Financial Control and Business Strategy in Start-Up Companies: An Empirical Analysis

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Abstract

This study reports the results of a survey on the usage of financial control (FC) practices in start-up companies. In particular, the paper focuses on the relationship between FC techniques (*stricto sensu*) and business strategy (BS) and investigates whether the strategic risk assessment is associated with the kinds of BS.

The quantitative survey has been integrated using qualitative data collected with a series of interviews. The interviews, with expert entrepreneurs, aims to find out the importance of FC techniques in start-up companies and the benefits to adopt them.

The survey results show that the use of different FC techniques (stricto sensu) does not depend on kinds of BS. While, the empirical evidence finds a positive association between reputation risk, as a strategic risk factors, and BS. In particular, reputation risk is significantly different between focus and differentiation strategy.

The empirical analysis documents evidence for understanding better the implementation of FC practices in start-up companies. Overall, the paper provides new evidence for the debate concerning the role of FC.

Keywords: Start-up companies, business strategy, financial control, strategic risk, survey, interviews.

1. Introduction

We examine, as the main purpose of this study, the use of FC techniques in start-up companies[1] and their importance by interviews with experts on start-ups.

Another purpose for this study is, on the base of empirical analysis, to contribute to the discussion on the FC in start-up companies, as a prerequisite for new empirical research on the topic.

Looking at start-up companies, extant literature contributes in various ways. As Johnson et al. (2014, p. 312) say: *"Given the difficulties of large incumbent firms in fostering innovation, many would conclude that the best approach is to start up a new venture from scratch"*.

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[1] Atkinson *et al.* (1997, p. 550) suggest that *"financial control involve comparing actual financial numbers with the targets from a standard or budget to derive variances"*. Then, the author's state: *"Financial control involves the use of measures based on financial information to assess organization and management performance"[1]* (Atkinson *et al.*, 2012, p. 487). Bhimani (2013, p.2) notes that: *"Traditionally, the principal objective of financial controls was to assist organizations plan their future and to monitor performance to ensure that planned objectives were achieved"*. Again […] *"Financial controls encompass accounting activities, financial performance, risk analysis, business continuity and strategic intelligence"* (2013, p. 5).

Nicotra et al. (2018) that report empirical evidence from Spain and Germany has reasserted that numerous countries are promoting start-ups for several different aims and policies.

In Italy, often with the financial contribution of the State, we can observe that many young companies propose different types of start-ups based on new business models and different strategies. Recognising this, the Foreign Commerce Institute (ICE) promotes a series of courses to build start-up's foreign incubator and start-up district. Moreover, the confederation of industry and the foundation of universities, such as Bocconi University (Milan) and Polytechnic University (Milan), created some incobators.

In the entrepreneurial life cycle there are many challenges. Literature, analysing the challenges of start-ups (the first stage of the entrepreneurial life cycle), indicates that the first key factor for survival and growth is the availability of sources of capital and the capital structure adopted (equity and debt financing). In particular, sources of financing need to supply the specific types of capital invested in the company by specialised investors in new ventures.[2]

Further, Bhimani (2017, p. 3) notes that: *"Inadequate financial understanding is seen as a key reason for start-up failure across Europe (European Union, 2016), the Middle East and North Africa (Economist, 2017) and others countries like India (Imorphois, 2016), China (Liu, 2016), Australia (Swan, 2015), Malaysia (Rahman et al., 2016) and Brazil (Cheston, 2016). So, investors will set targets for you and they'll want financial information about your start-up's progress"*.

Many previous studies have looked on the role of management control systems (MCSs) in start-up companies (e.g. Davila & Foster, 2007; Davila, Foster & Oyon, 2009; Cassar 2010; Davila, Foster & Jia, 2015). Basically, these studies have proved the importance of MCS in star-up growth. Our work focuses on the use of FC techniques rather than MCSs[3].

Our paper focuses on the results of a survey on financial control practices (FCPs) of start-up companies in association with the BS. The survey aims at studying the peculiar challenges at the first stage of the entrepreneurial life cycle. Moreover, the paper investigates whether the strategic risk assessment is associates with the BS type and how competitive forces can emanate competitive risk in start-up companies. Besides, a series of interviews were undertaken. The interviews with expert entrepreneurs aim to find out the importance of FC techniques in start-ups companies and the benefit to adopt them.

Why is FC crucial in early-stage firms? What is relevant to achieve the firm's objectives depending on context and business circumstances (Bhimani, 2013). However, the role of FC enhances its potential to facilitate the attainment of organizational performance (See Nixon, 1998). FC processes, as part of financial management activities, are the first investments in controls that chief finance or chief accounting officer of start-up companies are charged with. Designing and improving the firm's accounting system for decision-making and control is the first important step in the management of the companies.

During the early-stage of start-up companies, there is little need to install a complete MCS (see Simons, 2014, p. 308), while in even the smallest companies become essential to install, together with an accounting system for the external report, an internal accounting system[4].

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[2] A natural follow-up challenge for investors, that provide sources of debt financing, is to understand whether: (a) the start-up communicate strategic statements - covering goals, scope and advantage – for to evaluate the initiatives in term of suitability, acceptability and feasibility, (b) there is familiarity with financial management.

[3] Simons (1995, p. 5) define MCS as *"formal, information-based routine and procedures managers use to maintain or alter patterns in organizational activities"*.

[4] As Zimmerman (2017, p. 4) say: *"An internal accounting system should have the following characteristics: provide the information necessary to assess the profitability of products or services and to optimally price and market these products and services, provide information to detect production inefficiencies to ensure that the proposed products and volume are produced at minimum cost, when combined with the performance evaluation and rewards systems, create incentives for managers to maximize firm value, support the financial accounting and tax accounting reporting functions, contribute more to firm value than it costs"*.

External reports are under a legal obligation to collect information about the transactions of a business in T accounts[5]. Accounts are summarized in financial statements such as the balance sheet, the income statement and the statement of cash flow. The firm's decision to install an internal accounting system is not a legal obligation. However, considering that also basic systems are costly, the start-up companies are motivated to choose their systems covering financial information selectively. For example, given the high risks of entrepreneurship in the start-up period in any organization's evolution, the risk control is relevant because all firms are subject to changes. For this reason, many companies attempt to develop risk measurement, through a variety of techniques to quantify the impact on planned objectives, and identifying and managing (often informally) the strategic risk to help managers to achieve organizational performance and safeguarding tangible and intangible assets.

Our contribution to the extant literature documents evidence for better understanding the use, but also the importance for some experts, of FCPs in Italy. Overall, the paper provides new evidence for the debate concerning the role of FC in start-up companies.

The paper comprises six sections. The next section summarizes the literature review and illustrates the framework in which the present study is developed. Section three develops the hypotheses based on the literature and on the qualitative experts's information[6]. The description of the research method is given in Section four. Section five presents the survey results, the hypothesis testing, and the finding of the qualitative interviews. The paper concludes with a discussion about the results and the limitations of the study and offers potential avenues for future research.

2. Theory development

2.1 Literature review

As Johnson et al. (2014. p.312) say "*The entrepreneurial life cycle progresses through start-up, growth, maturity and exit [...] each of these four stages raises key questions for entrepreneurs*". The principal objective of start-ups is to translate new ideas in innovative products and services as the source of competitive advantage, into an entrepreneurial approach to innovation, while venture capitalists are specialised investors in financing the new venture. Theory and practice, such as discussion with experts, converge across the view that Start-ups development is a very high uncertain process[7].

This study aims at extending this line of research, adopting a control mechanism different from the previous studies on start-up companies and an alternative set of independent variables. In particular, several characteristics distinguish this study. In contrast to previous works, the unit of analysis is the FC rather than the MCS in start-up companies.

Past work on FC in start-up companies are limited and follows basically two major strands.

One line of research focuses on the preparation of financial statements and projection in start-up ventures. In Cassar (2009), the author suggests that "*the benefits of reducing competitive and fundamental uncertainty are more influential in explaining variations in intentions to prepare financial statement. Further, I find the determinants of preparation frequency vary among different statement; for instance, cash statements are more important for start-up with*

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[5] The accounting procedures chosen for external report to shareholders and taxing authorities are dictated by regulators.

[6] Refer major comments of expert entrepreneurs on strat-ups during a qualitative test (informal discussions).

[7] Here, for example, Davila (2000, p. 386) report that "*the main role of management control systems in product development is to supply information required to reduce uncertainty*". The theoretical background on the concept of uncertainty is based on the seminal paper of Galbraith (1973)

product in earlies stage of development and with greater competition". The work of Rockness and Shields (1988) can be included in this line of research. This study, focuses on financial measures and suggests that the perceived importance of budgets in R&D *"decreases monotonically from planning to monitoring, monitoring to evaluating, and evaluating to rewarding"* (1988, p. 571). In line with the alternative interpretation of financial control systems as tools to manage innovation activities, studies on product development all concur on the significant role of FC techniques as problem-solving in assisting engineering during the product development (Nixon, 1998) and supporting new product development (Tervala, et al., 2017).

The second line of research adopts a broader view of control systems. For example, Kim et al. (2011) study the association between control and debt financing. These authors conclude that *"an external audit is of information value in the pricing of private debt such as bank loans, probably because it enhances the credibility of audited financial statements and thus helps banks or other private lenders overcome information problems related to borrower credit quality. Overall, our evidence helps us better understand the role of auditing institutions in an environment that has not been studied much, that is, where voluntary demand for external audits arises mainly from a need for private debt financing"*. Sandino (2007), focusing on a sample of US retailers, identify four categories of controls (basic, cost, revenue and risk) to study the first investment in controls in the early stage of start-up companies. Sandino *"hypothesize and find that the choice among these (4) categories reflect the firms' strategy"*.

2.2 Organizing framework

We adopt a specific organizing framework for examining FCPs by start-up companies. Within this framework, we focus the analysis on two specific variables: (1) BS concerning how an organizational unit can compete in a given market place; and (2) FC techniques (*broadly speaking*) to evaluate the economic organisational performance of all BS and different kinds of BS in early-stage of start-up companies.

2.2.1 Business strategy

Following strategist for to understand the attractiveness of a particular industry and the threats from competitors the analysis of five forces is particularly useful.

However, for early-stage start-up companies, that provide innovation activities in the marketplace, customer's expectations are not all the same. Here, the exploration of different perspectives for the future development of each small entrepreneurial start-up is relevant. This means that start-ups should be able to combine the industry factors with the new business-specific factors in order to define the attractiveness of the firm in the market and potential for success. Often following the concept of markets segment[8], the start-up growth must keep customers need through secure strategic choices. Here, the literature distinguishes almost three different levels of strategy (corporate, business and operational strategies) and the importance of their integration[9]. In this paper, that describe the association between FC and strategy, we focus on business-level strategy (BS). Among the kinds of BS (often called competitive

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[8] The term market segment is used to identify a group of customers with similar need but different from customer needs in other parts of the market.

[9] *"Corporate-level strategy is concerned with the overall scope of an organization and how value is added to constituent businesses of the organization whole [...] Business-level strategy is about how the individual businesses should compete in their particular markets [...] Operational strategies are concerned with how the components of an organization deliver effectively the corporate- and business level strategies in term of resources, process and people"* (Johnson et al., 2014, p.7).

strategies) the study examines the following three generic competitive strategies: cost leadership, differentiation and focus (see Porter, 2004, p. 11).

We decide to consider these three kinds of BS because they are fundamental to standalone small businesses like in start-up companies.

2.2.2 FC techniques

The existing literature on managerial accounting and finance supplies many theoretical models and suggestions about FC tools and techniques that should be adopted. In particular, we examine the FC techniques adopted by start-up companies with respect to BS. The key FC techniques identified in this study are inspired by some previous work (e.g. Sandino, 2007, Tervala et. al., 2017). However, our reinterpretation is more coherent with the aim of the present research for evaluating strategies. In this study the four FC techniques categories are: (1) basic financial analysis, (2) profit planning, (3) financial forecasting and (4) Simons's strategic risk factors. The 20 FC techniques are categorised as reported in Table 1.

INSERT ABOUT HERE TABLE 1

While, the survey measures the level of use for the first 16 FC techniques (*stricto sensu*) on 7 level Likert scales, the Simons's strategic risk factors are collected on a dichotomic measurement scale. Each of the 4 FC techniques categories is briefly examined.

- Basic financial analysis

When considering basic approach to performance in term of economic outcome the financial analysis based on accounting statements can be relevant. This financial analysis aims at considering whether new business initiatives meet desired organizational targets and then comparisons with other comparable organizations.

In particular, the basic financial analysis documents economic measures of performance, such as cash flows and financial ratios analysis. While the cash flows analysis examines some features about the way the firm is operating in term of the flow of funds to measure the cause of variation on cash in a time period[10], the analysis of the financial ratios refers to direct economic measures of performance[11]. In this study we include the following seven financial ratios: (1) liquidity ratios; (2) leverage ratios; (3) activity ratios; (4) profitability ratios; (5) growth ratios; (6) valuation ratios; and (7) trend over time ratios (see, also, Brealey et al., 2014).

- Profit planning

We deal with FC techniques focusing on financial planning and control process in evaluating new initiatives in the early stage of start-up companies. We distinguish between two approaches: profit planning and financial forecasting.

Profit planning refers to direct measures in term of expected net income outcomes. The net income outcomes have many dimensions: operating income (NOI); earnings before interest and tax (EBIT); earning before tax (EBT); net income (NI). Here, the study emphasises the operating profit plan that reflects the combined influence of sales plan, product plan and capacity productivity plan, considering inventories policies. Operating profit plan refers to

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[10] Basic types of the statement of cash flows include operating, investing and financial flow of funds.

[11] The literature on evaluating strategies distinguish two approaches to performance: direct economic measures and organizational effectiveness (see Johnson et al., 2014, p. 368. See, also, Kaplan & Norton, 2001)

direct measures in term of (expected) operating income. This economic outcome is considered a key firm's objective. In our study three analyses are fundamental for understanding operating income performance. The first relevant analysis is cost behaviour. It refers to direct measures of effectiveness and the analysis, for example, shows the evolution of cost structure and their elements over some time interval. The second, when involving projections, is the cost-volume-profit (CVP) analysis that can help in anticipating problems and better understanding the operating income performance. This analysis describes the relationship between the rise of investment and the required volume to achieve profitability. The third one is the operating leverage analysis, which can help, with management accounting information, to support decision making. Indeed, it refers to direct measures in term of the way a given change in sales volume affect operating income.

The fascinating feature of the operating profit plan, and its analysis, is that the possibility of a what-if sensitivity exercises is provided to the companies.

- Financial forecasting

Financial forecasting refers to a broader set of measures in term of relevant financial outcomes. These financial outcomes consider the simulation of overall financial planning. Then provide the possibility to compare projected performance for evaluating new initiatives using criteria of suitability, acceptability and feasibility.

In our study financial outcomes, such as contribution to the employee health and safety and contribution to the shareholders and bondholders, have four main dimensions. The first, dimension is the performance on cash budget which is a projection of future cash receipts and cash disbursement over some time interval. The second one is the performance on cash-breakeven point. As Weston & Copeland (1986, p. 222) say "*The cash breakeven point based on units of output is comparable to the profit break-even quantity, except that fixed cost must be adjusted for noncash outlays*". Then one can consider the performance on cash flow cycle, which refers to the consequences of business transactions cycle on the (pick) financing requirements over some interval. Finally, the financial forecasting is considered because it reflects the performance on expected financial results, such as the projected income statement, balance sheet and statement of expected cash flow.

- Simons's strategic risk factors

Another possible financial planning and control process consider a third approach to future performance. Strategic risk factors are relevant in pursuing a BS. Here, identification of possible loss (and harm) is based on strategic risk approach of FC considering Simons's strategic risk factors. These risk factors affect BS and are essential in the start-up stage because, after identifying the sources of strategic risk (operations risk, asset impairment risk, competitive risk, and reputation risk), the managers need control tools and techniques to manage the risks (see Simons, 2014, p. 249).

3.   Hypotheses development

Previous research on management control systems (MCSs) show that large companies design the MCS considering some contextual dependent variables such as environment, technologies, size, organisational structure, BS (see, for example, Chenhall, 2003). Moreover, Davila *et al.* (2015) identify that there are also other important contextual factors in the design and use of MCS, such as environmental uncertainty, globalisation, company growth, and strategy. Sandino

(2007), using survey-based research, describes the choice of MCS adoption by start-up companies in the retail industry and find the importance of BS as contextual factors.

This paper focuses on the relationship between BS and FC in start-up companies rather than MCSs. We develop five hypotheses that postulate the relationship between several FC techniques (*broadly speaking*) and BS (independent variable) in start-up companies. Here, some authors have made assumptions about the financial management for technology start-ups. For example, Bhimani (2017, p. 45) notes that there are three essential steps for financial control loop such as contribution analysis, financial analysis and progress analysis. Highlighting the importance of these contributions, we begin by evaluating strategies in term of organisational performance.

When the start-up companies assess organizational performance in term of direct economic outcome, the first hypotheses (H1) concern basic financial analysis. This FC technique category, based on accounting statements, reflects two FC techniques: cash flows[12] and financial ratios analysis[13]. The main conclusion of Sandino (2007), the suggestions of Bhimani (2017), our discussion in sub-section 2.2.2 and the major comments of experts (informal discussion) lead the following hypothesis:

H1: All start-up companies adopt basic financial analysis in evaluating the economic performance of BS, but their use is different between BS.

Now we consider the hypothesis relating different kinds of BS and FC usage on specific start-ups.

Different kinds of strategies presented by Miles & Snow (1978), Gupta & Govindarajan (1984) and Porter (2004) have attracted considerable attention in academic research (In Italy, for example, see Invernizzi 2005)[14].

As Porter (2004, p. 12) says: "*cost leadership is perhaps the clearest of three generic strategies. In it, a firm sets out to become the low-cost producer in its industry*". Such characterisation focuses on cost objectives and should introduce a cost control and also emphasise quality control to guarantee the product/service competitive in the market (see, for example, Kaplan & Norton, 1992).

However, especially in strat-up companies, if cost control in the time is fundamental to be successful in low-cost strategies a young firm cannot ignore the basis to translate its cost advantage into profits and the combined influence of risk. Therefore, considering the literature on strategic management accounting (Seal et al., 2009) and in particular the suggestions of Sandino (2007) on enhancing operating efficiencies (focus on cost) for reflect cost leadership strategy on start-ups, we believe that a particular challenge is to develop an FC approach based on profit planning. This approach includes operating profit plan and his analysis. While, sales plan, production and productivity capacity plan, considering inventories policies, was summarised in the operating profit plan. The analysis of operating profit plan can be used for cost behaviour analysis, cost-volume-profit (CVP) analysis and operating leverage analysis[15]. The following hypothesis (H2a) is set to test low-cost strategies:

H2a: Cost leadership start-up companies use more profit planning than differentiation and focus companies.

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[12] Basic types of cash flow statement techniques includes: operating, investing and financing flow of funds.

[13] Performance comparisons against organizational targets and comparable organizations can be important for understanding variance.

[14] Some studies (e.g. Miles & Snow, 1978) based on mature firms found that leadership cost strategy needs an MCS to reduce uncertainty with planned activities and standard procedures.

[15] These considerations, that includes others analysis such as pricing, is taken from Seal et al. (2009).

As Porter (2004, p. 14) says " *In a differentiation strategy, a firm seeks to be unique in its industry along some dimensions that are widely valued by buyer* […] *The logic of differentiation strategies requires that a firm choose attributes in which to differentiate itself that are different from its rivals"*. In contrast to cost leaderships, one successful differentiation strategy does not set out to become the low-cost in an industry, but choose some attributes to meet needs perceived as necessary in the industry, such as product durability, high levels of quality, customer service, brand reputation. Consumers valued these attributes and rewarded with a premium price. A differentiation strategy can be seen as a kind of BS sophisticated in term of strategic management because it must respond continuously to key competitors and environmental change.

While many authors (e.g. Govindarajan and Gupta, 1985) found that differentiators use selected non-financial information to evaluate organisational performance, Simons (1987) finds that firms following differentiation use FC systems more intensively than cost leaders. In contrast, Davila (2015, p. 236) provide evidence that MCS in start-up companies:" *following a differentiation strategy and companies following a cost-leadership strategy do not differ significantly in their adoption of basic MCS, they differ significantly in the adoption of incremental systems"*. This results that reflects the firm's strategy on start-up is important but consider MCSs. To our knowledge in literature there is a lack of consideration in respect to the FC techniques that involve the use of measures to assess economic performance. Here, we believe that is very useful to combine literature and practices by experts's suggestions on start-ups. We hypothesize that these considerations reflects the firm's strategy and that firms that choose a differentiation strategy are aware of a kind of BS more sophisticated than cost leadership in term of strategic management and accounting information for decision making. These considerations lead to the following hypotheses:

H2b: Start-up companies pursuing differentiation strategy make greater use of financial forecasting than the other kind of companies.

As Porter (2004, p. 15) states: "*The focus strategy has two variants. In cost focus a firm seeks a cost advantage in its target segment, while in differentiation focus a firm seeks differentiation in its target segment"*. Here, if a crucial question for a firm is where to compete and in what segment to focus strategies, the focus strategy is a combination of cost leadership and differentiation strategies. In parallel, this consideration influences a combination of accounting information for decision making and strategy execution. For example, Chenhall and Langfield-Smith (1998, p. 258) suggested: "*strategic planning techniques are important in ensuring a holistic approach under which different approaches to management and accounting are coordinated and consistent with the long-term goals of the organization"*.

Empirical analysis on FC techniques relating focus strategy in start-up companies, to our knowledge, identifies again a lack of research studies. However, considering Chenhall and Langfield-Smith's suggestions, we hypothesize that in the existing literature the study of Cescon et al. (2019) can be very useful to reflecs the firm's focus strategy on start-ups. These considerations lead to the following hypothesis:

H2c: Start-up companies pursuing a focus strategy rely more on a holistic approach to FC techniques (*stricto sensu*) than companies following cost leadership and differentiation kinds of BS.

Now we consider a hypothesis regarding all start-up companies in the evaluation of strategic risk. In addition to previous considerations, evaluation of economic performance[16] using an FC (*stricto sensu*) needs to account for strategic risk. Here, given a chosen BS, the organizational performance concerned whether the company meets the organizational target. In other words, the strategic risk analysis considers the limit of acceptable risk for the organization (acceptability). Here, almost two approaches can be considered: (i) the measurement of risk approach; and (ii) the identification of strategic risk approach[17]. The approach to risk measurement is based on the evaluation of uncertainties, and the principal techniques that can help entrepreneurs are: sensitivity analysis, probability analysis, and financial risk analysis[18].

The identification of strategic risk approach assumes that "*to effectively manage their business, all managers must assess strategic risk, which is an unexpected event or set of condition that significantly reduces the ability of managers to implement their intended business strategy*" (Simons, 2014, p. 249). The three basic sources of strategic risk include operations risk, asset impairment risk (financial, intellectual property rights and physical impairment), and competitive risk. Reputation risk represents the fourth Simons's strategic risk factor that can be considered as the consequence of one or more basic sources of strategic risk[19].

In contrast with risk measurement approach, that calculates the risk with immediate financial impact, the strategic risk approach identifies four various types of risk and their linkage with BS. There are comments and evidence from the experts, that start-up companies often are managed by the founder, co-founder and young entrepreneurs that are risk-taker with a tolerance for risk higher than mature companies. This means that formal identification of strategic risk often is not incorporated to ensure that strategies meet the level of risk acceptable. Johnson et al. (2014, p. 391) have noted that "*Start-up businesses are high-risk businesesses. They are at the beginning of their life cycle and are not yet established in their market: moreover, they are likely to require substantial investment*". Following the above literature we hypothesize that strategic risk factors potentially affects every business that supplies the necessary control to ensure start-up companies growth. The following hypothesis (H3) is set to consider the applicability of Simons's suggestion:

H3. The most start-up companies adopt strategic risk assessment to meet the limit of acceptable risk in evaluating strategies but the level of adoption is different between BS.

4. Research Method

This section describes the method used, sampling procedures and data analysis.

4.1 Mixed methods

A mixed-method was used to report the results into FCPs of start-up companies. While the hypotheses were tested using the survey data, a series of interviews were undertaken[20]. This

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[16] While the study emphasis how the existing strategy are performing in term of three economic performance dimensions (financial analysis, profit planning and financial forecasting), we don't consider others important dimensions of the organizational performance such as social and environmental aspects.

[17] The analysis of different risk dimensions is a third approach that considers: (1) impact of firm liquidity; (2) variability of outcome; (3) ruinous loss (see Accola, 1994).

[18] The financial risk is important to understand and to ensure that strategies meet level of risk acceptable considering the level of leverage and the organization's liquidity (the lack of liquidity assets).

[19] See, for other considerations, Simons 2014.

[20] As Creswell (2014, p. 4) says "*the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone*".

qualitative analysis, with expert entrepreneurs, aims to find out the importance of FC techniques in start-up companies and the benefits to adopt them.

4.2 Sampling Procedures

4.2.1 Survey sample and descriptive statistics

The sample examined in this study included Italian start-up companies, and these young organisations were analysed in the period 2012-2018.

Addresses and company statistics for the survey were obtained basically from the start-ups' database of the Italian Industry, Commerce, and Agriculture Confederation (CCIAA) and the start-up's district and incubator created by four Industry Confederation Units and two Universities Foundations.

This database typically does not provide the names of possible respondents and their e-mail address, so we send a letter of introduction asking to identify the name of possible respondents such as Funder, Co-Funder, President, CEO or senior accountants. The letter explained the objectives of the research and requested to indicate whether they would be interested in participating in the initial pilot test. As a result of the pilot testing step, some survey questions were revised before to prepare the final questionnaire.

A sample of 452 start-ups was randomly selected from the CCIA's database, and 99 firms were selected from the start-up district and incubator' database. Sixty-eight (68) companies agreed to respond to the questionnaire, and an e-mail was sent to the respondents. The e-mail includes: (a) a specific link to the web questionnaire and (b) a glossary of terms. Fifty-three (53) complete questionnaires were returned, indicating a global response rate of 10%.

A specific section of the survey was devoted to the study of the FC techniques use by year from the foundation of the company. In particular, we asked the respondents to indicate the calendar year of formalisation for the FC techniques. Table 2 shows the percentages of firms that formalized the used of the FC techniques (*stricto sensu*) by the end of first year of activity.

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The most widely adopted FC techniques at the end of year 1 are: cash flows and cash budget. We can argue that FC techniques are the results of a large number of policies and decisions. It gives a possible measure of the effectiveness of the start-ups' management and guides practising managers and entrepreneurs.

Table 3 presents a summary of the main descriptive statistics of the survey sample.

Panel A presents the distribution of the sample by the foundation year. It is essential to reflect that in the period 2016-2018 the number of companies by founding year were very high (83%)[21].

Panel B presents the distribution of the number of start-up companies by size and industry. Size classification is based on the three-level of revenues (€), and we classify the sample into three main industries. The largest industry (sector) in the sample is the manufacture (62,3%), followed by services (30,2%). The size, in term of revenues (€), shows the presence of a very large proportion of small start-up companies (92,4%). This aspect can be a factor that influences the FCPs.

Panel C presents the distribution of the number of start-up companies by technology and BS. On the one hand, the classification based on technology distinguishes between high, medium

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[21] The implication do to the (young) age of the founding year is a factor that influences the managerial practices (see Greiner, 1998).

and low technology level. On the other hand, the sample is classified into three generic competitive strategies (cost leadership, differentiation and focus). The most diffused BS in the sample is differentiation (66%), followed by focus (32%) and only one company compete with a cost leadership strategy. For the technological level the high-tech companies are the most diffused (51%) followed by the one presenting a medium level (45%). A plausible explanation is that the start-up companies typically promote high technology as a key source of business-level strategy (with effect for cost, price and competition)[22].

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4.2.2 Interviews data

The quantitative data collected with the survey were integrated with interview data. The qualitative data, using the concept of the entrepreneurial life cycle progresses (start-up, growth, maturity and exit), consider some companies in the stage of entrepreneurial growth. In each company we ask: (a) to describe the principal characteristics of the firm; (b) to identify an authoritative person to assure responsibility and competence on start-ups. Then we sent the research questions, with a list of the FC techniques and a glossary of terms, to the people indicated as acknowledged experts in the field of start-ups. We ask their comments and suggestions on the importance (ranging from 1 to 7) of the 20 FC techniques and benefits to adopt them.

The interviews were conducted during autumn 2019 in ten organizations. The semi-structured interviews were collected with two different methods:: face to face (from 1 to 1,5 hours) and online interview by e-mail (depend of the available of the respondents).

Information on companies and on their acknowledged experts involved in the interviews was summarized in Table 4.

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4.3 Data Analysis

An inferential approach was adopted to study the survey (quantitative) data**.** In particular, the proposed hypotheses were tested in a non-parametric framework. In particular, Chi-squared, Wilcoxon, and Kruskall-Wallis tests were adopted depending on the kind of comparison we were focusing on (see Agresti, 2007 for a full review of these methods).

To test hypothesis H1 we adopted a two-sided Wilcoxon test. The same procedure was considered to study the hypotheses H2a, H2b and H2c relating different kinds of BS and FC techniques (*stricto sensu*), but with a one-sided approach.

The Chi-squared non-parametric procedure was considered to check hypothesis H3.

Moreover, we adopted the Kruskall-Wallis non-parametric test to study the relevance of competitive risk pressures that the five forces can emanate.

All the considered analyses were developed in R (R Core Team, 2019).

5. Results

5.1 Questionnaire

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[22] These observation are taken form Johnson et al. (2014).

In this subsection, the paper provides survey results, hypotheses testing and a summary of the results of hypothesis testing that contribute to a better understanding of FCPs in start-ups.

5.1.1 Survey Results

As indicated in Panel B of Table 3 fifty-three (53) start-ups were categorised according to their size and industry, while panel C of Table 3 shows that they pursue different kinds of BS. In particular, panel C shows that differentiation strategies were most prevalent, followed by a focus strategy, while only one company considered the cost leadership strategy. Responses, based on 7-point Likert scale ranging from 1 to 7, are summarised in Table 5 that reports the mean score for each FC technique (*stricto sensu*) of the three groups of companies separately**.**

INSERT ABOUT HERE TABLE 5

This analysis facilitates the use of hypotheses testing.

5.1.2 Hypotheses Testing

In order to determine whether there was a statistically significant difference in the practices of the group of companies, we use a non-parametric analysis to test H1.
Remember that the survey sample included three kinds of BS, but a single company adopts the cost leadership strategy. Therefore we adopted for testing H1 two groups of companies such as differentiation and focus companies.
The results of these tests were summarised in Table 6.

INSERT ABOUT HERE TABLE 6

The results did not support (at 10% level) hypothesis 1 (H1): All start-up companies adopted basic financial analysis in evaluating economic performance but their use was different between BS.
While from the descriptive statistics point of view it was possible to verify that the usage of basic financial analysis were considered medium-high for the respondents of the three groups of companies, the results of the testing procedure for the two groups of companies (differentiation and focus) provided evidence of a negative association**.**

Now we tested the hypothesis H2a, H2b, H2c, relating different kinds of BS and FC techniques (*stricto sensu*) usage, considering two groups of companies (differentiation and focus).
Hypothesis 2a (H2a) related to cost-leadership strategy stated: cost leadership start-up companies use more profit planning than differentiation and focus companies. The analysis of H2a, based on the sample of start-up companies surveyed, cannot be tested because there was only one company in this group.
Hypothesis 2b (H2b) related to differentiation strategy states: start-up companies pursuing differentiation strategy make greater use of financial forecasting than the other kind of companies. The results of the non-parametric Wilcoxson (one-sided) tests show that H2b is not supported because there are no significant associations between the specific FC techniques (financial forecasting) and the kind of BS (differentiation). As reported in Table 5, the empirical evidence (sample mean comparisons) is that, in general, the focus companies make greater use of those FC techniques. Consequently, all observed significance levels (p-values) for the Wilcoxon tests are very large. Results of the specific tests are redundant and for this reason, are omitted.

Hypothesis 2c (H2c) relates to focus companies and states: start-up companies pursuing a focus strategy rely more on a holistic approach to FC techniques (*stricto sensu*) than companies following cost leadership and differentiation kinds of BS.

Table 7, summarizing the results of the non-parametric Wilcoxson (one-sided) test, shows that H2c cannot be supported (at 10% level). Except for cash budget (p-Value= 0.084), cash breakeven point (p-Value=0.068) and cash flow cycle (p-Value=0.089), as a financial forecasting techniques, all the others FC techniques (*stricto sensu*) were seen as no important for the respondents.

INSERT ABOUT HERE TABLE 7

Focusing on hypothesis H3, Table 8 collects the results of the test for the association between strategic risk assessment, the last four strategic risk techniques (*broadly speaking*), and BS using the Chi-squared test.

INSERT ABOUT HERE TABLE 8

The survey results appear to support hypothesis 3 (H3): The most of start-up companies adopt strategic risk assessment to meet the limit of acceptable risk in evaluating strategies but the level of adoption is different between BS.

The hypothesis testing show that reputation risk (p-Value = 0.015) is significantly different between differentiation and focus strategies. In particular, the percentage of adoption is larger in companies adopting a focus strategy. In general, a possible explanation of the Chi-squared test's result suggests that entrepreneurs use strategic risk analysis on a regular basis for appreciating firm's reputation for different purposes.

For instance, Simons (2014, p. 256) suggest that reputation risk "[…] *is not itself a source of risk. Instead, is a consequence of excessive risk in any one of the three basic risk dimensions*". This theoretical consideration explains the motivation that hypothesis 3 (H3) cannot be rejected. However, caution must be exercised in drawing conclusions about hypothesis 3. For the survey respondents, operations risk is a relevant source of strategic risk (considering the percentage of adoption). In the qualitative part of the paper, we describe this aspect of the strategic risk in the analysis of the discussion with expert entrepreneurs.

Further analysis of basic financial analysis
While descriptive statistics on the basic financial analysis techniques indicate restricted and also relevant adoption in the start-up companies, this is not the case for non-parametric test.
Therefore, a specific section of the survey was devoted to the further analysis of basic financial analysis because the descriptive statistics show that the item cash flow presents a very high usage in all the three groups of companies.
Respondents were asked to indicate the year of the first cash flow adoption in their start-up companies. Table 9 indicates the frequency of respondents by the first period of cash flow's adoption and for each group of companies.

INSERT ABOUT HERE TABLE 9

Table 9 shows that at the beginning of the first year, the majority of companies (27/53) used cash flow. In 3 years, except for the cost leadership company that use cash flow analysis in the first year, the cash flow's adoption is 71.4% in differentiation companies and 70.5% in focus companies. These survey results, therefore, appear to indicate that, for the respondents, the cash flow analysis plays a primary role among the basic financial analysis techniques.

Further analysis of the strategic risk pressures due to competitive forces
As Simons (2014, p. 254-255) say: " *Competitive risk, by definition, is faced by all businesses that compete in dynamic markets*" […] " *The five forces analysis provides a starting point to consider the direction from which these risks can emanate [...] Interactive controls systems are essential to monitor competitive risk in a culture that could potentially create barriers to impede the free flow of information about emerging threats and opportunities*".

The practices of start-up companies were further investigated through the analysis, based on a 7 point Liker scale, aimed at identifying which competitive forces (the threat of entry, the threat of substitutes, the power of buyer, the power of suppliers, competitive rivalry) were considered relevant for the kinds of BS and the kinds of industry considered in the sample.

The results of the comparative analysis – based on the Wilcoxon non-parametric test – showed that there were no significant differences (at 10% level) among the kinds of BS. The results of these testing procedures were redundant and for this reason are omitted.

In contrast, the analysis regarding the kinds of industry – based on the Kruskal-Wallis (KW) test – indicates that there were some significant differences (at the 10% level) among the three groups of companies. In particular, there were two criteria: the power of buyers (p-Value = 0.098) and the power of suppliers (p-Value = 0.062) which are significant.

The results of these tests are summarised in Table 10.

INSERT ABOUT HERE TABLE 10

In this study, it can be concluded that the KW test results indicated that the power of buyers and the power of suppliers affect the threat on competitive risk. However, as in the previous case, caution must be exercised in drawing conclusions on the relevance of competitive risk pressures that some of the five forces, such as the power of buyers and power of suppliers, can emanate on start-up companies.

5.1.3 Summary of results of hypotheses testing

A summary of the results of hypothesis testing procedures was reported in Table 11.
In general, the evidence provided by the results of hypotheses testing suggested that FC techniques usage did not depend on the kinds of BS.
H1, H2 (b and c) – relating different kinds of BS and FC techniques (*stricto sensu*) – were rejected, while H3 – that consider FC techniques in term of Simon's strategic risk was not rejected because reputation risk was significant.

INSERT ABOUT HERE TABLE 11

Furthermore, the results of the competitive risk pressures that the five forces can emanate – base on the kinds of industry - indicates that there are two criteria, such as the power of buyers and the power of suppliers, which are significant.

5.2 Interviews

The study comprised semi-structured interviews in 10 organizations (see table 4). The interviews, with expert entrepreneurs, aims to find out the importance of FC techniques in start-up companies and the benefits to adopt them.

We summarised the expert's suggestions and comments for each of the 4 FC categories - ranging from low, middle and high importance - and the benefits to adopt them

Basic financial analysis

In this FC category expert's comments distinguishes between three macro-techniques: cash flows; financial ratios; and trend over time.

Most of the experts interviewed (9 out of 10) suggest that cash flows have very-high importance. Moreover, they suggest that trend over time (trend analysis) have a middle importance (6 out of 10) and that ratios analysis (5 out of 10) have middle-low importance.

Here, a comment (company G) claimed that: *"In my view, it is difficult to set up the suggested FC techniques during the start-up stage. In most cases, the founders are technical experts. Rarely does the team of founders include a sales expert, and even more rarely is there a financial expert. Usually, an accountant is involved dealing with financial/accounting issues. This is an important point; external accountants should be trained to offer a better service to start-ups by using these techniques. Often, accountants are not familiar with the world of start-ups and so they are unable to give partners good advice on the risks they are running, and they hardly ever use the FC techniques listed. From a financial point of view, the greatest risk for a start-up is running out of money in the bank, so cash flow is important. The other FC techniques, for example profitability ratios, are less important"*.

In our interpretation, in general, the expert's claimed is influenced by some limitations of ratio analysis. Indeed, also the literature emphasized that: *"Although ratios are exceptionally useful tools, they do have limitations and must be used with caution. Ratios are constructed from accounting data, and these data are subject to different interpretation and even to manipulation"* (Weston & Copeland, 1986, p. 195).

In sum the interviews in comparison with the survey results, in term of descriptive statistics, confirm the emphasis on cash flows analysis and the low importance of ratios analysis. While, the results of tests do not support H1 that all start-up companies adopt basic financial analysis in evaluating BS.

Profit Planning

In this FC category expert's suggestions distinguishes between three macro-techniques: (a) operating profit plan; (b) cost behaviour and, (c) cost-volume-profit (CVP).

The above FC techniques vary, but they were considered by the expert entrepreneurs of high importance for start-up companies. In particular, maximum very-high importance (9 out of 10) being for operating profit plan, while high importance was for cost behaviour analysis (8 out of 10) and CVP analysis (7 out of 10) respectively.

Here, comment's experts suggested that the benefits achieved after the introduction of the above FC techniques during the start-up stage provideed *"greater control over cost item and better capability to develop planning in the medium term"* (company B), *" greater focus on operation management and improved delineation in making strategy choices* (Company F), *"making business area budgets as clear as possible, permitting continuous checks, guaranteeing that the strategy developed received enough fuel to be implemented"* (company L).

In sum, the interviews basically contrast the survey results in term of descriptive statistics.

In our interpretation the application of the FC techniques mentioned above had several advantages as: (i) expanding the profit planning method; (ii) involving profit comparison of absorption and variable costing and, (iii) making the more realistic assumption about the role of the operating budget. As Seal et al. (2009, p. 449) say: "The *budgeted profit and loss account is one of the key schedules in the budget process. It shows the company's planned profit for the*

upcoming budget period, and it stands as a benchmark against which subsequent company performance can be measured".

Financial forecasting

One of the ideas in constructing financial forecasting in start-up companies is the financial planning and control process that involves the projections and use of main types of the master budget such as cash budget, cash flow cycle and expected financial results.

The companies interviewed (6 out of 10) suggest cash flow cycle have relative importance, while (10 out of 10) stated that cash budget and expected financial results are critical placing "very-high importance" in the preparation of these budgets.

We ask to give what benefits can be achieved from such budgets. For example, the experts claimed that: "*they support strategic decision-making*" (company H); "*derive from planning and control process and support performance evaluation in the short-term in order to achieve medium-term objectives*" (company I); "*Continuous control of the company in respect the development and investments planning*" (company C).

Here, again, the interviews with experts basically contrast the survey results in term of descriptive statistics. Moreover, the experts were in contrast with the results of tests that do not support that start-up companies make greater use of financial forecasting in evaluating BS (in particular pursuing a differentiation or focus strategy).

In particular, as suggested by the experts, in our interpretation the adoption of cash budgets and expected financial results play an important role also in start-up companies. First, the projection and the use of cash budgets (statement of expected cash flows) is important because external finanaciers of start-ups are expected to value formal control for different reasons such as firm's managerial quality and support and enhance decision making (see Davila 2015, p. 209). Second, preparing and using expected financial results (projected income statement and balance sheet) is a key challenge for planning and coordinating (each element of the budgeting process). Moreover, the start-ups companies might discover that the skill is unable to move from the start-up stage to managing potential future growth. For example, Atkinson et al. (2012, p. 421) stress that: "*By considering the interrelationships among operating activities, a budget helps to anticipate potential problems and can serve as a tool to help provide solutions to these problems*" .

Simons's strategic risk factors

A related issue on financial planning and control process is to find out the importance ofacknowledged experts on the (formal) risk assessment for evaluating strategies. Johnson et al. (2014, p. 379) assert: "*Young entrepreneurs may have a higher tolerance for risk than established family businesses, for example. Importantly, risks other than ones with immediate financial impact should be included, such as risk to corporate reputation or brand image*". Using Simon's strategic risk factor, most of the experts interviewed (7 out of 10) suggest that operations risk and reputation risk have high importance. Moreover, they assert that competitive risk had a middle importance (5 out of 10)[23].

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[23] Informal discussion with two experts start-up's co-founder suggests that during strategy development and implementation they tend to use non-structured tools for identify and managing competitive risk. Again, informal discussion indicate that many firms don't focus on the structure and formality of strategic risk activities and are aware of the danger that investors consider formal risk control a key variable for provide debt financing to the start-up companies.

Again we ask to give what benefits can be achieved with formal risk assessment. These were the suggestions of two experts: *"we know how much the key factors affect the corporate risk the context of poor resourses"* (company E), *"to became aware of the impact on company's financial performance"* (company A).

The comments indicate that the acknowledged experts well understand the importance of the risk analysis in managing and measuring the companies. Further, we can conclude that the survey results from both descriptive statistics and tests on Simons's strategic risk factors, as FC categories, basically is not in contrast with the semi-structured interviews.

6. Concluding Remarks

We examine the use of FC techniques in start-up companies and their importance for acknowledged experts on start-ups. The sample included Italian start-up companies, while the interviews with the experts were conducted in 10 organizations. We find that the most widely adopted FC techniques (*stricto sensu*) at the end of year 1 are respectively: (1) cash flow; (2) cash budget and, (3) operating profit plan. Descriptive statistics, based on a mean score, suggest that start-up companies, even though vary a great deal in term of BS, exhibit similar patterns of FC techniques (*stricto sensu*) usage to those reported at the end of year 1. Survey results provide tests evidence on the use of FC techniques conditional on kinds of BS. Companies pursuing a differentiation strategy and companies following a focus strategy do not differ in their use of FC techniques (*stricto sensu*). In particular, testing procedures for these two groups of companies provide evidence of a negative association, except for cash budget, cash flow cycle and cash breakeven point in the case of companies following a focus strategy. Moreover, while start-up companies do not support the use of basic financial analysis, profit planning and financial forecasting as FC category techniques *stricto sensu* significantly. The testing procedure appear to support the hypothesis that the most of start-up companies adopt strategic risk assessment but the level of adoption is different between BS. The use of reputation risk, as a source of Simons's strategic risk that combine the three basis risk dimensions, is significantly different between differentiation and focus companies. In particular, the percentage of adoption is larger in companies following a focus strategy.

The comparison between the descriptive statistics based on the survey results and the interviews' findings confirms the very-high importance of cash flow analysis and the low importance of ratios analysis. Basically, in contrast with the survey results, the findings of the interviews suggest high importance of operating profit plan and cost behaviour analysis Moreover, the experts confirms the very-high importance of cash budgets and the relevance of others expected financial results (projected income statement and balance sheet), as financial forecasting FC techniques (*stricto sensu)*, for the potential growth of start-up companies. Finally, survey results from both descriptive statistics and test on Simons's strategic risk factors, as a FC techniques category, basically is not in contrast with the acknowledged experts. These, in particular, suggest that operations risk and reputation risk have high importance and provide valuable benefits to adopt them also in the stage of start-ups.

This paper contributes to the extant literature mainly because the analysis documents evidence for understanding better the use of FCPs in start-up companies. Overall, the paper provides new evidence for the debate concerning the role of FC. However, even if our research design considers a mixed-method, some relevant limitation must be considered when interpreting and generalising the findings. First, our results suffer from a low number of observations in the sample. This limitation was mitigated through a qualitative approach using comments and suggestions of experts on start-up companies and how the qualitative and quantitative elements inform each other: use and importance of FC techniques. Second, while we document the use of FCPs and the relationship with BS, we do not examine the usage and effectiveness with

others strategic position, such as environment, accounting and finance culture, ownership models. A possible direction for future research should also consider cross-national investigations.

Acknowledgment

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Table 1 – Summary of the FC categories and techniques

FC techniques categories	FC techniques (broadly speaking)
Basic financial analysis	Cash flows
	Liquidity ratios
	Leverage ratios
	Activity ratios
	Profitability ratios
	Growth ratios
	Valuation ratios
	Trend (over time) ratios
Profit planning	Operating plan
	Cost behavior
	Cost-volume-profit (CVP)
	Operating leverage
Financial forecasting	Cash budget
	Cash breakeven point
	Cash flow cycle
	Expected financial results
Simons's strategic risk factors	Operations risk
	Asset impairment risk
	Competitive risk
	Reputation risk

Table 2 - Evolution of FC techniques (*stricto sensu*) usage by the end of years 5

FC Categories	FC Techniques	Percentage of companies that adopted the techniques by the end of the i-th (first) year of activity				
		1	2	3	4	5
Basic financial analysis:	Cash flows	50.9%	64.2%	71.7%	75.5%	75.5%
	Liquidity ratios	43.4%	49.1%	60.4%	62.3%	64.2%
	Leverage ratios	20.8%	28.3%	30.2%	34.0%	35.8%
	Activity ratios	41.5%	45.3%	49.1%	52.8%	54.7%
	Profitability ratios	41.5%	52.8%	60.4%	67.9%	69.8%
	Growth ratios	30.2%	35.8%	39.6%	43.4%	45.3%
	Valuation ratios	30.2%	34.0%	39.6%	43.4%	45.3%
	Trend ratios	28.3%	37.7%	45.3%	52.8%	54.7%
Profit planning:	Operating profit plan	47.2%	56.6%	62.3%	69.8%	73.6%
	Cost behaviour	24.5%	35.8%	39.6%	43.4%	47.2%
	Cost Volume Profit	35.8%	52.8%	54.7%	60.4%	64.2%
	Operating leverage	20.8%	34.0%	35.8%	39.6%	45.3%
Financial forecasting:	Cash budget	49.1%	58.5%	62.3%	73.4%	77.4%
	Cash breakeven point	37.7%	54.7%	62.3%	67.9%	73.6%
	Cash flow cycle	49.0%	54.7%	60.4%	69.8%	73.6%
	Expected financial results	24.5%	35.8%	39.6%	41.5%	45.3%

Table 3 - Summary statistics on the final sample of start-ups.

Panel A: Number of companies by founding year.

Founding year	2012	2013	2014	2015	2016	2017	2018
Number of companies	1	1	4	3	10	12	22

Panel B: Number of companies, by size and industry.

	Revenues (€)	Industry			Total
		Manufacture	Services	Others	
	1,000,000 +	1	1		2
Size	500,001 - 1,000,000	1	1		2
	100,000 – 500,000	31	14	4	49
Total		33	16	4	53

Panel C: Number of companies, by technology and BS of the start-ups.

		Business strategy			Total
		Cost leadership	Differentiation	Focus	
	High	1	19	7	27
Technology	Medium		14	10	24
	Low		2		2
Total		1	35	17	53

Table 4 - Information on the expert entrepreneurs involved in the interviews

Start-up companies	Ownership models	Nature of company	Primary's technological innovation	Interviewee
A	Entrepreneurial business	Software development for fitness sector	Digital transformation	President & Co-Founder
B	Entrepreneurial business	Production of materials for Soundproof	Tridimensional structure with soundproof properties	CEO
C	Entrepreneurial business	Production of inspection systems for quality control in real time	Quality product control in each workpiece	CEO & Co-Founder
D	Entrepreneurial business	Technology integrator systems for industry 4.0	Interconnection between O.T and I.T levels	Co-Founder
E	Family Business	Consulting and design of new technologies	IOT's product development connected with digital platform	Founder
F	Entrepreneurial business	Information technology systems for e-commerce	Dynamic pricing's e-commerce managers	Co-Founder
G	Family Business	Development of application for forecasting water-works	Software programme of artificial intelligence using satellite computer	Founder
H	Family Business	Software development for industrial firms.	Using machine learning by different external sources of data	Founder
I	Entrepreneurial business	Consulting development for new technologies and products.	Digital Knowledge	CEO
L	Entrepreneurial business	Education and software supply for high technology sector	Training course in the sector Blok chain based technologies	Co-Founder

Table 5 – A comparisons of FC techniques (*stricto sensu*) for the three groups of companies

	Cost Leadership	Differentiation	Focus
	(n = 1)	(n = 35)	(n = 17)
	Mean	Mean	Mean
Basic financial analysis:			
Cash flows	6.0	4.314	5.059
Liquidity ratios	5.0	3.714	3.529
Leverage ratios	3.0	2.257	3.118
Activity ratios	5.0	3.143	3.588
Profitability ratios	5.0	3.571	4.235
Growth ratios	3.0	3.114	2.706
Valuation ratios	3.0	2.686	3.412
Trend ratios	6.0	3.429	3.294
Profit planning:			
Operating profit plan	6.0	4.029	4.235
Cost behaviour	6.0	2.600	3.059
Cost-volume-profit (CVP)	6.0	3.457	3.941
Operating leverage	5.0	2.457	2.882
Financial forecasting:			
Cash budget	7.0	4.000	5.000
Cash breakeven point	3.0	2.714	3.824
Cash flow cycle	6.0	4.143	5.118
Expected financial results	6.0	2.571	2.941

Table 6 – Results of non-parametric Wilcoxson test **of H1** for the two groups of companies

	Median Rank		Test Statistic	P-Value (two sided)
	Differentiation	Focus		
Basic financial analysis:				
Cash flow	4.0	5.0	233.5	0.204
Liquidity ratios	4.0	3.0	306.0	0.875
Leverage ratios	1.0	2.0	238.0	0.241
Activity ratios	3.0	3.0	264.0	0.515
Profitability ratios	4.0	4.0	247.5	0.328
Growth ratios	3.0	2.0	329.0	0.541
Valuation ratios	3.0	3.0	243.5	0.290
Trend ratios	4.0	3.0	306.5	0.867

Table 7 – Results of non-parametric Wilcoxson test **of H2c** for the two groups of companies

	Median Rank		Test Statistic	P-Value (one sided)
	Differentiation	Focus		
Basic financial analysis:				
Cash flow	4.0	5.0	233.5	0.102
Liquidity ratios	4.0	3.0	306.0	0.570
Leverage ratios	1.0	2.0	238.0	0.121
Activity ratios	3.0	3.0	264.0	0.258
Profitability ratios	4.0	4.0	247.5	0.164
Growth ratios	3.0	2.0	329.0	0.736
Valuation ratios	3.0	3.0	243.5	0.145
Trend (on time) ratios	4.0	3.0	306.5	0.574
Profit planning:				
Operating profit plan	4.0	5.0	266.0	0.269
Cost behaviour	3.0	3.0	273.5	0.320
Cost-volume-profit (CVP)	4.0	4.0	259.5	0.229
Operating leverage	2.0	3.0	269.5	0.293
Financial forecasting:				
Cash budget	4.0	6.0	227.5	0.084
Cash breakeven point	2.0	5.0	221.5	0.068
Cash flow cycle	5.0	6.0	229.0	0.089
Expected financial results	2.0	2.0	275.0	0.332

Table 8 – Results of Chi-squared test for the association between strategic risk assessment and BS.

Simons's strategic risk factors	Percentage of Adoption		Test Statistic	P-Value
	Differentiation	Focus		
Operations risk	80.0%	88.2%	0.119	0.730
Asset impairment risk	25.7%	29.4%	0.000	1.000
Competitive risk	48.6%	64.7%	0.637	0.425
Reputation risk	08.6%	41.2%	5.873	0.015

Tab.9 – Number of companies by the first period of cash's flow adoption.

	Business strategy			All companies (n = 53)
	Cost leadership (n = 1)	Differentiation (n = 35)	Focus (n = 17)	
1^ year	1	18	8	27
2^ year	0	6	1	7
3^ year	0	1	3	4
4^ year	0	2	0	2
5^ year	0	0	0	0
Never used	0	8	5	13

Table 10 – Results of non-parametric KW test as regards the relevance of competitive risk pressures that the five forces can emanate.

Five forces	Industry						Test Statistic	P-value
	Manufacture		Services		Others			
	Mean	SD	Mean	SD	Mean	SD		
The threat of entry	4.68	1.19	4.33	1.81	5.00	1.41	0.797	0.671
The threat of substitutes	4.06	1.52	4.27	1.66	4.50	2.51	0.394	0.821
The power of buyers	3.93	1.34	4.21	1.57	2.50	1.29	4.643	0.098
The power of suppliers	4.31	1.88	3.39	1.67	2.00	1.41	5.550	0.062
Competitive rivalry	4.31	2.08	4.12	1.34	4.50	1.29	0.158	0.924

Table 11 – Summary of the results of hypotheses testing

Hypotheses	Test	Test results
H1: All start-up companies adopt basic financial analysis in evaluating economic performance of BS, but their use is different between BS.	Wilcoxon (two sided)	Not supported
H2a: Cost leadership start-up companies use more profit planning than differentiation and focus companies.	Wilcoxon (one sided)	Cannot be test
H2b: Start-up companies pursuing differentiation strategy make greater use of financial forecasting than the other kind of companies.	Wilcoxon (one sided)	Not supported
H2c: Start-up companies pursuing a focus strategy rely more on a holistic approach to FC techniques (*stricto sensu*) than companies following cost leadership and differentiation kinds of BS.	Wilcoxon (one sided)	Not supported
H3. The most of start-up companies adopt strategic risk assessment to meet the limit of acceptable risk in evaluating strategies but the level of adoption is different between BS.	Pearson's Chi squared	Support for reputation risk

Further analysis	Test	Test results
Strategic risk pressures due to competitive forces	Kruskal-Wallis	Support for power of buyers & power of suppliers.