Management Control Systems in Post-Incubation: An Investigation of Closed Down High-Technology Start-Ups

Jochen Edmund Kerschenbauer, Roman Salinger, Daniel Strametz

Abstract—Insufficient informal communication systems can lead to the first crisis ('Crisis of Leadership') for start-ups. Management Control Systems (MCS) are one way for high-technology start-ups to successfully overcome these problems. So far the literature has investigated the incubation of a start-up, but focused less on the post-incubation stage. This paper focuses on the use of MCS in post-incubation and, if failed start-ups agree, on how MCS are used. We conducted 14 semi-structured interviews for this purpose, to obtain our results. The overall conclusion is that the majority of the companies were closed down due to a combination of strategic, operative and financial reasons.

Keywords—Closed down, high-technology, incubation, Levers of Control, management control systems, post-incubation, start-ups.

I. INTRODUCTION

THE foundation of start-up companies is a very popular activity today. The number of companies of all kinds established in Austria has been increasing continuously since the 1990s. In 2014 there were 37120 new foundations and this corresponds to about 110 foundations per day [1]. The highest risk of insolvency for these start-ups exists during the first three to four years. This means that many of these companies fail at an early stage of life. The reasons for failure in this context are insufficient commercial knowledge, no secured financing, a changed market situation, miscalculation and insufficient observation of the economy [2]. These factors present a remarkable problem for young founders. Start-ups have essentially two possibilities to avoid serious mistakes in order to increase their survival rate. Firstly, they can use the support provided by external organizations such as business incubators in the first years of their development. The period when start-ups enjoy the benefits of the incubator is called incubation. The time after incubation is called post-incubation. Secondly, start-ups can also use MCS to decrease the risk of failure. This study focuses on the reasons why start-ups fail and investigates the circumstances of these failed start-ups. For this purpose, some words need to be defined in the next point of this paper. The terms start-up, incubation and post-

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incubation will be explained and the meaning of MCS for high-tech start-ups will be given. The illustration of problems that arise concerning post-incubation and MCS have led on to the guiding questions behind the research in this study.

A. Start-Up

Start-ups are defined as young unestablished companies, which are established with the purpose of implementing an innovative business idea with little starting capital. These companies need to grow their business and increase their capital base very soon to survive in the market [3]. Today, start-ups face many challenges in the early stages of their life-cycle. The ability of the entrepreneur to tackle and overcome these challenges is therefore seen as crucial for success. Brettel et al. [4] and Langenberg [5] stated that the high-tech start-ups are characterized by relative immaturity, limited resources and a high degree of exposure to external market dynamics leading to an increased business risk. These attributes tend to evoke further challenges and are sometimes referred to as "Liabilities of a Start-up". These liabilities are the liability of age/newness, the liability of size/smallness and the liability of adolescence/growth. The liability of age/newness means that due to recent establishment and the corresponding early stage of development, companies take on unfamiliar tasks and responsibilities and must define processes, which are accompanied by a higher risk of default and failure. The liability of size/smallness means that the lack of financial and human resources tends to negatively influence the likelihood of surviving in the early stages of the company life cycle. The liability of adolescence/growth is described in terms of establishing a functional organizational structure and managing internal coordination as also coping with the challenges of operations. All of these are seen as essential tasks to which entrepreneurs should devote their attention. These liabilities interact with each other and collectively contribute to increased uncertainty faced by high-tech start-ups [4], [5]. The increased uncertainty can translate into a higher degree of business risk and can potentially cause a start-up to fail.

B. Incubation and Post-Incubation

The term incubation derives from medicine and often refers to an incubator for babies. It has a similar meaning for start-ups, where it also functions as an initial survival aid. In incubators, start-ups should experience solid and stable growth. The European Commission [6] defines an incubator as

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follows:

"A business incubator is an organization that accelerates and systematizes the process of creating successful enterprises by providing them with a comprehensive and integrated range of support, including: Incubator space, business support services, and clustering and networking opportunities."

Business incubators can thus be seen as an entrepreneurship resource to support start-ups in their early stage of life [7]. In Austria incubators exist in the form of companies as also those private and public incubators, which are the focus of this study. The public incubator in Austria is the AplusB (Academia plus Business) – incubator consisting of eight AplusB centers. These centers were founded in 2002 and they are integrated in the Federal Ministry for Transport, Innovation and Technology. The average incubation period in AplusB centers is between 1.5 and 2 years in Austria [8]. Start-ups subsequently graduate from their incubator. The following phase is consequently called post-graduation or post-incubation, depending on the literature source. Schwartz [9] defines post-graduation as the phase when the incubated ventures have completed their incubation period. Bizzotto [10] defines post-incubation when tenant companies graduate into the wider business community. Studies have shown that the period following graduation has a high risk of failure [7].

C. Management Control Systems (MCS)

Management Control combines strategic planning and operational management by breaking down long-term business goals to short-term operational objectives and actions [11]. Anthony [12] defines Management Control as the process by means of which managers can ensure that the resources of a company are used effectively and efficiently to reach the organization´s objectives. Simons [13] defines MCS as the formal, information-based possibilities managers use to handle the structures in organizational activities. A further definition of MCS from Malmi and Brown [14] focuses on the influence of the employee behavior. They describe MCS as systems, rules, practices and other activities to control the employee behavior. All in all, it can be stated that there are multiple and varied definitions of MCS. We use the definition of Simons for this study, in which MCS are explained as methods to maintain or change the structures in organizational activities [13]. This definition of MCS is best suited to high-technology start-ups. One type of this MCS is the Levers of Control (LOC) framework from Simons [13]. This LOC framework underlies the idea of opposing forces, the tension between freedom and restriction, between empowerment and responsibility, between top-down instructions and bottom-up creativity and between experimentation and efficiency. The overcoming of these tensions and challenges is taken over by positive and negative control systems [13]. The LOC framework is based on four key concepts: 1) core values, 2) risks to be avoided, 3) critical performance variables and 4) strategic uncertainties. Each of these concepts is directly controlled by a specific system, or as Simons [13] calls it, a certain Lever of Control: 1) Belief Systems, 2) Boundary Systems, 3) Diagnostic Control Systems and 4) Interactive Control Systems.

D. Problem Statement

Little discussion has been focused on the period directly following graduation [15], even though it is known that there is a high risk of failure in the post-incubation period [7]. Most of the few studies that address post-incubation only consider the tenants' survival rates [9]. Furthermore, the main problem is that literature rarely focuses on post-incubation of high-technology start-ups. Another interesting view from Schwartz [16] is that the possible and suitable research designs are limited by the lack of necessary data on former tenant firms. Furthermore, he points out that the investigation of post-incubation from successful companies only leads to significant distortion of the findings. This shows up the need for questioning both successful and also failed start-ups in post-incubation to obtain significant results, irrespective of the difficult circumstances faced by some of these companies. A high demand for further research in post-incubation and MCS is indicated by many researchers. Lövstål [17] is of the opinion that in order to understand the relationship between entrepreneurship and MCS, MCS should be studied in their contexts and that it is important to know how managers use them and why. Some researchers suggest that MCS have a negative impact on entrepreneurship because they prevent entrepreneurs from growing up in terms of innovation and creativity [17]. These systems are used in different control processes such as planning and decision-making, but there is an area of uncertainty concerning the idea that MCS are affected in different ways depending on the system. Even though examples from different studies are available [18], [19], no single precise perspective is available for analyzing the full influence of MCS in the entrepreneurial world. Moreover, Lövstål [17] maintains that entrepreneurship and management are opposite concepts and that it is extremely difficult to combine them in the context of corporate entrepreneurship. The point here is that, on the one hand, MCS aims to organize and keep the balance within a system, but on the other hand, entrepreneurship faces unknown situations where MCS are of limited use. Davila et al. [20] contend that there is a significant need for research on controlling in companies that are characterized by entrepreneurship and innovation. These characteristics are met best by technology-oriented start-ups. High-technology IT start-ups definitely belong to this start-ups type. In addition, Lövstål [17] says that new ways and new perspectives are needed to develop management models in the future. A paper analyzing the LOC framework defends the view that future case studies can contribute to further consolidation of the model [21]. Furthermore, the Simons Interactive Control framework considers the informal characteristics of MCS from small start-up companies in a turbulent environment in the best way [22]. For this reason, the LOC framework needs to be adapted to small start-ups, because the framework was usually developed for normal enterprises. In summary there is little research overall on the post-incubation of high-technology

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start-ups in combination with MCS, the situation which has initiated the main guiding questions for the research in this study.

E. Research Guiding Questions and Goals

To date, research has not answered the following two main questions, which therefore guide our research. First, how are MCS used in post-incubation of high-technology start-ups? Only MCS used in incubation have been investigated so far and so the answer to this guiding question for the research referred to is of great interest. Second, what are the reasons for closing down companies in post-incubation?

The main goal of this paper is to address these questions by publishing and discussing the results of our interview study, which provides first answers.

F. Structure

The study is divided into two sections. First, a literature review was made of basic information on start-ups, incubation, post-incubation and MCS. Second, an empirical qualitative study was carried out with failed high-technology start-ups to get more information about post-incubation and MCS. Finally, the results of these interviews are interpreted and the study is then rounded off and completed with a discussion.

II. METHODOLOGY

When deciding on the research design, it is important to keep the guiding questions for the research and the main goal of the study clearly in mind. The research objective of this study corresponds with what Maxwell [23] describes as being indicative for the suitability of qualitative research, i.e. that a qualitative research design should be selected to obtain more information about the meanings of situations, events and actions in a specific context, unexpected phenomena or influences, causal explanations or the underlying process of taken actions. A second reason to choose a qualitative research design is when the guiding questions for the research include a what, how or which [24]. For these two reasons, the guiding questions in the research will be answered by means of qualitative research design.

The implemented study follows the research approaches as proposed by Eisenhardt [25]. She describes the procedure as a combination of the case study method and the grounded theory approach. Furthermore, extensive research questions were derived from a broad literature review. In order to answer these research questions, the method of expert interviews was chosen and implemented in the form of semi-structured interviews. These interviews were analyzed by applying the content analysis proposed by Mayring [26]. This qualitative analysis of the interviews has the intention of systematically filtering out the important information in the text.

In this study, a combination of a theoretical and a practical sample survey was chosen as a means of motivating the most suitable companies to answer the research questions. Furthermore, access to potential interview partners was a second selection criterion of this investigation. For these reasons, only companies in high-technology industries and especially IT start-ups were selected for the interviews. The companies also needed to fulfil some additional selection criteria. They were located in Austria, accepted by the AplusB centers, had graduated from the incubator in the past and have already failed. To "fail" or "close down" does not mean that the whole company has ceased to exist, but they have at least rejected their initial business idea. The interviews were held with the founders of the start-ups and if the start-up had more than one founder, the CEO was the preferred interview partner. The potential firms were then split into two groups depending on when they graduated. The point of time of 2.5 years after graduating was chosen as a division, because 33% of all failed companies in Austria are insolvent during the first four years of their operational life [27]. A second reason for choosing a period of this length is because Kerschenbauer, Mühlburger and Grasser [28] emphasize that the first three years after graduating are particularly critical for start-ups. In Austria, the average period of incubation lasts 1.5 years. That is to say the missing term for completing the first four years of the company´s life are 2.5 years of post-incubation. To sum up, the study focuses on start-ups in a first period (up to 2.5 years after graduating) and a second period (more than 2.5 years after graduating) of post-incubation. In this study, group 1 (<2.5 years in post-incubation) comprises 8 failed start-ups. In group 2 (>2.5 years in post-incubation), there are 6 companies that have closed down. All in all, 14 failed start-ups were investigated. The analysis divides the factors into different types of markedness. If a factor is fully marked, every company described this factor on the hand quantitative in the interview. But on the other hand the factor was also described in a qualitative way as fully marked. Strong marked means that more than 50% of the companies described it both – quantitative and qualitative – strongly marked. Less marked means that less than a half of the companies mentioned it a quantitative and qualitative way. If none of the companies mentioned the factor it is not marked. Following this definition for the sampling criteria in the research, the results of the study are presented in the following section.

III. RESULTS

This chapter describes and presents the most central and important results. The results describe how the MCS were used in the post-incubation of those IT companies that have closed down. The results of the MCS are structured according the 4 LOC. At the end of this chapter the most common reasons for the closure of companies are described.

A. 4 LOC

1. Belief System

The vision and the core values of a company are defined in the belief system. A distinction is made between two types of vision: a) the target-orientated vision, which is for example "to be self-employed" or "to develop and sell its own product" and b) the right to exist because of the vision, which essentially means to create a strategic added value for the customer, for

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example "make things in life easier for people". The study has shown that closed down companies have mostly had either an exclusively target-oriented vision with the concomitant understanding or belief that their right to exist is derived from the understanding they have of their vision.

Nearly a third of the closed down companies were offering non-product-related (external) services and defining team goals for achieving the vision. Non-product-related (external) services were much more frequently offered in phase 1. A logical reason for this is that the companies used revenues from these services to stay liquid and therefore survive. Regarding the definition of team goals, there was no major difference between phase 1 and phase 2 in closed down companies. It is also surprising that less than a quarter of the closed down companies gathered feedback from external persons as a measure for achieving their vision. This case is also remarkable due to the fact that not one single phase 2 company had mentioned "to get feedback from external persons". Market analyses were also carried out only by very few of the phase 1 and 2 closed down companies. In addition, it is also striking that only a small number of the company founders cited the possession of a high staying power level as a measure for vision achievement.

The second point of the belief system refers to core values. Almost half of the founders stated that they had set internal and external core values. The phase 2 companies placed a higher priority on external core values than the phase 1 companies. Internal core values refer to their staff, and they describe a) employee's behavior and b) the interaction between founders and employees. The external core values describe what companies expect from external stakeholders (e.g. customers or suppliers). For the closed down companies, it was particularly important for the employees to identify with the company as well as with the product, and also for them to be receptive for new technologies. The most important internal core value for the interaction between founders and employees was a 'pleasant working climate'. As external core values, founders very often cited that they had especially demanded quality and reliability from external stakeholders. In the closed down companies, the core values had been communicated both verbally and by creating a corporate culture.

2. Boundary System

The Boundary system sets boundaries and rules for the company and its employees. Approximately three quarters of all closed down companies had set financial limits. It is interesting that only half of the founders in phase 2 said that they had only financial limits in their companies. The most common financial limit was the budget. A budgetary limit was given for almost all of the closed down companies. Closed down companies had frequently set regional boundaries. A substantial majority of the phase 1 founders described this type of boundary. It is also interesting that no phase 2 company had focused only on specific regions. The founders here had limited themselves regarding the availability of human resources. This was because they had not been able to perceive any possible chances resulting from the availability

of human resources. It is also striking that a market focus had only been implemented to a very limited extent in these companies, independent of the phase.

3. Diagnostic Control System

The Diagnostic Control System is defined and controlled by the company's goals and key performance indicators. The results show that every company used a strategic and operative reporting system. It is also interesting that a financial reporting system was always used in combination with strategic and operative reporting. Reports and key performance indicators are the two methods that had been most commonly used in closed down companies. The turnover is the most commonly mentioned key performance indicator. Less than a quarter of the companies used formal team meetings. Hardly any founder mentioned that they had informal meetings or project management software in use.

4. Interactive Control System

Uncertainties, risks, opportunities and chances are tracked by the interactive control system. Every founder mentioned risks in the strategic and operative area. An interesting point for the closed down companies is that nearly half of the founders mentioned liquidity risks. The greatest risk is the lack of customer acceptance for the product. This was a main problem especially for companies in phase 1. There have also been risks concerning the founders themselves ('founders clash'). This was mostly the case when a company was managed by several founders. Half of the closed down companies in phase 2 referred to product development risks, but only a few of the companies in phase 1 mentioned this kind of risk. A possible reason for this could be that many companies in phase 1 are still in the midst of development efforts and any problems from product development only become visible in phase 2. Nearly one-third of the founders also described a non-functioning business model as a high risk.

Founders of closed down companies have mostly seen strategic and operative chances. The increase of the customer acceptance of the product was the biggest chance. Nearly a third of the founders recognized a chance due to an improvement of market conditions. Twice as many phase 2 as phase 1 companies named scalability of their business model as an opportunity. For a quarter of the founders, a chance was simply to be a "founder of a company". Working for and developing their own company was described a great pleasure. Fig.1 in the appendix shows the qualitative analysis of the usage of the '4 levers of control' framework in closed down companies. The style of the connection lines shows the markedness of the different factors.

B. Reasons for Closure

The main reasons for closure were a combination of strategic, operative and financial problems. Only a few companies pointed exclusively to financial issues as the cause of closure. No major differences between the two phases were noted in the reasons they gave for closure. Only in cases of the "part-time founder" were there any remarkable differences

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between the two phases. More than twice as many founders in phase 1 than in phase 2 had to close down, because they were only "part-time founders". These reasons primarily affect the product, the turnover, the investors, the founders themselves and the customers. The majority of closed down companies reported having failed because of the lack of product acceptance by the customers. Nearly half of the founders of closed down companies stated that their turnover had been too low relative to the size of their company. Further problems were that no investors could be found and that customers were not satisfied with the product. Fig. 2 in the appendix shows an analysis of the reasons for closing down but because of the sample size of 14 companies the statement of this analysis is limited.

IV. DISCUSSION

In conclusion, it can be said that many of the closed down companies had given too little focus to the important issues. Examples of this are the lack of attention paid to the feedback from external persons, lack of market analysis and often the lack of staying power. Surprisingly not one closed down company in the phase 2 mentioned that they had received feedback from external persons. Furthermore, only a few of the closed down companies had carried out a market analysis. It would thus have been better for closed down companies if they had possessed both a target-oriented vision and the sense of a right to exist because of that vision. The research work results show that the closed down companies limited themselves excessively by establishing too many operational boundaries and setting these too tight. More than half of the companies in phase 1 state that their wish was to operate only in Austria. The Austrian market, however, could well have been too small for some of these companies. This also leads to the second most common reason for closure – the turnover was too low. The most common reason for closure was the lack of product acceptance. The logical consequence here is that a start-up needs both a product which is accepted by the market and a customer who is willing to pay an appropriate price for it. Only when these two conditions are fulfilled can it be possible to generate sufficient turnover to finance all the running costs.

Due to the fact that the most common reason for closure was the lack of product acceptance among the customers, it is very important for company founders to contact external persons and stay in contact with them - especially with potential customers - because this will provide them with essential feedback. The product is more readily accepted by the market when there is feedback from external persons and the customer is also more willing to pay an appropriate price for it. When these requirements are fulfilled the company structure that is needed will be financeable. Company founders should also be sure to undertake a market analysis in order to increase product acceptance. All in all, many of the common reasons for business failure and closure could have been avoided if the company founders had been equipped with sufficient knowledge of the market through market analysis and customer feedback. Moreover, a company founder always requires a great deal of staying power.

One limitation of the research work is that only high-technology companies in the IT sector were investigated. A further limiting factor is that 'only' 14 Austrian closed down companies from the Austrian AplusB incubator have been investigated. Moreover, the interviews were conducted only with the founders of the companies, so the results reflect only the views and opinions of the founders themselves.

Future studies could examine the same issue for companies that had not been in an AplusB incubator or have gone through some other incubator (e.g. a private incubator). Future studies might also consider multiple points of view such as the employee, investor and incubator center consultant perspectives. It would also be interesting for a new research paper to tackle and discuss the same subject, but by investigating companies from other sectors. Finally, a quantitative approach focusing on the same research questions might well prove to be very interesting by either confirming or rejecting the results of this work.

Finally, a quantitative approach with a bigger sample size focusing on the same research questions might well prove to be very interesting by either confirming or rejecting the results of this work.

This paper contains information about MCS usage based on the 4 LOC in the post-incubation phase of high-technology IT companies. Only companies that have already closed down were investigated. Not only the MCS usage is described, but also the common reasons for closure.
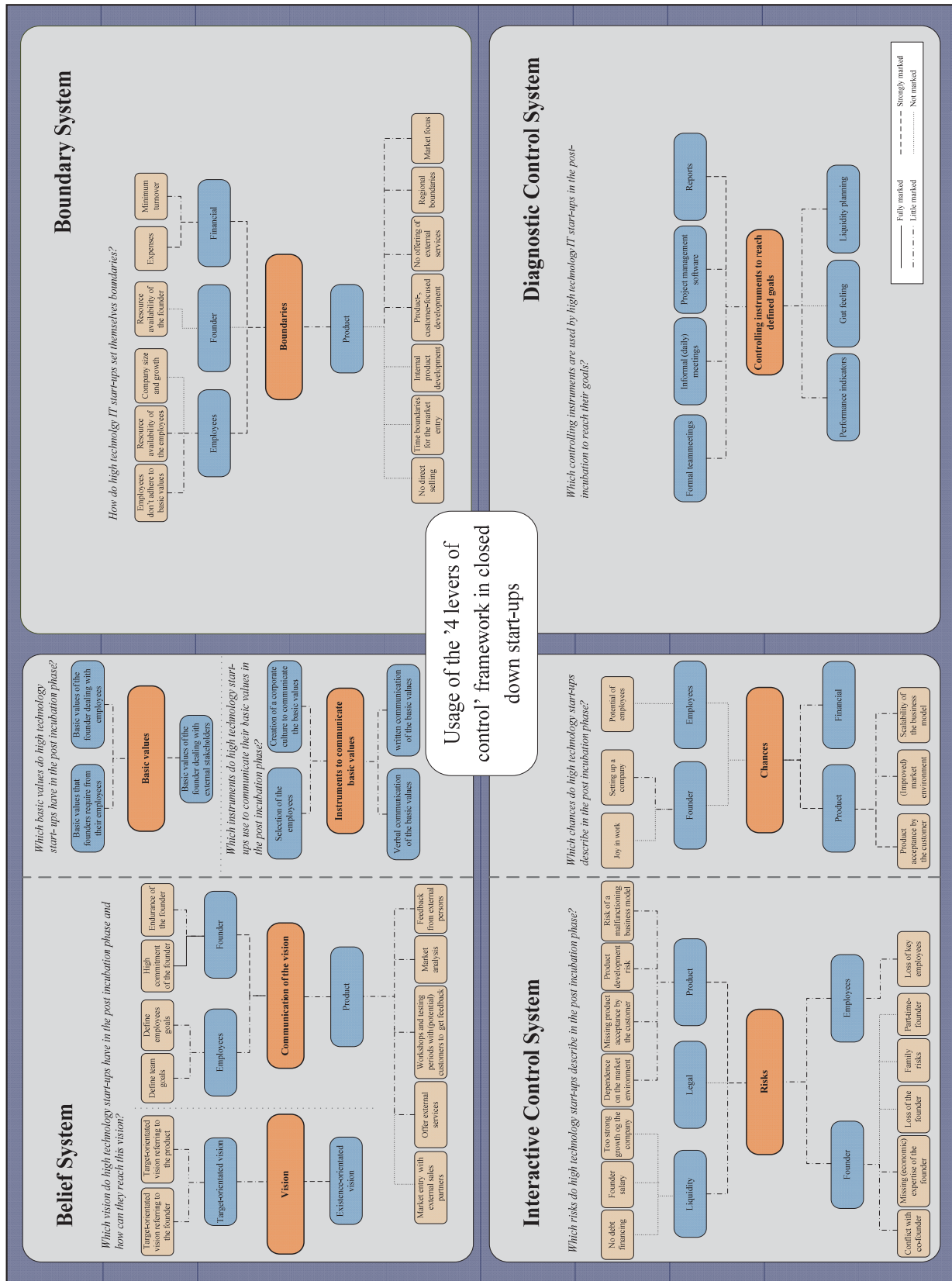
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APPENDIX

Fig. 1 Qualitative analysis of the usage of the '4 levers of control' framework in closed down companies

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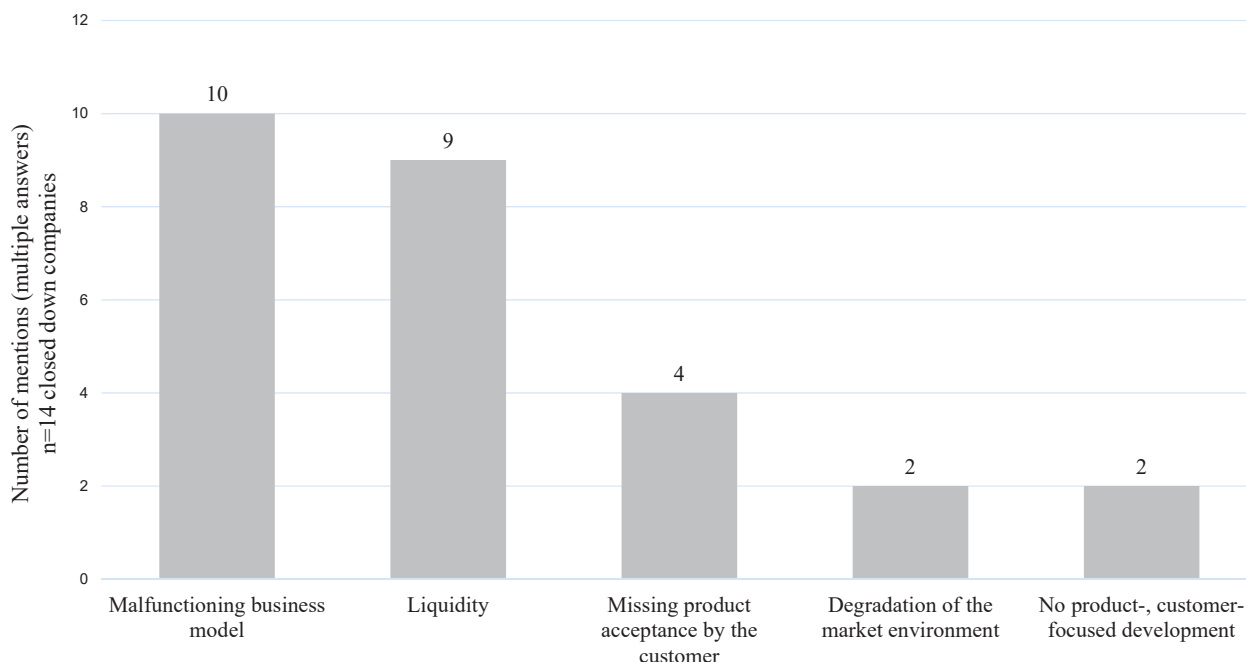Vol:10, No:5, 2016

Most frequent reasons for closing down

Fig. 2 Most frequent reasons for closing down high technology IT start-ups in post-incubation

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