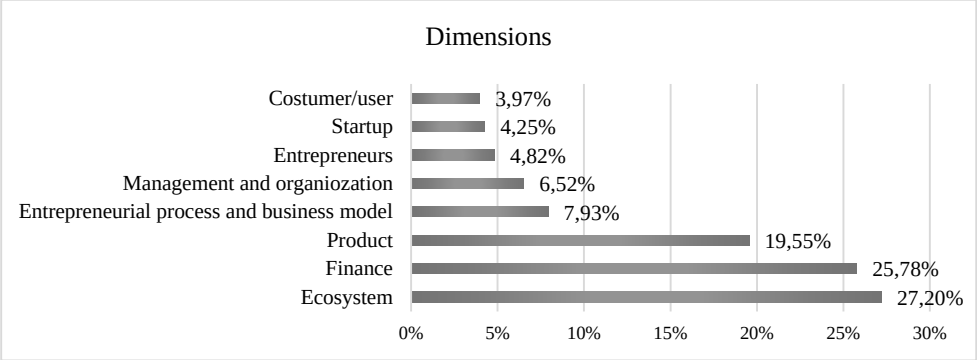
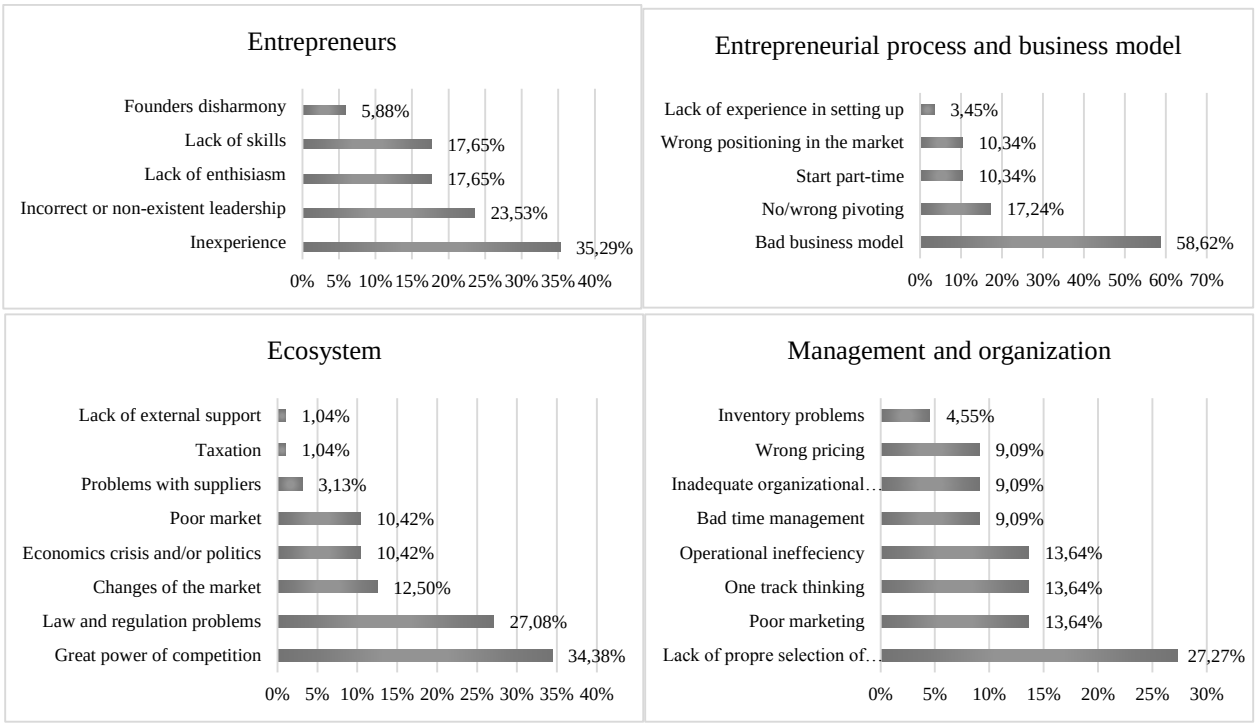
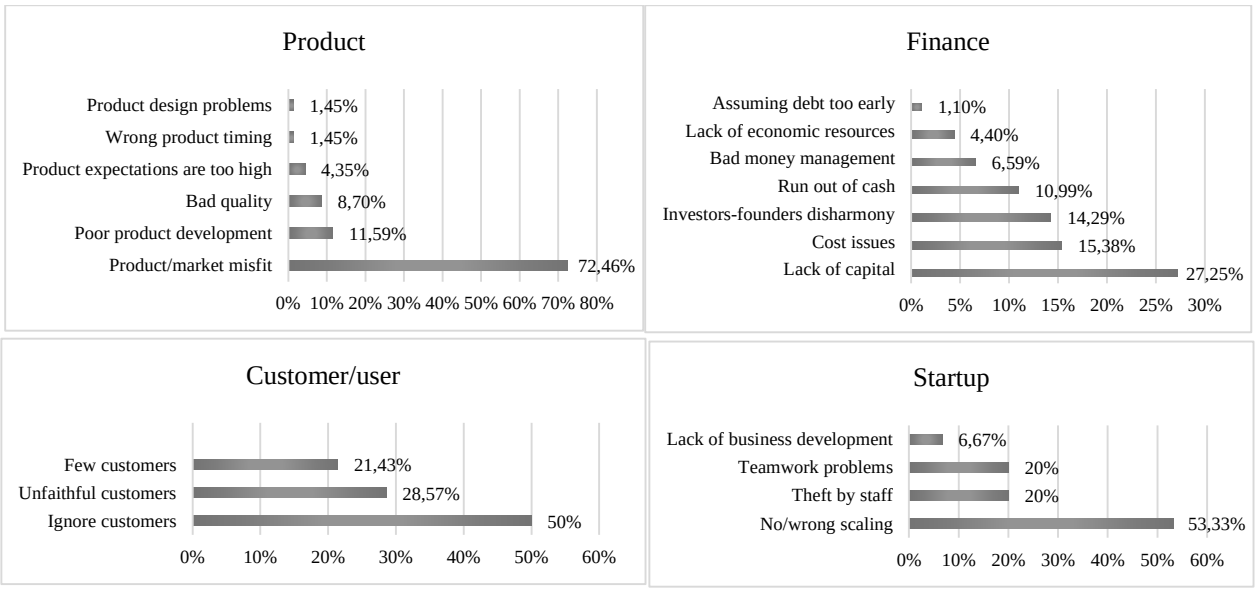


Figure 2. Dimensional perspective of startups failure factors





Dimensional details present no/wrong business, ignore customers, lack of proper selection of team workers, lack of capital, product/market misfit, great power of competition, bad business model, inexperience as the most substantial factors that lead startups to fail within their dimensions. However, one cannot interpretate those results as these factors having larger proportions from the general perspective. For instance, the factor of cost issues does not appear as the most important factor within its dimension, but it weighs more than ignore customers, lack of proper selection of team workers, and inexperience (check figure1).

4.3. Sectoral/industrial perspective

In this part, we identify the sectors and industries in which failure is highly concentrated. Meanwhile, we highlight the characteristics of the studied sample in terms of its distribution to the sectors and industries to which they belong. In the sectoral analysis, we have relied on the North American Industry Classification System[1] (NAICS), which contains 20 sectors, by analysing the core activities of these companies to determine the sectors they belong to. Results are shown in Figure 4. As for the industrial analysis, it was mainly based on Cantamessa et al.'s study results, as well as on the classification that appears in the profile of the studied companies on the "crunchbase.com" website, results are demonstrated in Figure 5.

[1] - The United State Census Bureau (2017) [40] define it as a standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analysing, and publishing statistical data related to the U.S. business economy. NAICS was developed under the auspices of the Office of Management and Budget (OMB), and adopted in 1997 to replace the Standard Industrial Classification (SIC) system. It was developed jointly by the U.S. Economic Classification Policy Committee (ECPC), Statistics Canada This link to a non-federal Web site does not imply endorsement of any particular product, company, or content., and Mexico's Instituto Nacional de Estadistica y Geografia This link to a non-federal Web site does not imply endorsement of any particular product, company, or content., to allow for a high level of comparability in business statistics among the North American countries. For more details see [41].

Figure 4. Startups failure rates according to NAICS classification

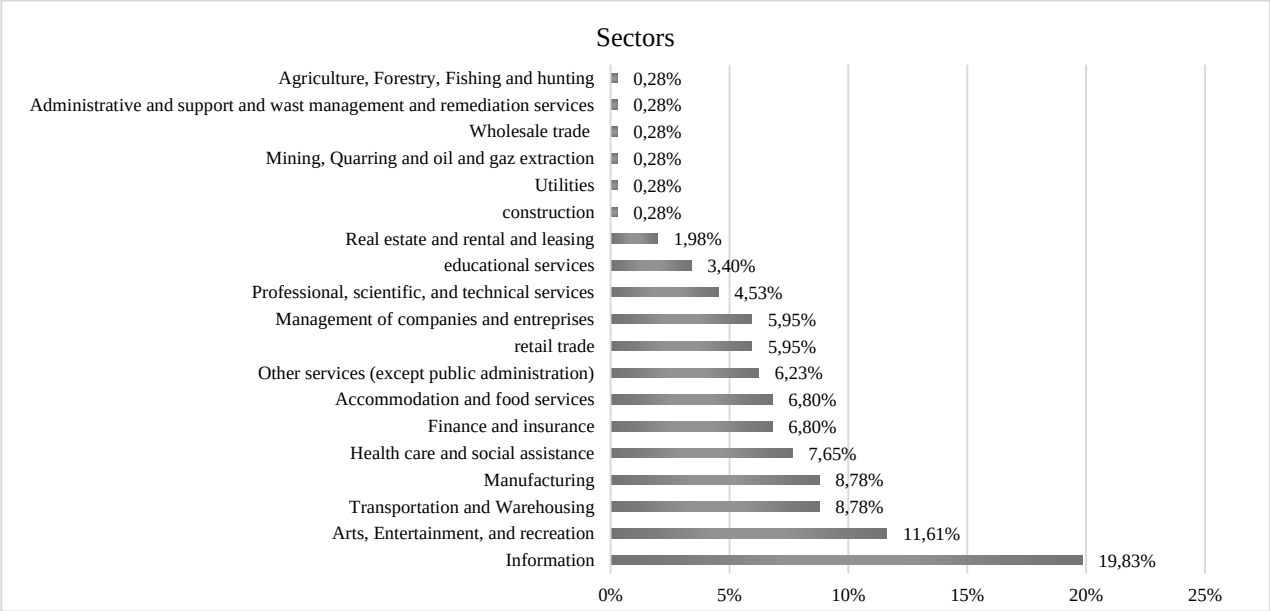
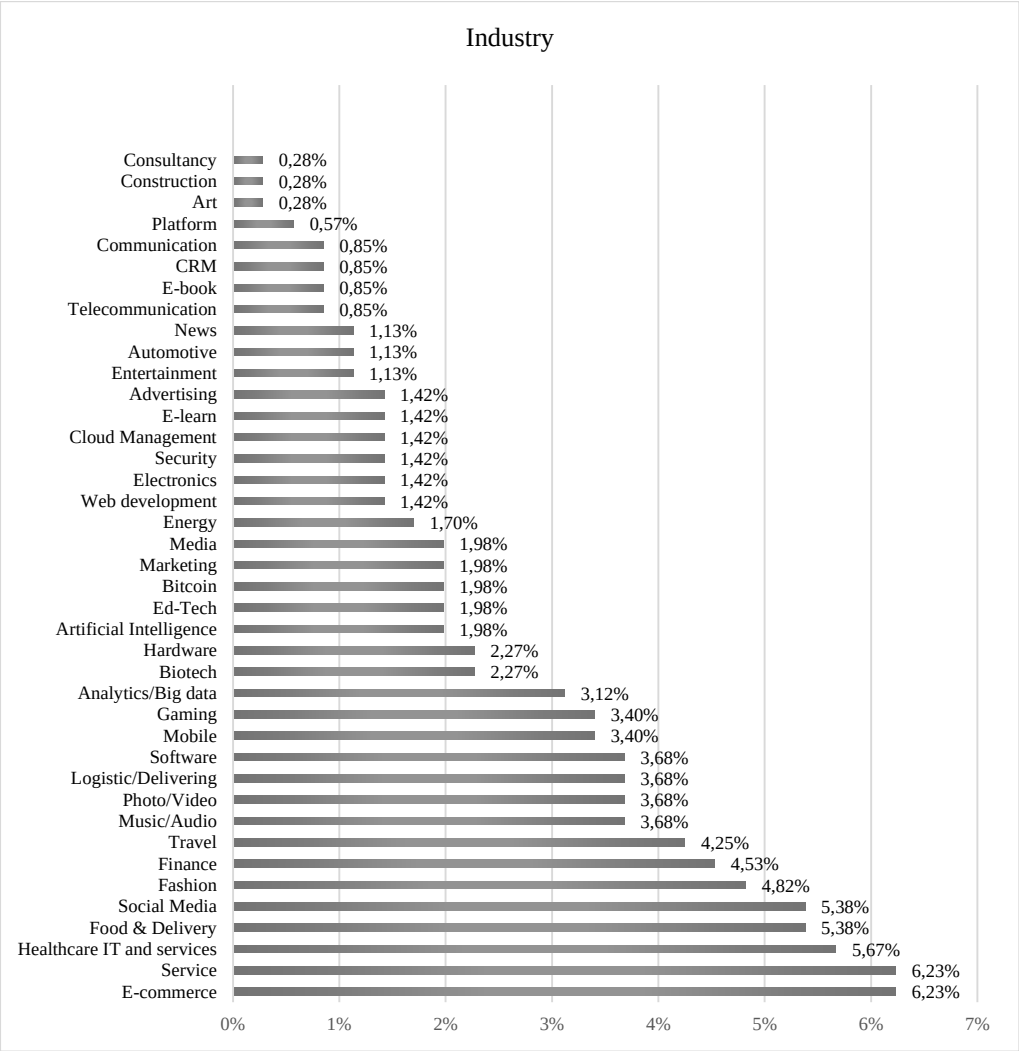


Figure 5. startups failure rates by industry

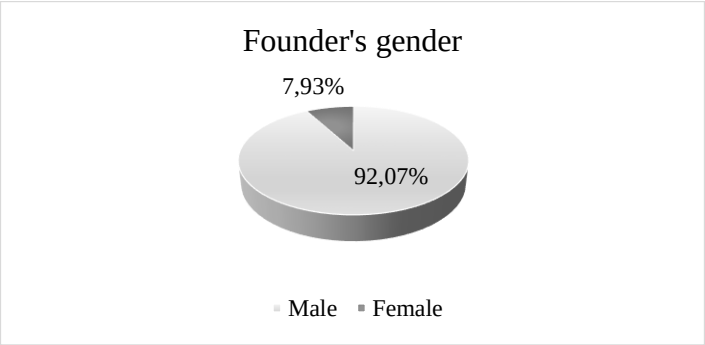


Sectoral analysis results indicate that failure is concentrated largely within the information sector by 19,83%, arts, entertainment, and recreation sector by 11,61%, followed by transportation and warehousing, manufacturing sectors with 8,78%, and, to a lower degree, the rest of sectors. We exclude the public administration sector, which did not appear entirely in the sample. For their part, industrial analysis supports the industries related to e-commerce and service by 6,23%, followed by healthcare IT & services with 5,67%, food & delivery and social media by 5,38% compared to those related to social media (12,3%), software (9,3%), service (8,3%), entertainment (6,9%) and e-commerce (5,9%) in order of Cantamessa et al's. (2018) outputs. Our results show four new industries that did not appear in Cantamessa et al's. study which are: construction, electronics, art, and automotive, but at low levels. We note that it is impossible in this regard to give further details about the failure factors related to each sector and industry because of their large number.

4.4. Gender perspective

From this perspective, we stand by how startups failure factors among male and female founders are distributed. The sample was not equal in terms of the number of founders for the two genders, as the percentage of startups with male founders reached 92,07% compared to 7,93% for female founders (figure 6). We note that the process of determining the gender of founders has been difficult mainly because the majority of studied startups have a team of founders rather than a single founder, so when the founding team includes both men and women entrepreneurs, we were of the view that gender should be determined according to predominance in terms of number.

Figure 6. Failure by gender



The predominance of the male gender over the studied sample imposes the logic of general perspective of failure factors on those of startups with male team founders, showing a near-identical result with a slight difference in the order of the rest of failure factors as illustrated in Figure 8. As for the female gender, the most important failure factors are those related to the lack of capital by 18,52%, followed by poor market, great power of competition, law and regulation problems with 11,11%. Remaining factors are demonstrated in Figure 7.

Figure 7. failure factors in startups with a male founding team

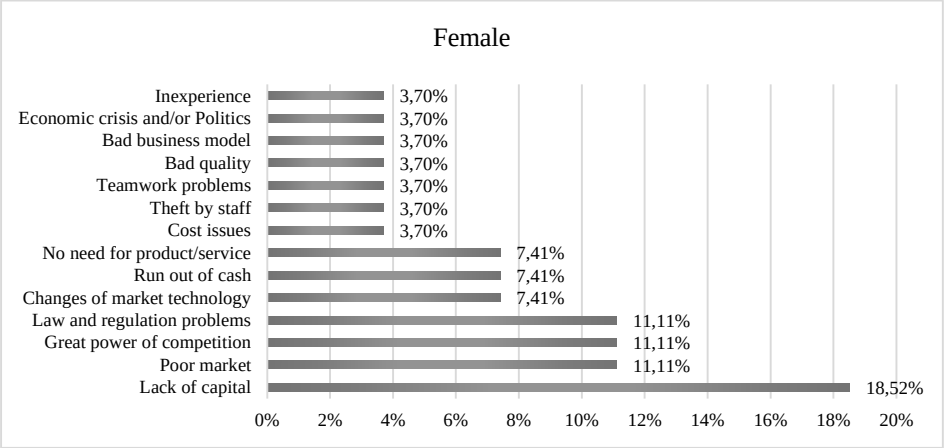
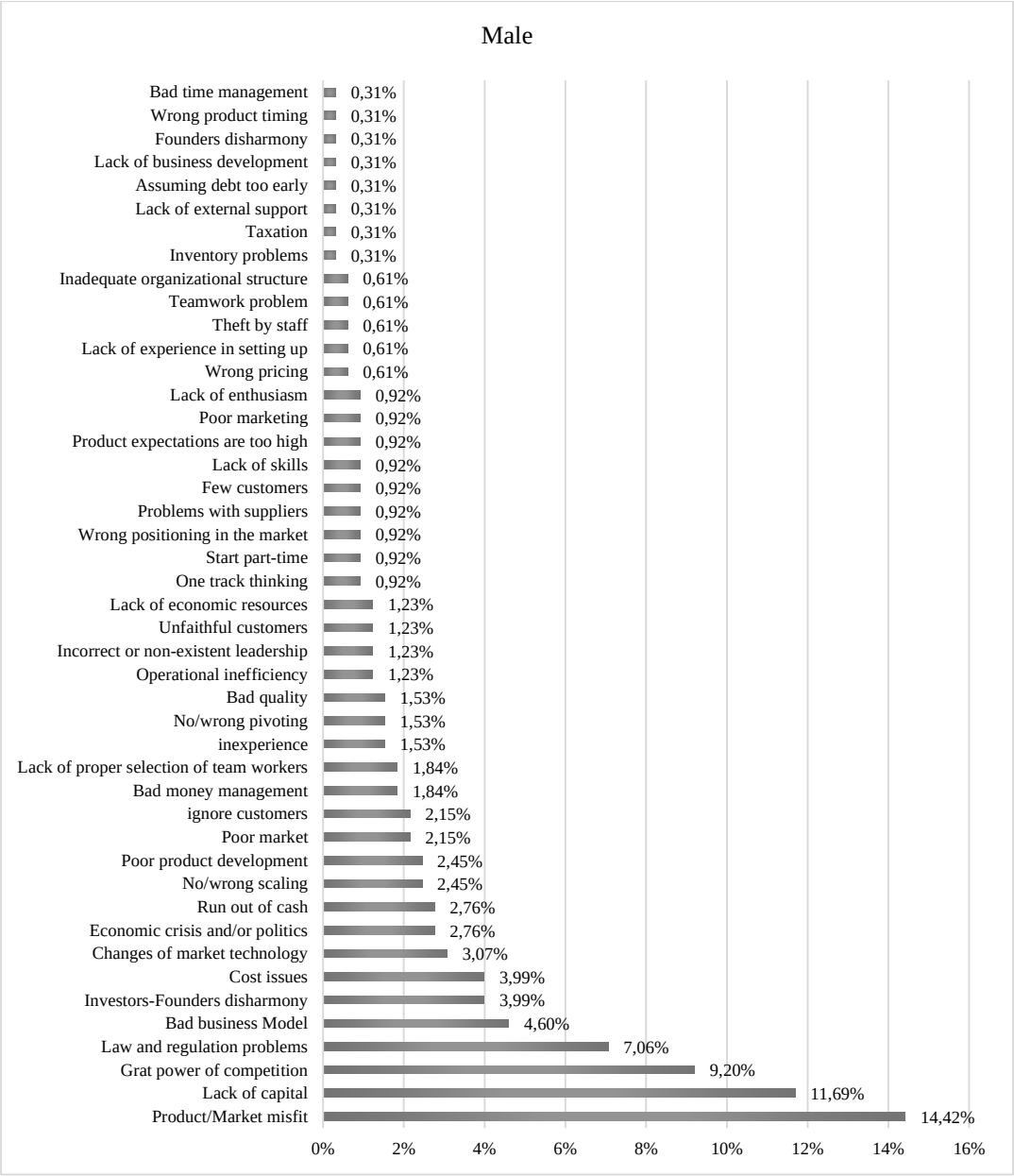


Figure 8. failure factors in startups with a male founding team



4.5. Startup life cycle perspective

Startup life cycle is one of the most discussed ideas in the topic of startups. The concept generally indicates that these companies are undergoing a series of changes that affect their activities over time, and they try to adapt to them by acquiring new resources and capabilities. This effect could go beyond touching basic organisational standards such as structure, strategy, and power distribution [42]. Thus, we emphasise that the transition of a startup from one phase to another necessarily entails different factors that may lead to failure at each phase. From this point, we consider this dimention in our study from a different perspective than prior literature that depended mainly on the age of the startup.

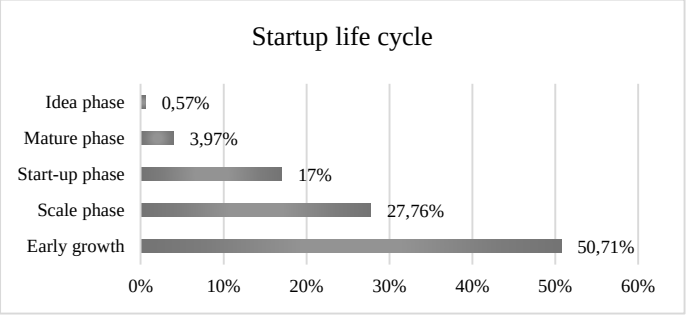
Perhaps the most difficult stage this study went through is determining the phase to which the studied startups belong, duo the fact that postmortem reports generally did not include enough information to allow deciding this accurately. Accordingly, we used the "CrunchBase.com" website based on a set of quantitative criteria that it is illustrated by Table4.

Table 4. Criteria for classifying startups by their life cycle

Startup life cycle	*Number of employees*	*Funding size*	*Startup age*
Idea phase	0	< 10000$	< 1 year
Startup phase	1 - 10	< 10 million $	< 3 years
Early growth phase	10 - 100	< 50 million $	< 5 years
Scale phase	100 – 1000	< 250 million $	< 10 years
Mature phase	> 1000	> 250 million $	> 10 years

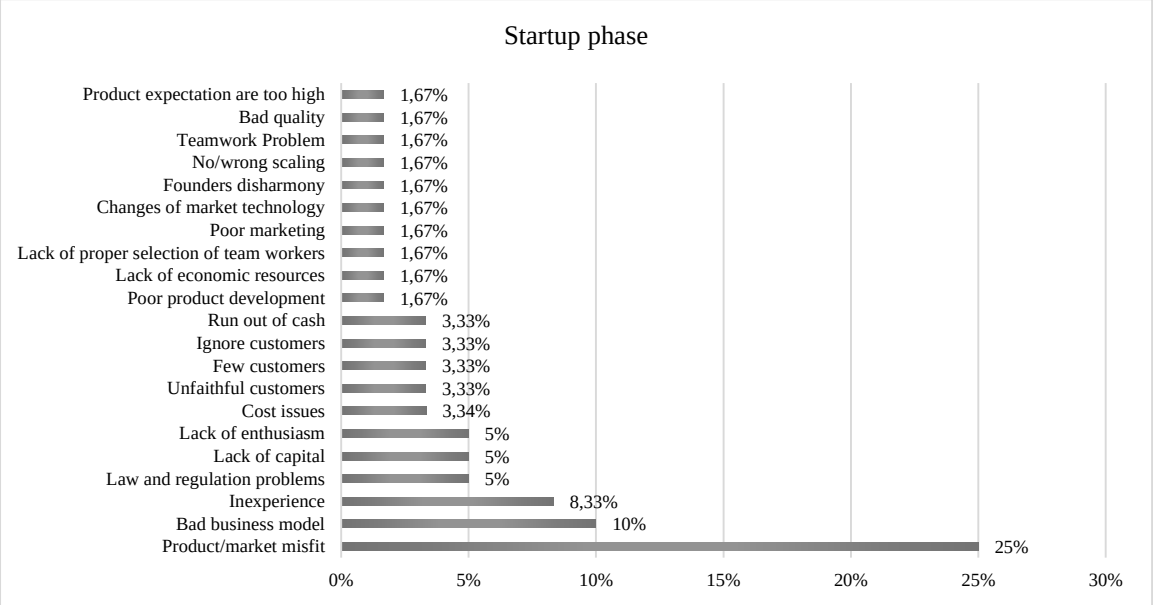
It is worth emphasising at this point that the analysis was not based on these criteria in an absolute manner, but also on the contents of the reports, since the statements of founders often gave direct indications of the location of their startups in their life cycle. Findings are represented in Figure 9.

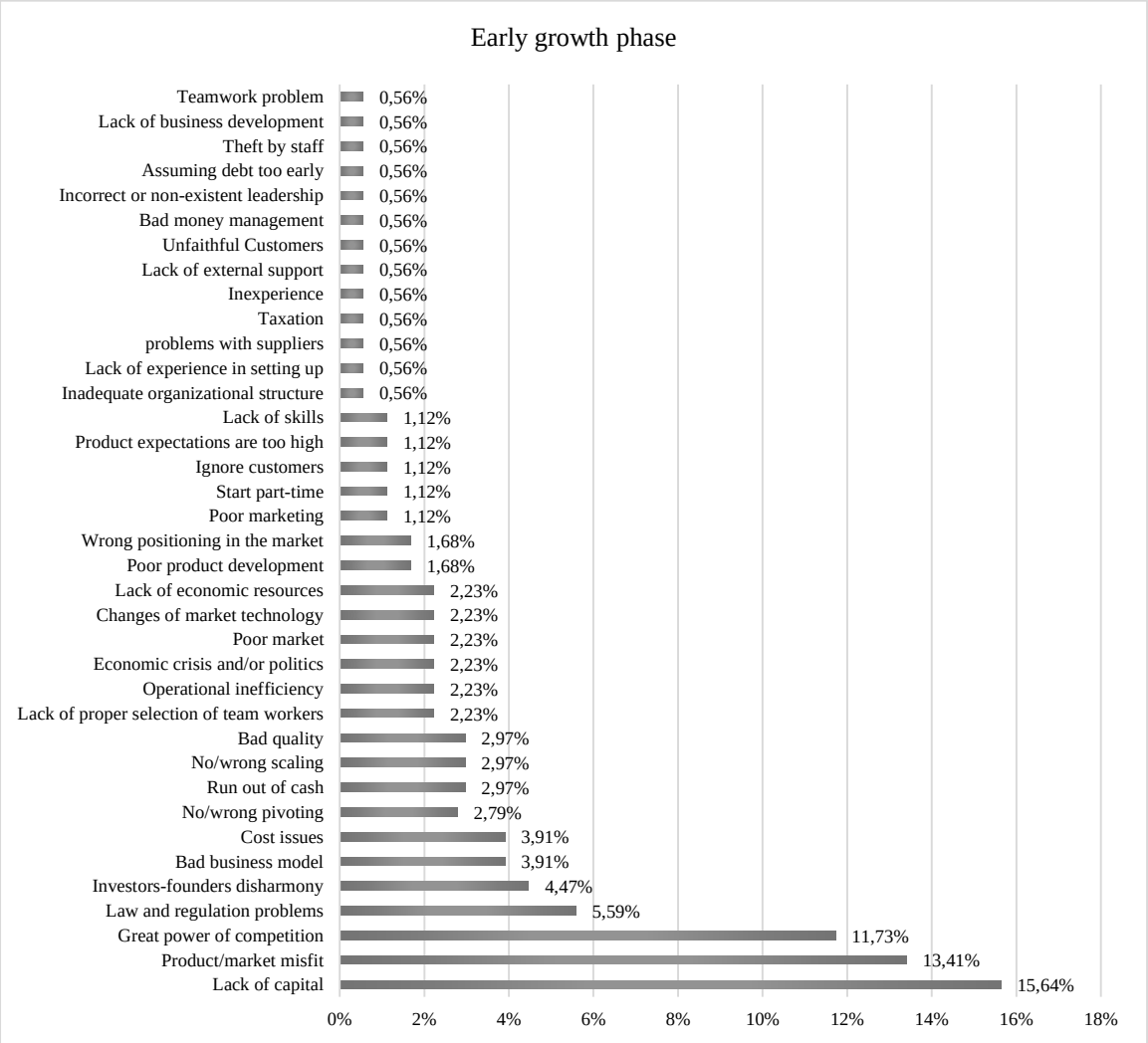
Figure 9. Failure by startup life cycle phases

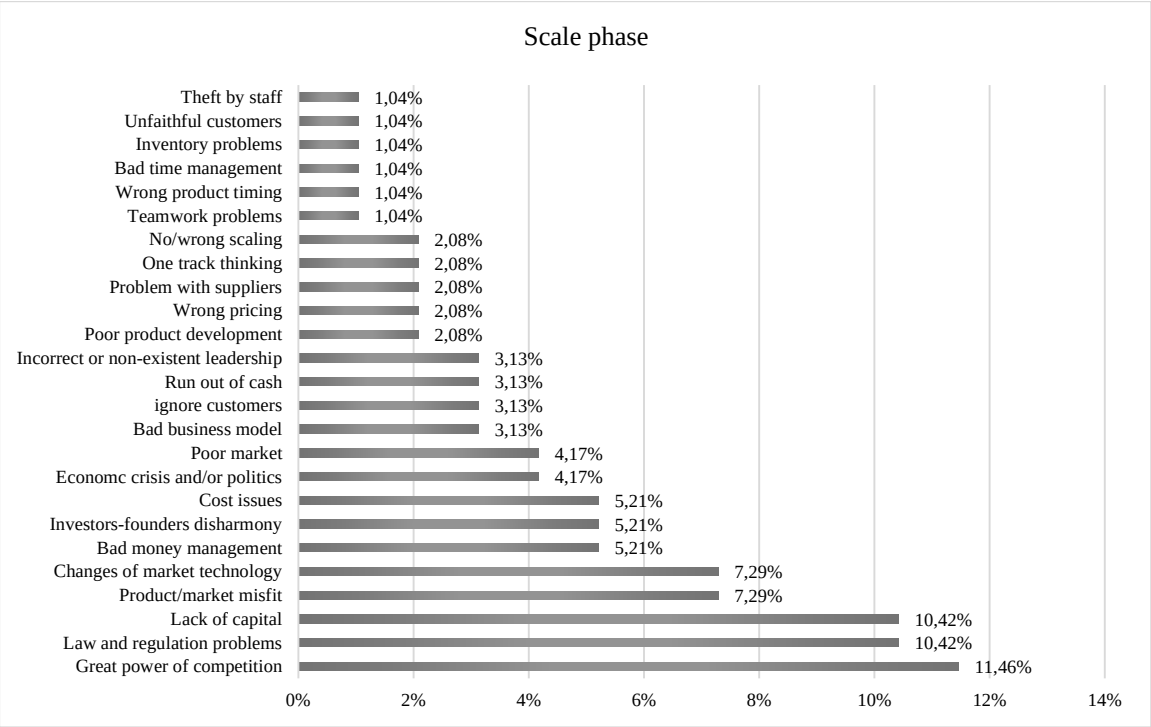


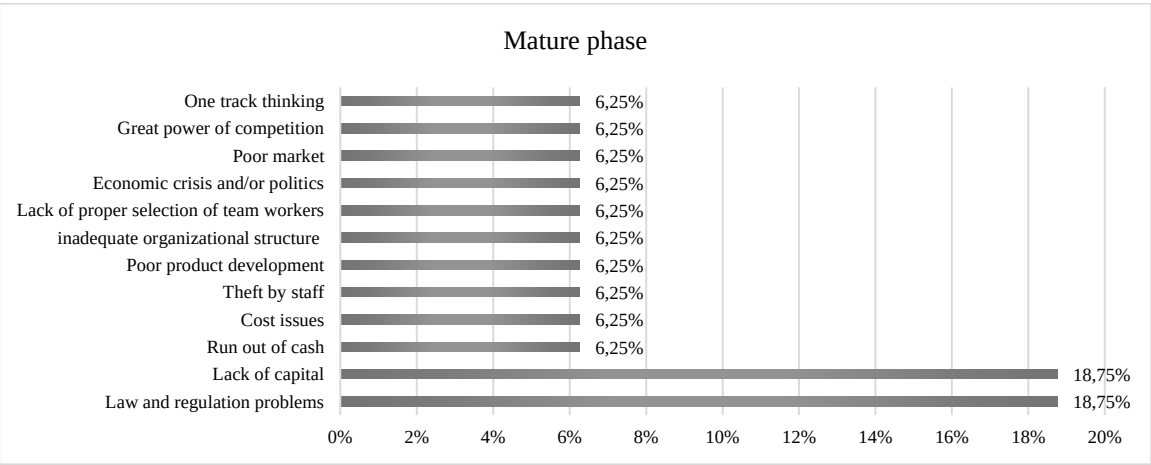
Results indicate that the majority of studied startups failed in the early growth phase at 50.71%, followed by the scale phase at 27.67%, then the rest of the phases in lower rates. Startups failure factors in the start-up phase of its life cycle are centered on product/market misfit, bad business model, and inexperience. In the early growth phase, the lack of capital factor appears at the forefront with an increasing percentage of factors related to the great power of competition, to dominate along with law and regulation problems in the scale and mature phases, with a decline of competition factor in the last phase (see figure 10). This is explained by the fact that, once startups enter the early growth phase, they begin to move more and more toward formal structuring, which in turn, imposes growing needs for management and accountability, and consequently increases financing and external competition, in addition to full submission to the legal aspects that control the external environment, before reaching a mature phase where the startup becomes in a position to face it relatively. This explains why we notice that failure factors related to inexperience, bad business model, and market/product misfit decline against factors related to competition and regulation. Furthermore, the ideas phase included only two cases that were of failure related to product/market misfit.

Figure 10. failure factors by startup life cycle phases


Startup phase
Product expectation are too high 1,67%
Bad quality 1,67%
Teamwork Problem 1,67%
No/wrong scaling 1,67%
Founders disharmony 1,67%
Changes of market technology 1,67%
Poor marketing 1,67%
Lack of proper selection of team workers 1,67%
Lack of economic resources 1,67%
Poor product development 1,67%
Run out of cash 3,33%
Ignore customers 3,33%
Few customers 3,33%
Unfaithful customers 3,33%
Cost issues 3,34%
Lack of enthusiasm 5%
Lack of capital 5%
Law and regulation problems 5%
Inexperience 8,33%
Bad business model 10%
Product/market misfit 25%
0% 5% 10% 15% 20% 25% 30%


Early growth phase
Teamwork problem 0,56%
Lack of business development 0,56%
Theft by staff 0,56%
Assuming debt too early 0,56%
Incorrect or non-existent leadership 0,56%
Bad money management 0,56%
Unfaithful Customers 0,56%
Lack of external support 0,56%
Inexperience 0,56%
Taxation 0,56%
problems with suppliers 0,56%
Lack of experience in setting up 0,56%
Inadequate organizational structure 0,56%
Lack of skills 1,12%
Product expectations are too high 1,12%
Ignore customers 1,12%
Start part-time 1,12%
Poor marketing 1,12%
Wrong positioning in the market 1,68%
Poor product development 1,68%
Lack of economic resources 2,23%
Changes of market technology 2,23%
Poor market 2,23%
Economic crisis and/or politics 2,23%
Operational inefficiency 2,23%
Lack of proper selection of team workers 2,23%
Bad quality 2,97%
No/wrong scaling 2,97%
Run out of cash 2,97%
No/wrong pivoting 2,79%
Cost issues 3,91%
Bad business model 3,91%
Investors-founders disharmony 4,47%
Law and regulation problems 5,59%
Great power of competition 11,73%
Product/market misfit 13,41%
Lack of capital 15,64%
0% 2% 4% 6% 8% 10% 12% 14% 16% 18%





Finaly, we emphasise that the multiplicity of startups failure factors and their dimensions make the event of failure a complex phenomenon that is difficult to grasp or control, which imposes the multiplicity of attempts and approaches in previous literature and the difference in findings. However, the matter that many researchers often neglect is that the failure factors are also controlled by the studied sample characteristics, the ecosystem in which startups operate, the personal characteristics of entrepreneurs, the specification of the sector or industry in which they operate, and so on. This requires that the studies' results should not be generalised to the phenomenon as a whole to avoid contradiction. Therefore, we note that our results do not disapprove those of Cantamessa et al. and CB insights, but rather reflect the development of failure factors for the studied sample as a result of the increasing number of postmortem reports. Morover, we do not aim to deliver a general judgment about the phenomenon. Rather, our objective is to provide a deeper understanding or at least highlight some of its ambiguous aspects.

5. Conclusion and future research

Startups failure phenomenon still permeates entrepreneurial activities in a way that in most cases eliminates the positive impact and added value that these companies can create. This situation feeds the debate about the diagnosis of this pathology among scholars interested in the subject, in which our study falls within. After analysing 353 post-mortem reports, we concluded that failure factors related to product/market misfit, lack of capital, great power of competition,

law and regulation problems, and bad business model are the most substantial factors that lead startups to fail. From the dimensional perspective, the failure of these companies focuses primarily on dimensions related to the ecosystem, finance, and product, followed by the rest of the dimensions in lower proportions.

Furthermore, results indicate that the most important sectors in which failure is concentrated are information, art, entertainment, recreation, transportation and warehousing, and manufacturing. From the industrial perspective, failure is widely distributed in industries related to e-commerce, services, healthcare IT and services, food and delivery, and social media. The analysis also addressed failure factors from the perspective of founders gender, and results indicated that the male-dominated character of the study sample imposed the logic of failure factors in their general view for male founders, while those for female founders centered on the lack of capital, followed by poor market, great power of competition, and law and regulation problems. Under the startup life cycle perspective, results confirmed that failure factors related to product/market misfit and lack of capital appear strongly in the early stages of the startup life cycle, to decline gradually in the later stages, leaving room for factors related to great power of competition and law and regulation problems with relative stability of financial problems.

It should be noted that this study does not intend to provide absolute judgments about startups failure factors, and its results cannot be generalised to the phenomenon as a whole. Rather, it only pertains to the database that we have analysed. Likewise, this study did not come as a contradiction and opposition to CB insights report and Cantamessa's et al. study, but rather as an extension that reflects the development of these factors as a result of the expansion of the studied sample, which explains the different results by the increase in the number of reports contained in this database, or by the method adopted by researchers, their convictions and their perspective during the classification process. Thus, we consider our study an attempt to update the analysis of an ever-growing database. We also note that we did not focus on the comparison between our results and those of prior studies as much as on analysing the failure phenomenon since comparison conditions were not sufficiently available.

This study is not devoid of some limitations as it is based only on the CB Insights Tech Market Intelligence Platform database. Moreover, it is hard to confirm the objectivity of the postmortem reports content since the majority of these reports are statements written by the failed startup founders, not to mention the negative impact of failure that may control these subjects when they present these statements leaving them vulnerable to bias. We note as well that the database deals with the failed companies as startups without considering the conditions that may be imposed by the conceptual framework of the term "startup", in which the academic discourse has broad discussions. In this regard, future research should take these points into account when addressing the topic of startups failure. Furthermoren, these limitations call for future studies that may use the same database to support data, if possible, with field investigations that take the viewpoint of business incubators and research and development centers' managers into account. In the same vein, the selection of failure factors used in future studies should be presented to the factorial analysis. Despite these limitations, our study and its previous research remain an important reference for potential entrepreneurs and policy-makers, and even future research that may rely on the same expanding database.

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