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Management Control Systems in Post-Incubation of High-Technology Start-Ups

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Management Control System in Post-Incubation of High-Technology Start-Ups

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TU GRAZ

STATUTORY DECLARATION

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

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date (signature)

Abstract

Nowadays a lot of start-up companies are growing up in the market. Most of them deal with the development of high-technology and the innovations that enterprises have been creating in recent years.
In the first years of their development start-ups need support from external organizations such as business incubators. In order to create business strategies, business incubators use management control systems (MCS). There are different kinds of management control systems, but in this bachelor thesis the author will put more emphasis in the Levers of Control framework created by Simons. This approach takes into account aspects related to the innovation and creativity that managers should balance to be successful.

During the incubation years, start-ups acquire the essential knowledge to develop their businesses but after this period there is a question: Do all the start-ups survive after leaving the incubator?
There are several studies that try to face this question (Colombo & Delmastro 2002; Schwartz 2008; Flammer & Kacperczyk 2013; Rothaermel & Thursby 2005; Ferguson & Olofsson 2004; Mas-Verdú, Ribeiro-Soriano & Roig-Tierno 2015). The main aim of this Bachelor Thesis is to make a deeply research on the start-ups' incubation, focusing on the post-incubation phase and several aspects connected to this phase. The main obstacle for the development of this thesis is the lack of information related to the post-incubation phase of high-technology start-ups.

During the thesis the author will explain the main concepts related to business incubators and start-ups' framework. Afterwards the research made to find information about the different sub-points and some ideas for an upcoming study related to this framework will be shown. The last point will talk about the firm's survival and the influence of business incubators in this sense.

According to different sources, business incubators are useful to let companies develop their businesses and represent a positive tool that leads companies into a successful approach. On the other hand some authors defend that business incubators are not a synonym of becoming a successful firm.

All the information given in this thesis will be interesting for an upcoming study about the post-incubation of high-technology start-ups that should analyse the different years and the problems that post-graduated firms experiment.

Contents

1 Introduction

The concept of business incubator appeared in Batavia (New York) in 1959 with the creation of the “Industrial Centre” in that city (Aernoudt 2004, p. 128; Lewis, Harper & Molnar 2011, p. 5; Hackett & Dilts 2004, p. 57). According to the Department of commerce and economic development of the United States of America the number of incubators has increased from 1400 in 2006 to more than 7000 in 2011. This growth must to the rising number of start-up companies during the last years (Lewis, Harper & Molnar 2011, p. 13).

During the last years, the concept incubation has being used as a tool in the entrepreneurship world but the meaning of the concept is becoming more and more polyvalent.
Related to the entrepreneurship and the concept of business incubators, Eva Lövstål (2008, p. 14) analyses how managers deal with the balance between entrepreneurial requirements and the professional management requirements.

Quoting Eva Lövstål (2008, p. 15) and her study of management control systems (MCS) in entrepreneurial organizations, an overview about management control systems is given:

“Formal management control systems, such as the ones mentioned previously, can easily be perceived as a contradictory force to entrepreneurship (…) These systems seem to aim at creating order, and at making existent processes more efficient (…) Many management control systems are further based on ideas about stability and predictability, whereas entrepreneurship is surrounded with uncertainty, chaos and ambiguity.”

(Lövstål 2008, p. 15)

Management control systems and entrepreneurship defend opposite points of view but in combination they develop the company vision. Management control systems (MCS) act not only in opposition to the entrepreneurship ideals but also teaching entrepreneurs to organize their companies (Lövstål 2008, p. 16).

In this thesis a deep research will be made in terms of post-incubation phase and the development of the post-incubation firms. There are several studies focusing on the incubation phase but less emphasis has been laid upon analysing the innovations they seek to diffuse and performance of the companies after the incubation period (Virtanen & Kiuru 2013, p. 2; Hackett & Dilts 2004, p. 57). This thesis will try to find further information about

the post-incubation phase and how the incubators affect the firms in their development after the incubation period.

1.1 Categories of Business Incubators

A wide range of goals can be shown according to National Business Incubation Association (NBIA) (Scaramuzzi 2002, p. 5). The main goals for a Business Incubator (BI) would be related to:

- Economic development and generation of new jobs
- Marketing of research investments
- Property venture/real estate development
- Creation of entrepreneurship in transition economies
- Opportunities for national immigrants and nationals graduating abroad
- Development of export production

In Figure 1 Scaramuzzi (2002, p. 5) makes a distinction between typical incubator resources and typical incubator objectives.

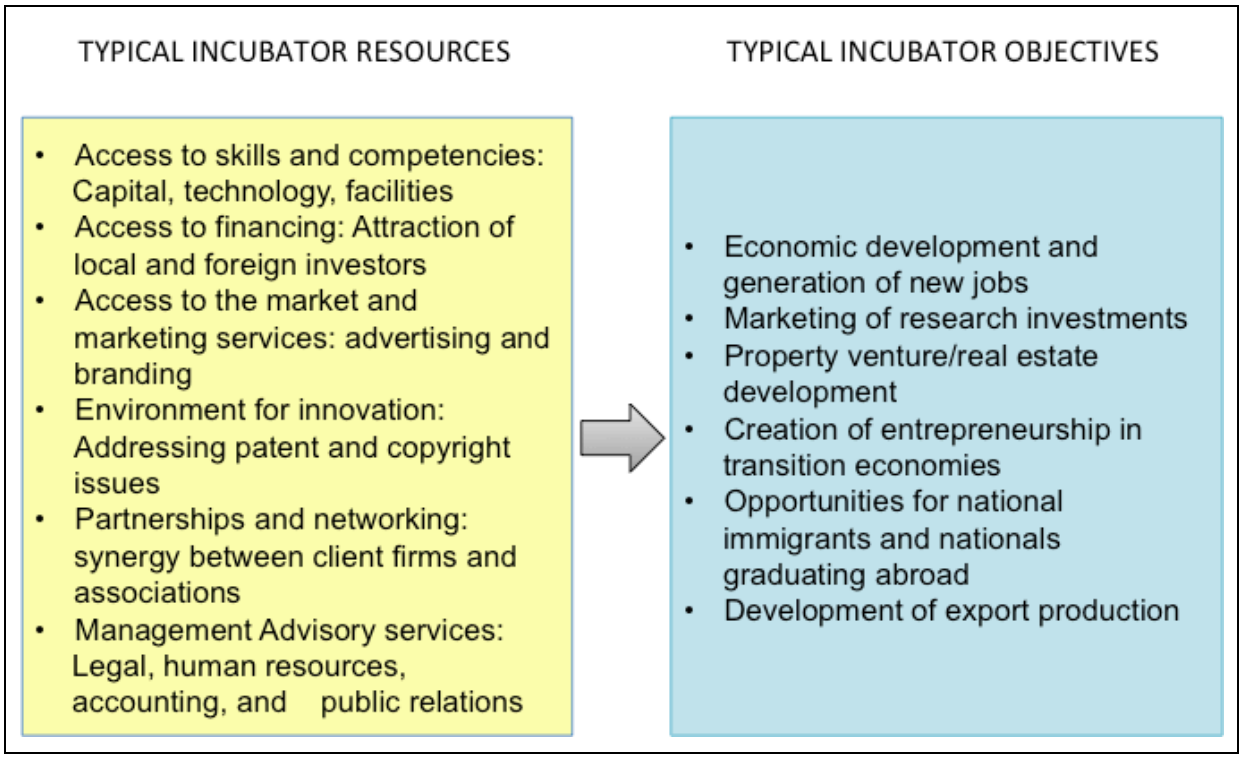

Figure 1: Incubator resources and objectives (Scaramuzzi 2002, p. 5)

Knowing these goals and trying to classify the business incubators (BIs), Lewis, Harper & Molnar (2011, p. 13) divide them according to the most common segments:

- Mixed-use (these incubators foster the growth of all kinds of companies)
- Technology (these incubators foster the growth of companies involved in emerging technologies)
- Service (these incubators foster the development of entrepreneurial firms in the service sector)
- Manufacturing (these incubators assist new enterprises primarily engaged in the manufacturing sector)
- Other

This classification mentioned by Lewis, Harper & Molnar (2011, p. 13) was made to analyse the start-up companies in a stricter way because the standards do not fit all the companies in the same way.

Close to this classification Aernoudt (2004, p. 128) shows another distribution while explaining the history of business incubators. In Table 1 further information is given about the main philosophy, the main objective, the secondary objective, and the sectors involved.

	Main philosophy: dealing with	Main Objective	Secondary Objective	Sectors involved
Mixed incubators	Business gap	Create Start-ups	Employment creation	All sectors
Economic development incubators	Regional or local disparity gap	Regional development	Business creation	All sectors
Technology incubators	Entrepreneurial gap	Create entrepreneurship	Stimulate innovation, technology start-ups and graduates	Focus on technology, recently targeted, e.g. IT, speech-, biotechnology
Social incubators	Social gap	Integration of social categories	Employment creation	Non profit sector
Basic research incubators	Discovery gap	Bleu-Sky research	Spin-offs	High tech

Table 1: Typology of business incubators (Aernoudt 2004, p. 128)

1.2 Evolution of Business Incubators' Concept

The research on start-up companies in the entrepreneurial world has changed along the years due to developments in these kind of enterprises.
At first Business Incubators (BIs) were close to the research institutes or to technical universities focused on building new facilities such as science, technology parks… (Colombo & Delmastro 2002, p. 1105).

Business Incubators in different periods

According to Lewis, Harper and Molnar (2011, p. 14), in the decade of 1980 every study was focused on defining the concept of business incubators whereas during the 1990's decade the studies were focused on the best practices within an incubator besides developing technical incubators around specific industrial and technological clusters.
Later on, the studies have been focusing on the Business Incubators and their benefits for the start-up companies (Lewis, Harper & Molnar 2011, p. 14).
After researching on the field of business incubators in start-up companies, a trend can be shown focusing on the study of business incubators all over the world comparing cases between different countries.

Business incubators, an umbrella word

The NBIA describes business incubation (BI) as a dynamic process of business enterprise development (Aernoudt 2004, p. 127). This approach reinforces the idea of Business Incubators (BIs) as a helping tool.
Due to the variety of support services that lead to different incubation models (Grimaldi & Grandi 2005, p. 111) it is known that the term 'business incubator' is seen as an 'umbrella word' because it covers a heterogeneous reality. Furthermore, there is increasing acknowledge of the importance of the business incubator as a formal mechanism for embedding the new or young company in networks (Bøllingtoft 2012, p. 304)

Studies about Business Incubators

There is a lack of studies related to the current networking methods among tenants and incubators. Thus, the influence of the business incubators in the different start-up companies is shown (Bøllingtoft 2012, p. 304).
Regarding the business incubator model, there is a study form the European Union (Centre for Strategy & Evaluation Services; Directorate-General for Enterprise and Industry 2002, p. i) that shows the main structure of a business incubator.

In Figure 2 there is an input/output relation. The inputs are related to the management resources, the stakeholders and the projects put forward by entrepreneurs. On the other hand, the outputs show the successful companies graduated with positive job and wealth creation impact on local economies.

On the top half of the diagram the key best practice issues are shown (Efficiency, Effectiveness, Relevance, Utility and Sustainability).
For further information about each best practice indicators/issues there is a wider explanation in the document (2002, p. 28).

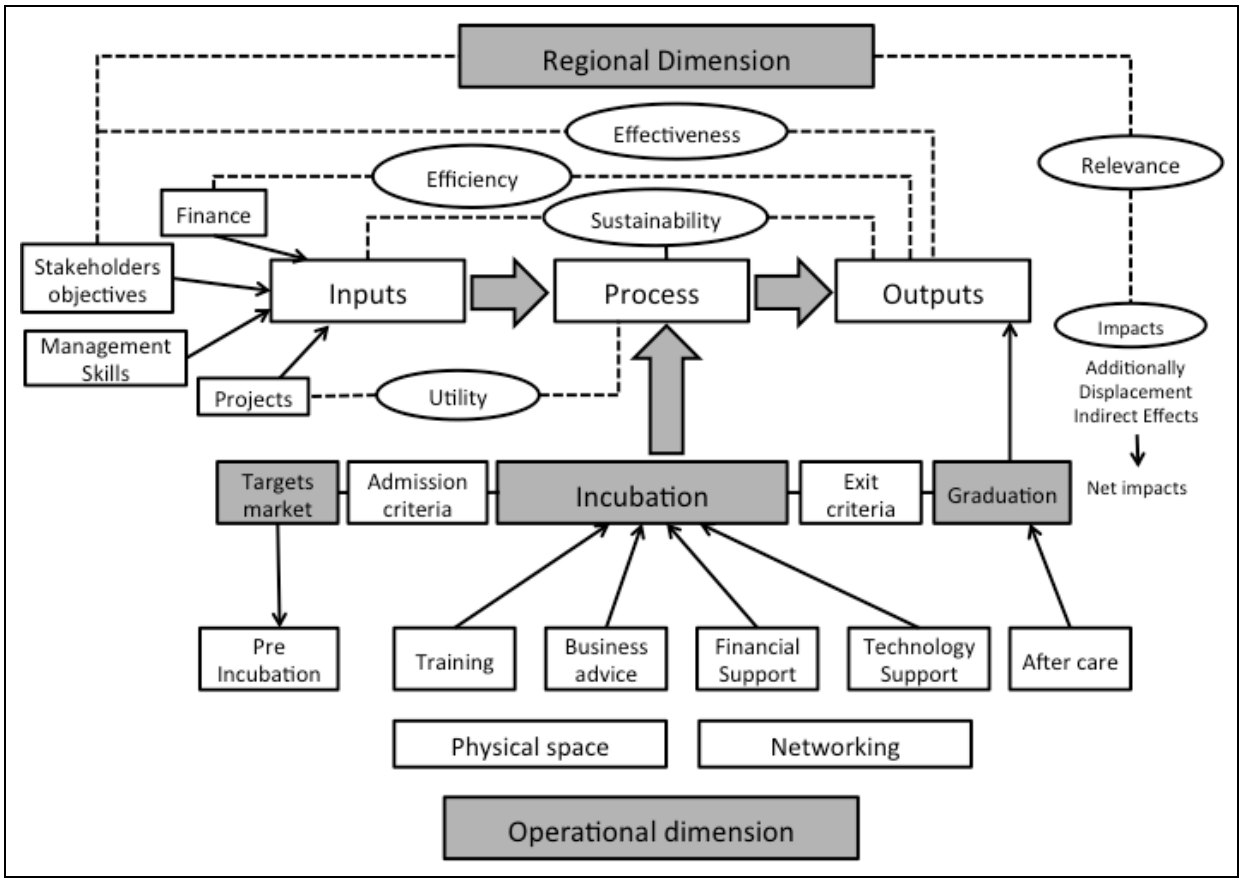

Figure 2: Business Incubator Model (Centre for Strategy & Evaluation Services; Directorate-General for Enterprise and Industry 2002, p. 25)

Before continuing this bachelor thesis, it is important to make clear the concepts of Business Incubators (BI) and Science Parks (SP). Some studies talk about Business Incubators (BIs) and other studies talk about Science Parks (SPs), but both terminologies refer to the same concept. According to Lewis, Harper & Molnar (2011, p. 15) Business Incubators (BIs) are the organizations designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services that could include physical space, capital, coaching, common services, and network connections.

1.3 Start-up development stages

There is not a standard number of phases in the development of a new business but getting information from different sources some similarities can be found. In this point of the bachelor thesis some information will be given to clarify the development phases of a start-up.
There is a classification of the phases according to BBVA (Banco Bilbao Vizcaya Argentaria) talking about new start-ups or IT start-ups. The main stages can be shown in Figure 3:

- Seed stage (concept development, no sales yet)
- Early stage (completion of a marketable range; initial sales and/ or user)
- Growth stages (strong sales and/or user growth)
- Expansion stage (established market participants/ trade sale or IPO occurs or is imminent)
- Exit

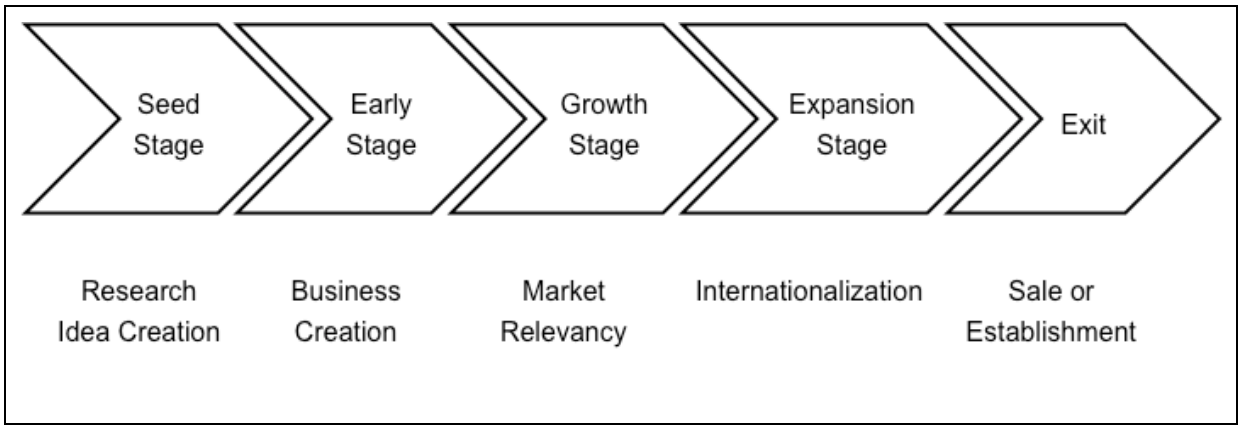

Figure 3: Start-Up development stages from BBVA (Brocal 2013)

Further Explanation of Figure 3:
In the seed stage the start-up creates the idea as the beginning of every enterprise. Here the firm develops the product or service and creates a business model. The investment in this phase is not that important because it is quite easy to start a project.

Talking about the early stage, there is an existing product in the market and customers are able to buy it. The business plan is already developed and you can get the first income. Here you need to add the financing component.

The next stage is the Growth stage where the firm is already established. Now is the time to optimize the products and services that means, improve the points that need an extra effort.

In this phase capital is needed to be able to develop the business. There are different ways of investment such as Business Angels, Venture capitalist or Business Accelerators.
The next phase is the Expansion stage where the idea is to reach other markets and segments. The development strategy should be clear to avoid fails. Here the Venture Capitalists are necessary to make the expansion easier.
The last step is the Exit where the start-up finalizes its growth. It is the moment to find the best solution for the firm whether the Fusion, or the sale maintaining the independence. You can either sell your company to a big enterprise or get into the stock market.

Aforesaid, start-up companies experiment different stages during its development. Another classification of the main “key stages” during the development of the start-up is presented in Figure 4. This is a general explanation of the main stages of a start-up company

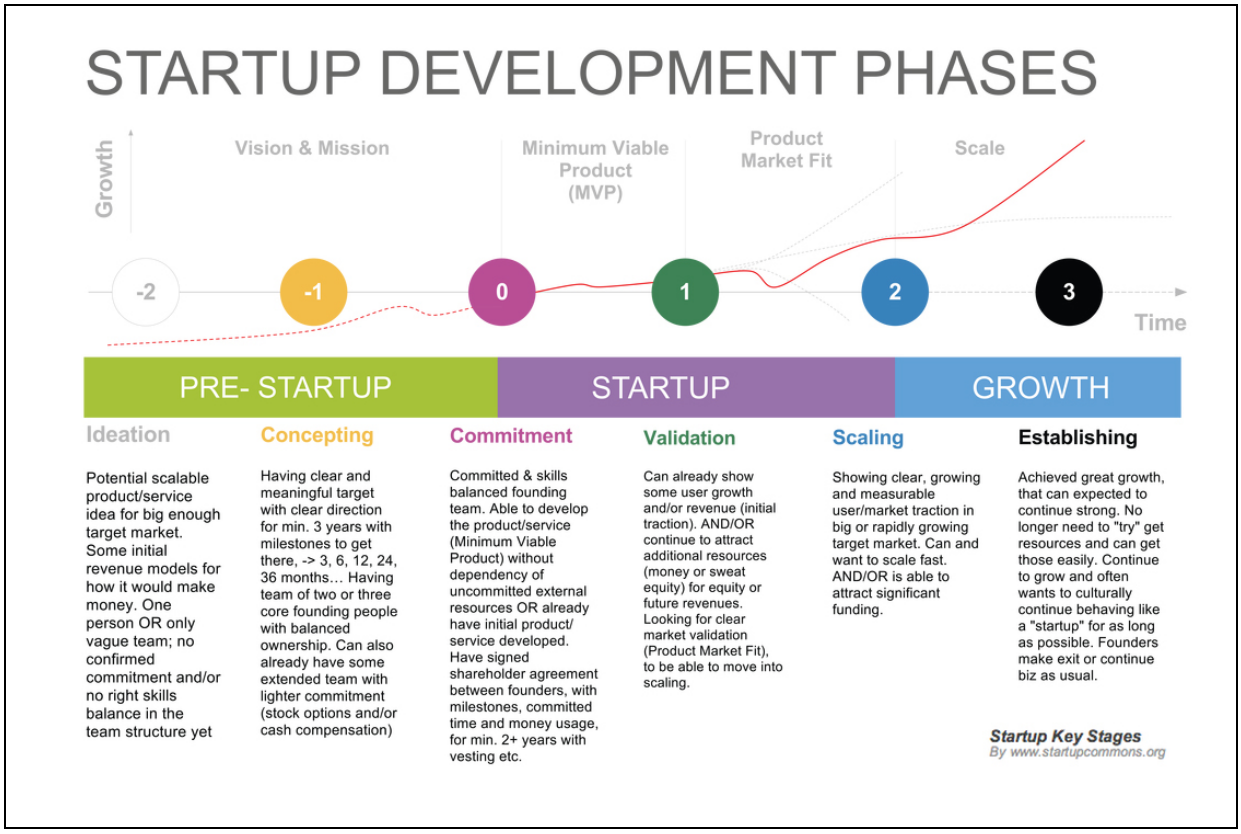

Figure 4: Start-up Development Phases (Startup Key Stages 2015)

A similar description is made by Austria Wirtschaftsservice (AWS) in Figure 5. According to them the stages of a start-up are Pre start-up, Start-up, Growth and International. In this figure there are similarities with the aforementioned description from BBVA. The pre Start-up phase is related to the idea creation and the previous steps towards the creation of a new business (Start-up stage). The Growth stage is linked to the establishment of the firm in the market so that it allows the firm's internationalization.

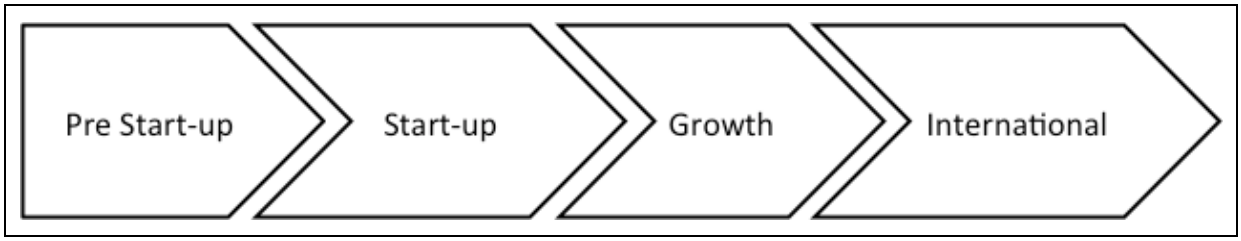

Figure 5: Start-up Development stages (AWS [a] 2015)

In Figure 6 there is an explanation of the main resources an incubator can offer. This example is from the Libya Institute for Advance Studies (LIAS 2015) but can be applied to other business incubators. This organization shows the fields in which a business incubator can be helpful for the development of a start-up.
At the same time Figure 6 shows the differentiation of the main phases of the start-up development and also some examples of the principal services an incubator can offer. In the figure a general overview of the incubator's areas of influences is shown (Training, Connectivity, Financing, Infrastructure and Business services).

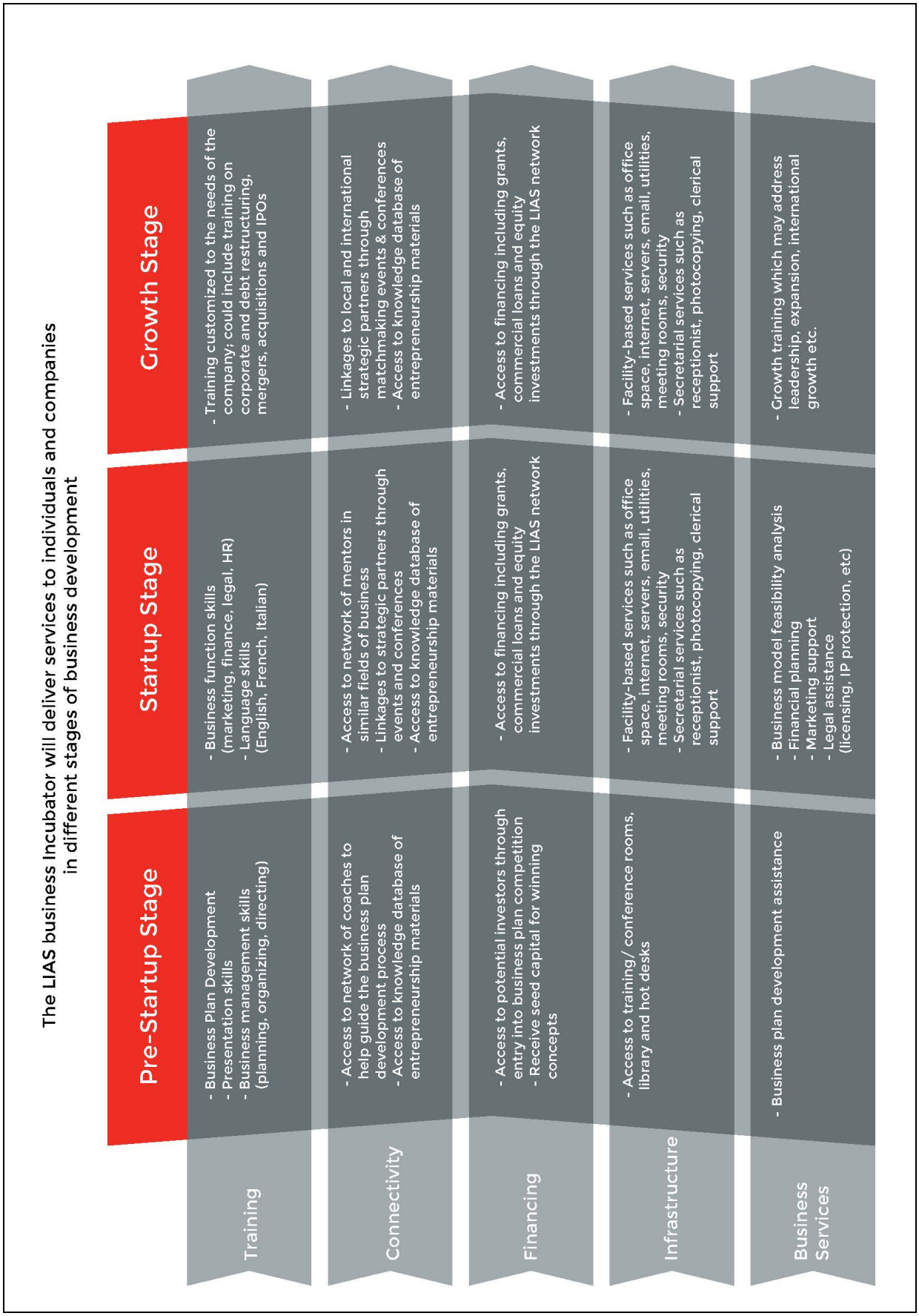

Figure 6: Incubator's Services (LIAS 2015)

Innovation process

In relation to the innovation process, there is a description of the little stages before launching the firm. In Figure 7 an explanation of the main financial issues during the Pre Seed stage is shown to give an overview of the most important points in this stage. In this figure there is a short description starting from the first idea until the foundation of the firm. This approach is based on a financial point of view but also shows the location of the first milestones of a firm.

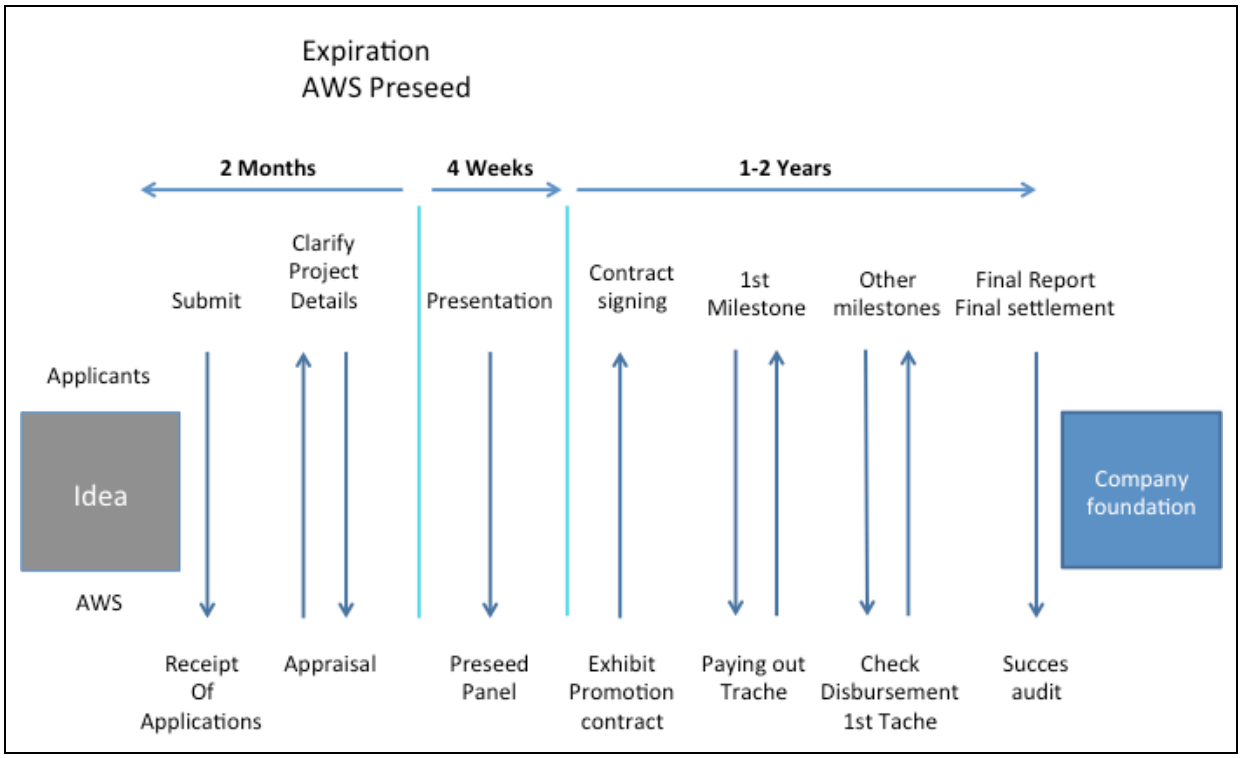

Figure 7: Pre-Seed main points (AWS [b] 2015)

Aforementioned, Figure 7 shows the important steps inside the Pre-Seed phase related to the process of creating a business. In Figure 8 there is an explanation with the main stages during the innovation process. The graph presents a visual description of how the financial requirements increase along the innovation process and, at the same time, it shows that the probability of finding risks is higher at the beginning of the process. As a general description the process of innovation starts with a basic research and then the financial aspects take part into the development of the company.

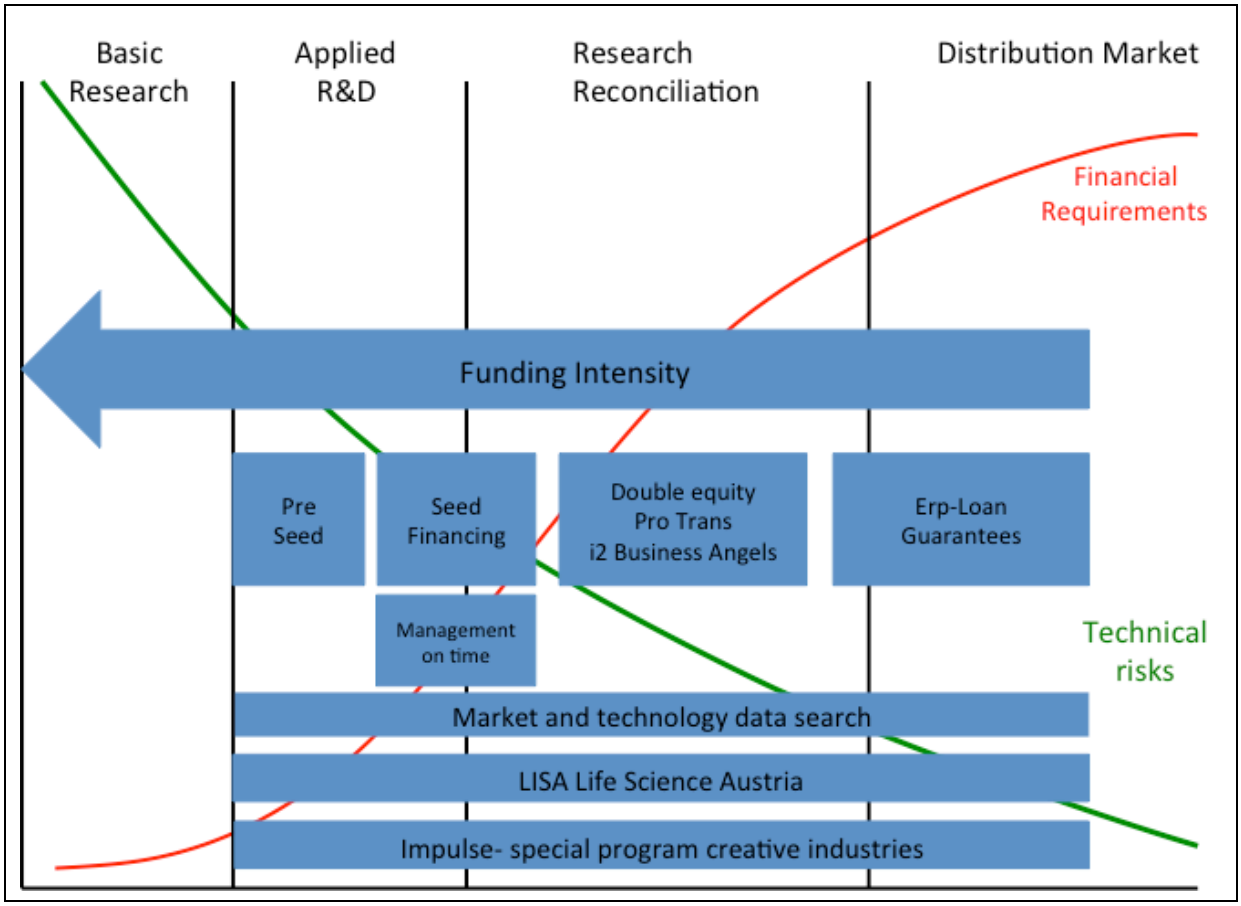

Figure 8: Simplified model of the innovation process, phases and funding instruments (BMWFW 2014, p. 4)

1.4 Economic Impact

Talking about business incubators, their main goal is to let the firms grow into a successful approach. The firms will leave the incubator with an economically stable position within margin and therefore, the whole concept will be related to the "health" of the firm.
Concerning the economic development, the Business Incubators (BIs) used in a proper way can foster job creation, increase wealth creation and, in consequence, develop the country economy.

Incubators' impact on economy

Business incubation is an important economic development tool that fosters job creation, increase wealth creation, and serve as an important contributor to the national economy (Lewis, Harper & Molnar 2011, p. 23).
In addition to the aforementioned approach, Joseph Alois Schumpeter (1934) analysed the economic development in relation to entrepreneurship (Lewis, Harper & Molnar 2011, p. 23). Schumpeter's approach guided the modern literature on the subject even though his study

was made before the creation of the first business incubator. He said that economic development is defined as changes in economic life that come from within, as opposed to forces that are generated outside an economy. According to Schumpeter (1934), the entrepreneur disturbs this equilibrium and is the prime cause of economic development.

In order to develop a study about the influence of the innovativeness in the start-up survival, Hyytinen, Pajarinen & Rouvinen rates (2015, p. 565) take into account Schumpeter's point of view. This study was made before the creation of the first Business Incubator (BI) but as the BIs support entrepreneurship projects that generate value, it´s directly connected to the economic impact.

According to Mas-Verdú, Ribeiro-Soriano & Roig-Tierno (2015, p. 793) incubators produce successful firms; these firms can leave the incubators once they are independent and financially viable. The primary objective of incubators fits within their general purpose, which is to stimulate innovation and regional development. Firm survival measures incubators' impact on economy.

The development of enterprises is growing in popularity as an approach related to community economic development. The main goal is to create wealth for owners and employees by helping entrepreneurs start and grow businesses (Lewis, Harper & Molnar 2011, p. 24).

According to Hackett and Dilts (2004, p. 71) incubators-incubation represent a systematic method of providing business assistance to firms in the early-stages of their development.

2 Methodology

Business incubators have been growing during the last years due to the increasing number of start-ups in the market. Some studies explain the evolution of these tools but not many studies explain the phase after the incubation period where the start-up firms face the market themselves.

To develop the research and answer the questions raised in this paper, relevant literature in the fields of entrepreneurship has been reviewed in order to analyse and get information from a range of publications including:

- High-ranked journals
- Academic thesis
- Scientific publications
- Textbooks and Encyclopaedias

While analysing the data, the first step is to get the information from the sources and get the most important points within the overall structure of the paper.
Once all the papers, thesis, journal articles and books are ready, the process of selecting the useful information starts with a strong classification of the main points in order to organize the information and facilitate the distribution of the relevant points.
All of the information comes from high-ranked journals to be able to give realistic and accurate data in the paper.

The information has been taken from different sources such as Google, Google Scholar, Google Books, SpringerLink, Sciencedirect, Scopus, Emerald Insight, and EcoBiz using similar keywords.
In some cases, the author had to contact the writers of the articles to read them because otherwise it was difficult to get the papers.
Talking about the journals chosen to collect the information, a list of existing journals was analysed to find information as accurate as possible. Following the VHB ranking of 2015, the rates of the journals can be found in Table 2 in order to know how accurate are their articles.
Some of the journals did not appear in this list so they were checked in another ranking from the Australian Business Deans Council (ABDC).

Here is the list of the journals used in this paper with the ratings from VHB ranking:

Journal	**ISSN**	**JQ3**	**Contained in the following part Rating**
Small Business Economics	0921-898X	B	TIE, Entrepreneurship,KMU
Review of Managerial	1863-6683	B	ABWL
Technovation	0166-4972	C	TIE, Entrepreneurship
International Business Review	0969-5931	B	INT
The accounting Review	0001-4826	A+	STEU, RECH
Accounting, Auditing & Accountability Journal	0951-3574	B	RECH, WEW
The Academy of Management	0363-7425	A+	ABWL
Journal of Technology Transfer	0892-9912	B	TIE, Entrepreneurship
Management Accounting Research	1044-5005	A	RECH
Journal of Accounting Literature	0737-4607	B	RECH
Management Science	0025-1909	A+	ABWL
California Management Review	0008-1256	B	ABWL
Business Ethics Quarterly	1052-150X	B	RECH, NAMA, WEW
Accounting, Organizations and Society	0361-3682	A	STEU, RECH
Journal of Business Venturing	0883-9026	A	TIE, Entrepreneurship

Entrepreneurship Theory and Practice	1042-2587	A	TIE, Entrepreneurship
Journal of Financial Economics	0304-405X	A+	BA-FI, STEU
Journal of Enterprising Culture	0218-4958	C	Entrepreneurship
Journal of Management Information Systems	0742-1222	A	WI
Technological Forecasting & Social Change	0040-1625	B	PROD, TIE
Research Policy	0048-7333	A	TIE, ENTRE
Journal of World Business	1090-9516	B	INT, NAMA
Journal of business Research	0148-2963	B	ABWL
The British Accounting Review	0890-8389	C	STEU, RECH
International Small Business Journal	0266-2426	C	TIE, Entrepreneurship, KMU
Theory and Decision	0040-5833	k.r.	OR
Journal of Cleaner Production	0959-6526	B	NAMA
Management Decision	0025-1747	C	ABWL
Journal of Management Control	2191-4761	C	ABWL
International Journal of Technology Management	0267-5730	C	TIE
Management Accounting Research	1044-5005	A	RECH
Omega	0305-0483	B	ABWL

Table 2: Classification according to VHb ranking

According to the Australian Business Deans Council (ABDC) there is an excel document with a wider classification of journals made on 2013. Here the author found some of the papers that were not in the previous ranking.

Journal	**ISSN**	**ABDC 2013 rating**
Journal of Technology Management & Innovation	0718-2724	C
Journal of Business Economics and Management	1611-1699	B
Journal of European Industrial Training	0309-0590	C

Table 3: Classification of journals from ABDC ranking

These are most of the documents found in journals, but there are also documents from conference papers and entrepreneurship webpages. Here are the most significant documents found in the journals:

Small Business Economics:

'Incubators: Tool for entrepreneurship?'

'Business Incubation Centers and New Firm Growth in the Basque Country'

Review of Managerial:

'The effects of the interactive use of management control systems on process and organizational innovation '

'Squeezing or cuddling? The impact of economic crises on management control and stakeholder management'

Technovation:

'The bottom-up business incubator: Leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment '

'Incubator best practice: A framework'

'University-related science parks — ‘seedbeds’ or ‘enclaves’ of innovation?'

'Business incubators and new venture creation: an assessment of incubating models'

'Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany '

Management von Innovation und Risiko:

'Modernes F&E-Projektcontrolling'

Verlag für Controllingwissen:

'Finanz-Controlling: Planung und Steuerung von Bilanzen und Finanzen'

International Business Review:

'Born globals: A cross-country survey on high-tech start-ups'

'Knowledge acquisition and the foreign development of high-tech start-ups: A social capital approach'

The accounting Review:

'Management control systems in early-stage startup companies'

Elsevier:

'Five Pillars of Technology Entrepreneurship'

Accounting, Auditing & Accountability Journal:

'Towards a socially responsible managemen control system '

The Academy of Management :

'Building Theories from Case Study Research'

Journal of Technology Management & Innovation:

'The impact of the Incubator on the Internationalization of Firms'

Journal of Technology Transfer:

'Science Parks and the Development of NTBFs-Location, Survival and Growth'

'A systematic Review of Business Incubation Research '

Management Accounting Research:

'A conceptual development of Simons' Levers of Control framework'

Journal of Accounting Literature:

'Contingency-based research on management control systems: Categorization by level of complexity'

Management Science:

'The Impact of Stakeholder Orientation on Innovation: Evidence from a Natural Experiment'

California Management Review:

'Models of Innovation: Startups and Mature Corporations'

Business Ethics Quarterly:

'The normative theories of business ethics: a guide for the perplexed'

Accounting, Organizations and Society:

'Organizational culture and performance measurement systems'

'Assessing the organizational fit of a just-in-time manufacturing system: Testing selection, interaction and systems models of contingency theory'

'Creating dynamic tensions through a balanced use of management control systems'

Journal of Business Venturing:

'Does innovativeness reduce startup surival rates?'

Entrepreneurship Theory and Practice:

'Toward entrepreneurial organizations: Meeting ambiguity with engagement'

Journal of Financial Economics:

'Theory of the firm: managerial behaviour, agency costs, and ownership structure'

Journal of Business Economics and Management:

'Management control systems and stakeholders' interests in Lithuanian multinational companies: Cases from the telecommunications industry'

Journal of Enterprising Culture:

'Entrepreneurship education: Empirical findings and proposals for the design of entrepreneurship education concepts at universities in german-speaking countries'

Journal of European Industrial Training:

'Knowledge management as a service: co-operation between small and medium-sized enterprises (SMEs) and training, consulting and research institutions'

Journal of Management Information Systems:

'Impact of Information Technology Management Practices on Customer Service'

Technological Forecasting & Social Change:

'Application of information technology in creative economy: Manufacturing vs. creative industries'

Research Policy:

'Science Parks and the growth of new techonolgy-based firms-academic-industry links, innovation and markets '

'How effective are technology incubators? Evidence from Italy'

'Incubator firm failure or graduation? The role of university linkages'

Journal of World Business:

'How valuable is information and communication technology? A study of emerging economy enterprises'

Journal of business research:

'Firm survival: The role of incubators and business characteristics'

'Founders' experiences for startups' fast break-even'

The British Accounting Review:

'Management control and performance management: whence and whither?'

International Small Business Journal:

'Realizing Potential: The Impact of Business Incubation upon the Absorptive Capacity of New Technology Based Firms'

Procedia- Social and Behavioral Sciences:

'Evolution of Management Controlling Framework: Literature Review'

Theory and Decision:
'Economic modeling triggers more efficient planning : An experimental justification'
Journal of Cleaner Production:
'Exploring the path from management systems to stakeholder management in the Swedish mining industry'
Management Decision:
'An integral framework for performance measurement'
Journal of Management Control:
'Management control systems: a review'
Betriebswirtschaftslehre für Technologie und Innovation:
'Technologiezentren und Erfolg von Unternehmensgründungen'
International Journal of Technology Management:
'Technology centers in Germany: economic justification, effectiveness and impact on high-tech regions'
Management Accounting Research:
'A conceptual development of Simons' Levers of Control framework'
Omega:
'Links between Higher Education Institutions and High Technology Firms'

All the researches have been based on the next keywords: Start-up company, Entrepreneurship, Technology-based, High-Technology, Incubator, Incubation, Life-Cycle management control systems, Levers of Control, Post-incubation, Graduation… and combinations of these words.

There was not much information related to the post-incubation period due to the lack of studies about this phase. The whole bachelor thesis tries to add more knowledge about this phase from the studies found on the reference sources and the data taken from papers that expose empirical studies about existing firms.

3 Investigating at IT-High-Technology Start-Ups

3.1 Introduction

Nowadays, most of the start-up companies are settled in the high-technology environment (Aernoudt 2004, p. 129), for this reason the study will be focused on explaining the incubation process in this area. One of the first documents that dealt with the information concept within a business environment was “The Information Economy: Definition and Measurement” by Porat (1977). Another source that takes into account the importance of new technologies and the IT growing trend is (Keese 2014) and his book about Silicon Valley. Keese (2014, p. 182), talking about the automotive industry, describes that around 40% of value is already digital which means that the industry is moving to a more technology-based approach.

The research promotion agency from Austria (FFG) “Forschungsförderungsgesellschaft” defends that information and communication technology (ICT) is the “lifeblood of the economy”. Nowadays this is one of the most important sectors because it raises productivity and it makes an important contribution to the economic growth. According to the European Commission Austria is set in the upper middle range in the field of ICT applications, research and development. According to FFG (2014) information and communication technology is one of the most important sectors in the field of research, development and innovation.

Information Technology (IT) in the actual world

Luo & Bu (2015, p. 1) in their study about the information and communication technology (ICT) behold new trends, challenges, and opportunities for today’s technology entrepreneur. The development of these new start-ups has affected the business development worldwide, including emerging economies. The main reason of this increase is the development of the Internet and the new technologies related to the mobile phones.

Nowadays, the world is experimenting the information era and so do businesses whose routine operations and management increasingly rely upon information and communication technologies (ICT) investment. In order to grow and be successful, new businesses necessitate a well-functioned ICT system to foster knowledge flow, sharing, and integration (Luo & Bu 2015, p. 10).

Impact of Information technology (IT)

In order to know about the importance of the information technology within the firms there is a study (Kyung Sung 2015, p. 111) analysing the impact of this tool. According to the author the application of IT provides several kinds of competitive advantages contributing to the

corporate performance. The main advantages of IT implementation are the efficiency threat, functionality, attack, and integration. Kyung Sung (2015, p. 115) explains deeply the competitive advantages by giving facts of each trait.
Kyung Sung (2015, p. 118) defends that firms in creative industries should seriously consider IT traits of efficient and threat while firms in manufacturing industries should deeply take IT traits of efficiency and integration into account.

According to the first chapter of the book “Technology Entrepreneurship: Taking innovation to the Marketplace” (Duening, Hisrich & Letcher 2015, p. 3) all technology entrepreneurship is a global movement. Innovation, competition, and disruptive technologies can emerge anywhere on the globe and rapidly disseminate to markets around the world. Thanks to the Internet, the development of these new technology start-ups has become easier and a lot of innovations are appearing in the marketplace. Nowadays entrepreneurs have the social pressure of growing as fast as possible to go from the innovation to the market in order to build their businesses.

The second chapter of “Technology Entrepreneurship: Taking innovation to the Marketplace” book talks about five pillars of Technology Entrepreneurship. The five pillars presented in the chapter are:

- Value Creation
- The Lean Start-up
- Customer Discovery and Validation
- The Business Model Canvas
- The Entrepreneurial Method

Explanation of the five pillars
Referring to the first pillar the fact is that every business is based on creating value for customers. The “value” concept has a huge number of possibilities. It is defined as whatever customers believe it to be. Indeed, it is very important to know about customer’s needs because sometimes the misunderstanding on defining the value can cause the fail of a start-up (Duening, Hisrich & Letcher 2015, p. 19).

The second pillar was created by Eric Ries, a serial entrepreneur (Duening, Hisrich & Letcher 2015, p. 20). The lean start-up is a particularly compelling framework for technology entrepreneurs because they have opportunities to learn customer needs and wants with less-than-perfect finished products.

According to (Duening, Hisrich & Letcher 2015, p. 23) customer discovery and validation should be the primary focus of technology entrepreneurs during the start-up phase.
The fundamental idea of this approach is to turn guesses about markets, customers, marketing channels, and pricing into facts.
Talking about the fourth pillar (Duening, Hisrich & Letcher 2015, p. 26), it is very important to recognize that business models are not declared and then executed at the launch of the venture, but instead have to be discovered through interaction with customers. In this sense a business model precedes the development of a business plan. Start-up companies use the canvas model in an iterative way so that they can find out what has to be adjusted even if they are checking another segment of the business model.

In the last pillar the authors show four principles that have been identified as part of the entrepreneurial method (Duening, Hisrich & Letcher 2015, p. 30). The principles defend that expert technology entrepreneurs believe value creation is the primary purpose of their business, rebound personally and professionally from failure, respect private property and uphold contractual obligations and, respect the judgement of the marketplace.

Foreign development of high-technology start-ups

Presutti, Boari & Fratocchi (2007, p. 23) defend that the foreign development of high-tech start-ups is an important issue because, as international activity, it requires specific knowledge that new firms may find difficult to locate and acquire. In this study the authors analyse the importance of the knowledge acquired from external relationships while reinforcing the foreign development of a global high-tech start-up.
High-technology start-ups have an international perspective since the early beginning of their creation. According to Presutti, Boari & Fratocchi this is due to both their high-tech products and their founders with significant internationalization experience (2007, p. 25).

3.2 Interest for an upcoming study

3.2.1 What do we don't know?

This information technology (IT) approach is really new and the use of information within the companies is getting bigger and bigger with the new technologies and the development of the communication tools like the Internet. As a barrier, there is always an uncertainty on how the business will develop and which direction it will take in an early future. There are always innovative approaches that can change the development of the whole industry creating a period of insecurity due to the lack of information on how the business will react.

Study new possibilities

Luo & Bu (2015, p. 11) measure firm productivity or performance only by sales per employees and they are aware the necessity to look at other important measurements of performance or competitiveness. They add that the utilization of Information and Communication Technology (ICT) may contribute to various outcomes and they suggest that the study of these systems in different countries and economies would be good to understand a general overview of the systems.

Lack of research instruments

Karii, Somers & Gupta (2001, p. 147) show some limitations of the use of Information technology. The main limitation is that, as a new tool for the development of a company, there is a lack of research instruments to measure Information technology (IT) management practices and their impact on marketing and operations functions. The main purpose for future studies is to attempt to theoretically construct and empirically validate research scales for conducting further empirical work in this area.

Research on conditions and relations that allow firm's success

In their study, Cannone & Ughetto (2014, p. 280) say that literature has ignored the differences that exist among born global firms and the market scope dimension has often been neglected. At the same time they suggest that a deeper understanding of the conditions under which born firms are likely to prosper, could stimulate policy makers to sustain a firm's early internationalization through appropriate support programs. By the end of their document they defend that the understanding of the interconnections that exist between the personal characteristics of the entrepreneurs, a firm's strategies and resource bases, and the institutional, industrial and economic environment needs to be further developed to gain a deeper understanding of the born global phenomenon.

3.2.2 What should we look on?

Trends within the Information Technology (IT) industry

According to Moore (2011, p. 2) over the past decade, there has been a fundamental change in the axis of Information Technology (IT) innovation. Few years ago, new systems were introduced at a very high end of the economic spectrum.

Moore (2011, p. 2) also shows that this trend is not relevant to the issues of business. He defends that the planet is wiring a new nervous system pressuring the organizations to participate in the planet's future.

Moore (2011, p. 2) explains the idea in an easy way:

"To be more specific, amidst the texting and Twittering and Facebooking of a generation of digital natives (…) For them, it is clear, there is no going back. If you expect these folks to be your customers, your employees, and your citizens, then you need to apply for their expectations to the next generation of enterprise IT systems"

(Moore 2011, p. 2)

Approaches in the IT

Moore (2011, p. 3) emphasises that there is a personal mental model of each individual person that is holding people back from this information technology approach. At first, the approach deals with the "Systems of Record" and the data processing mentality, but these systems are not perfect. Even though the system is not perfect, the last decade has been one of increasing optimization according to Moore.

The next theories are based on the "Systems of Engagement" that complement deep investments in systems of record. Companies are expanding their reach both organically and through acquisitions focusing on their core business, core competences, and core differentiation. In this sense business has become much more collaborative than ever before. There will be new collaboration capabilities; these are IT-enabled services that allow groups of people to interoperate both synchronously and asynchronously.

Evolution on the concept during the next years

Moore makes a prediction for the evolution of the concept between 2010 and 2020.Moore (2011, p. 5) defends that content management, as a discipline, grew up in the era of systems of record. At first it was concerned with supplementing and complementing transaction database systems with non-transactional data (typically documents or drawings or images). Over the past decade implementation practices have matured, the core technologies have

become stable and mature, and the focus has been on documenting and sharing return on investment for proven systems. Nowadays, companies are facing an avalanche of information and to be able to survive to this avalanche the traditional definitions of control and governance have to be adapted to the new approaches.

How managers implement technology to overtake the tasks

By the end of his paper, Moore (2011, p. 7) presents five steps for the Chief Information Officer (CIO) of the company. These steps are useful because CIO can use them as a reasonable roadmap for leading the establishment of an enterprise's IT. The idea is to focus on empowering knowledge workers and middle managers so that they can negotiate the complexity of global supply and delivery chains in real time. The author clarifies that these are not solutions; they are applicable uses of the new technology that can be controlled. He difference between two kinds of enterprises: Business-to-Business (B2B) or Business-to-Consumer (B2C).

<u>B2B enterprises:</u>

- Make meetings work better across time zones
- Address complex issues collaboratively
- Keep collaborators connected for faster decision making
- Mine community content to extract insights to enhance the business
- View collaboration and social systems in context

<u>B2C enterprises:</u>

- Use social media to attract and hold consumer attention
- Use social media to extend and improve customer service
- Use social media to develop deeper brand relationships and consumer insights
- Integrate social media with systems of record to provide a better end user experience
- Mine metadata to personalize offers for greater relevance and conversion

4 Investigating the Post-Incubation of High-Technology Start-Ups

4.1 Introduction

Business incubators are one of the most common tools in the entrepreneurship world (Bergek & Norrman 2008; Bøllingtoft 2012; Lewis, Harper & Molnar 2011; Virtanen & Kiuru 2013). According to Aernoudt (2004, p. 1) it is known that Business Incubators (BIs) in United States are more develop comparing to the European ones, but nowadays the gap between them is not that big due to the recent development.

Talking about the post-incubation phase, most of the studies (Engelman, Carneiro Zen & Madalena Fracaso 2015) are researching about the influence of the Business Incubators (BIs) in the entrepreneurial process. The idea is to check the performance of different firms once they are graduated from the incubator and check how good they behave in the "real world". According Engelman, Carneiro Zen & Madalena Fracaso (2015, p. 30) the studies have begun to look into their contributions and limitations, in order to bring improvements and provide better outcomes for the businesses and society, since many of these incubators are used for public resources.

In terms of globalization, Engelman, Carneiro Zen & Madalena Fracaso (2015, p. 30) suggest that technology incubators should provide incubated businesses services and actions, besides those generally available, designed to promote their internationalization.

Engelman, Carneiro Zen & Madalena Fracaso study (2015, p. 32) focuses on how business incubators help the internationalization of a company. Seeking business opportunities abroad is one way of supporting enterprises. Within this context, there is the installation of international incubators, such as the American International Business Incubator in Silicon Valley and the Austin Technology Incubator in Texas. After all the study Engelman, Carneiro Zen & Madalena Fracaso (2015, p. 36) conclude that incubation positively affects the internationalization of companies.

4.2 Interest for an upcoming study

4.2.1 What do we know?

Period of Incubation

Concerning the period of incubation, there is not a standard number of years and there are several studies defending different periods of incubation. Comparing all theses studies, most of the researches follow Aernoudt's (2004, p. 129) approach of 3 years as the ideal incubation period.

Engelman, Carneiro Zen & Madalena Fracaso (2015, p. 30) defend that small businesses, especially start-ups, may need a great deal of assistance in the process of consolidation and to achieve internationalization.

Post-incubation, an important step

The post-incubation phase is the one right after graduating from the incubator. According to Schwartz (2008, p. 5) little is known about the survival or exit dynamics of firms after leaving the Business Incubator (BI). He qualifies the post-graduation as a crucial issue for the survival of the companies and with his study he tries to add information about the duration of survival of the companies analysing 149 graduate firms in the post-incubation period.

As Schwartz (2008, p. 7) defends, few studies are focused on survival firms. That is why in the last point of this bachelor thesis an analysis about existing and failed start-ups will be shown to have an overview of the importance of being in an incubator.

Importance of the period of incubation

There are some hints that defend the fact of being longer in the incubation phase due to some benefits (Steinkühler 1993).

Concerning these benefits, Flanschger, Winkler & Reinisch (2012, p. 1) did a research within the Austrian companies' framework to get more information. The made a survey within 500 high-technology companies and they found out that support after the incubation period is being favoured. As a conclusion they defend that time for post-incubation is not clear at all.

4.2.2 Are there any similar studies?

Only few authors have been researching about the survival of incubated firms and the years of incubation. Along this point some studies will be shown.

4.2.2.1.1 Rudy Aernoudt

According to Rudy Aernoudt (2004, p. 128), a business incubator's main goal is to produce successful firms that will leave the incubator financially viable and freestanding within a reasonable delay. Aforesaid, Aernoudt defends (2004, p. 129) three years as the perfect incubation time.
During these years the Incubators provide different kinds of services focusing on management, access to finance, legal advice, operational know-how and access to new markets.
Aernoudt explains (2004, p. 127) that in the process of incubation you have some critical success factors such as Community, Incubator, Incubatee (with the subcategories).
The idea of the incubator is to cope with different market failures and try to keep the gap with them. All of these measures are really important to avoid a possible failure in the post-incubation process where the start-ups are exposed.

Aernoudt (2004, p. 130) compares the different technology incubator objectives in between different countries. For example in Spain and Belgium he says that the idea is to attract branches of multinational firms whereas in Germany the main interest is to develop clearly innovative start-ups.
Aernoudt (2004, p. 130) explains that France and Netherlands are focused on the university model. According to Aernoudt (2004, p. 131) the entrepreneurial movement has grown in Europe along the years. This fact is seen with the Business Innovation Network (EBN) created in 1984. Since then, 150 Business Incubator Centres (BICs) have been developed across 20 countries.

Aernoudt (2004, p. 132) explains the analysis of entrepreneurship and start-up financing taking into account 3 concepts:

- Entrepreneurship is still considered to be an anomaly in most European countries. A lack of entrepreneurship is at the same time an obstacle for a real incubator, and a determinant for change.

- Incubators have grown very quickly in Europe but have been integrated in a non-profit culture. They want to contribute to a regional or local development.
- Business angel networks do provide, through their angels, financing and hands-on management to start the companies. The main problem in Europe for these organizations is the lack of good projects, the lack of entrepreneurship…

4.2.2.1.2 Michael Schwartz

Schwartz (Schwartz 2008) analyses the survival of the firms according to the hazard rate, which is basically the firm's probability that a market exit occurs in a given interval after the graduation from the BI, under the condition of having survived until the beginning of that interval.

Risk of failure

There is a comparable high risk of failure just after leaving the incubator. Until the 4th year after leaving the Business Incubator (BI), the risk of failure decreases monotonically.

Regarding the exit rules, Schwartz (2008, p. 21) says that there are also important sectorial factors that influence these rules. Concerning biotechnology incubators, tenants will require lengthier incubator stays than 3-5 years.

Schwartz (2008, p. 11) noticed that from the total number of 36 failures right after the graduation, one third occurred during the 1st year after leaving the incubator. During the 2nd year there were 5 cases of failure and in the 3rd year another six cases. The whole study showed that 66.6% of all post-graduation firms did not survive the 3-year period.

4.2.2.1.3 Dean Patton

Patton (2013) researches about the impact of business incubators on new technology-based firms (NTBFs).

According to Patton (2013, p. 1) firm growth is dependent upon knowledge acquisition and application. This affects the development of early stage firms where founders have limited business experience, resources and network alliances to inform this process.

Concerning technology business incubators, Patton (2013, p. 5) shows that differences in effectiveness are apparent. Related to this study there is another study mentioned (Rothaermel & Thursby 2005) suggesting that University Technology Business Incubators (UTBIs) should facilitate technological knowledge flows and extra information from university

in order to enhance firm performance. Nevertheless, the main finding indicated that a firms' absorptive capacity was an important factor when transforming university knowledge into firm level of competitive advantage.

Evaluating incubation

As a fact Patton (2013, p. 5) suggests that a more productive approach to evaluate the contribution of incubation lies in analysing the process whereby potential benefits might be generated. The idea is to find how incubator managers can actively work with founders to enhance their commercial expertise, using the resources from the Business Incubators (BIs). Patton (2013, p. 7) develops a study within the firms from Southampton and Bristol university incubators. These firms have two years of incubation experience. The concept in this two companies deals with the 'business acceleration' format, which helps firms to commercialise technological ideas. The incubation support is shown overall in the strategic planning, the development of the management team, and secure investment.

As a conclusion from the studies Patton (2013, p. 14) says that, to successfully develop a business from the innovations, firm founders must absorb but also appropriately exercise managerial knowledge and expertise. During the paper it is shown how university technology incubators can assist firm founders to recognize problems and effectively give the required knowledge and skills to address such gaps. The paper is limited to the study and the sample of two incubators but it reflects an overview of high-technology incubators.

4.2.2.1.4 U.S. Department of Commerce (David A. Lewis, Elsie Harper and Lawrence A.Molnar)

In this paper Lewis, Harper & Molnar (2011) explain the whole impact of business incubators in US comparing different models based on a: sectorial focus, organizational framework, incubation model, and location factors.

Maturation period

According to Lewis, Harper & Molnar (2011, p. 62), there is a fact concerning the new start-ups. Whether receiving business incubation service or not, start-up firms have a critical maturation period of about five years. The U.S. Small Business Administration estimates that around half of the firms (49%) cease operations during these five years. In the first years of development the improvements are really slow until the enterprise reach the "take-off" phase, 3 to 5 years after their beginning.

This study defends that business incubators are designed to buffer start-up companies from stiff market forces by providing access to capital, managerial expertise and marketing assistance. The incubation period according to (Knopp 2007; Lewis, Harper & Molnar 2011, p. 62) is 33 months.

Once the firms reach the “take-off” phase and the companies graduate from the incubator period it is possible to notice the growth of the firm because otherwise, during the period of growth, the companies are still receiving direct assistance from the incubator program and they cannot show much growth.

4.2.2.1.5 I. Semih Akçomak

Akçomak & Semih (2009) from the university of Maastricht, compare the Business Incubator phenomenon in different countries. Talking about the key factors, tenant firms are expected to be self-sustaining after spending three or four years in an incubator.

Reading about the Chinese case, Chinese firms are required to reach self-sufficiency in three years but they seldom accomplish this target. Incubators who depend on the government are found to be less active in providing a variety of internal and external financial services.

4.2.2.1.6 Markku Virtanen and Pertti Kiuru

Virtanen & Kiuru (2013) presented a paper in the 58th International Council for Small Business World Conference in Puerto Rico. In their paper, the authors analyse the post-incubation phase of different firms. The data was taken from 2005 to 2011.
The researchers followed each firm for a minimum of 4 years to measure the performance of the firms. Virtanen & Kiuru (2013, p. 8) found that, in the last four-year period (2008-2011), 28% of the sample firms grew substantially after their incubation period.

The authors talk about “gazelle” companies refereeing to high growth companies that increase their revenues in a fast way. In Figure 9, Virtanen & Kiuru (2013, p. 8) show the gazelle’s distribution:

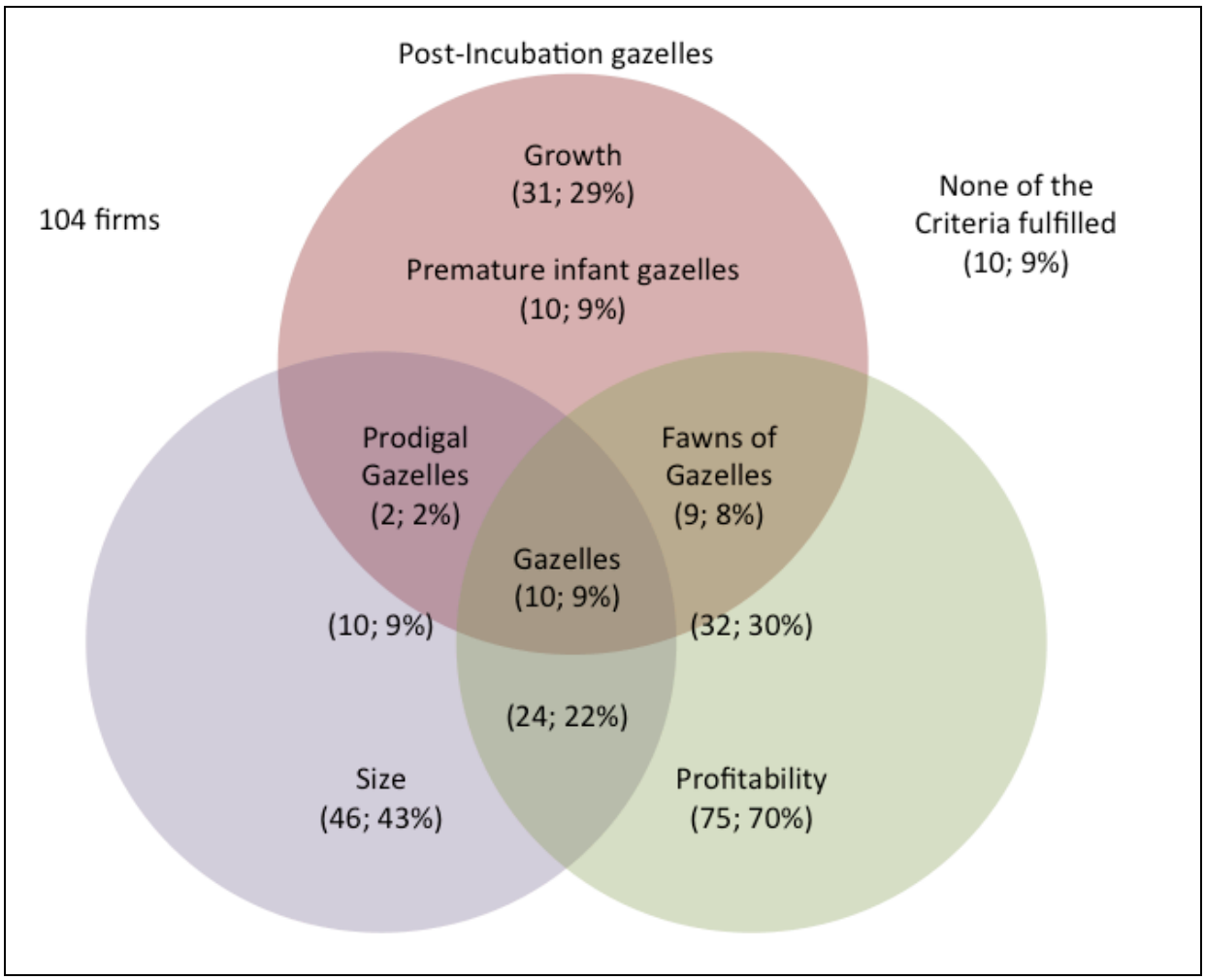

Figure 9: Gazelle's distribution (Virtanen & Kiuru 2013, p. 8)

Quoting Virtanen & Kiuru (2013) and their explanation of the picture:

“The distribution of the gazelles was such that 9% of them where real gazelles which were simultaneously growing, profitable and achieved also the required size. The same amount of high growth businesses was classified as premature infant gazelles. The share of fawns of gazelles was 8% and prodigal gazelles 2%. It should be pointed out that the share of those post incubation companies, which fulfil the profitability condition, is 70%.”

(Virtanen & Kiuru 2013, p. 8)

4.2.2.1.7 Flanschger, Winkler & Reinisch

In this short conference-paper from the Graz university of Technology (Austria) Department of Business Economics, there is a general study from 500 high-technology incubators in Austria.

Advantage of being in an incubator

From their study Flanschger, Winkler & Reinisch (2012, p. 7) defend that companies who were part of an incubator, have advantage over other companies in getting public financial support. At the same time, they show that the influence of business incubators is bigger during the years of incubation than after the incubation period.

The authors use the explanation about management control systems in early-stage start-up companies from Davila & Foster (2007, p. 909) to analyse the influence of management control systems during and after the incubation period. Talking about the incubation period they defend that management control systems can be a performance advantage for the company.

Concerning the after incubation phase, Flanschger, Winkler & Reinisch (2012, p. 7) mention the role of management control systems as an important fact because the assistance of the incubator is no longer given.

Flanschger, Winkler & Reinisch (2012, p. 8) quote different ideal incubation periods from other studies and, afterwards they defend that it should be examined in what way the impact of the incubator affects the start-up of a company and how strong is this influence during the first five years of company life. The second idea they add is the importance of analysing in which way control and planning instruments had being used and their effect on the company's first five years of life.

4.2.3 What do we don't know?

According to Schwartz (2008, p. 5), to understand the overall usefulness of Business Incubation (BI) support, it is very important to go beyond the initial incubation period. In this sense the successful and timely graduation is a crucial milestone in the incubation process. Related to this, there are several studies that will be mentioned afterwards (Colombo & Delmastro 2002; Hackett & Dilts 2004; Peña Legazkue 2004).

Period of incubation

There is not an exact length for the period of incubation, thus a post-incubation length is difficult to be fixed. Little is known about this phase of the incubation period, but it is known that previous phases influence the post-incubation because the number of post-incubation years depends on the level of maturity reached by the company. In this sense, according to Davies (2009, p. 10) most incubators are not single-purpose; they may provide assistance to early-stage firms (germination) as well as mature companies (tenancies).

There is a report from Hjorth (2013) that shows an actual point of view of the business incubators based on a study from Swedish incubators. In this report, Hjorth (2013, p. 15) mentions a PhD thesis from Alexandersson (2013, p. 33) in which she summarises the research with the next quotes:

"What do we know about the outcomes of business incubation? Are business incubators effective economic development tools? The empirical findings are not conclusive regarding their economic impacts. Research has not been able to verify if they actually are efficient job creators (…) the research indicates that the incubator is a relatively cost efficient economic development tool (…) post graduation there is no significant difference between the incubated firms and the control group, which calls into question the long-term benefits of the business incubation."

(Alexandersson 2013, p. 33)

Some of the studies have been focused on studying the issues that these firms can experience during the post-incubation phase (Virtanen & Kiuru 2013; Lewis, Harper & Molnar 2011, p. 25).

There is no much information about the survival or the factors that determine the probability of survival/failure after leaving the BIs. In his study, Peña (2004, p. 224) tries to show some factors that influence firm's survival. After researching on different literature, Business Incubators (BIs) can be defined as tools to develop and improve firms (Hackett & Dilts 2004, p. 57; Schwartz & Hornych 2010, p. 1). Measuring the effectiveness of business incubators is not that easy because the number of incubators is not extended in the same manner all along the developed countries.

4.2.4 What should we look on?

This study from Colombo & Delmastro (2002, p. 1103) focuses on the new technology-based firms (NTBFs), which were incubated using a science park (SP) or a business incubator (BI). Colombo & Delmastro (2002, p. 1110) took some information from the independent high-technology firms during the year 2000 using a standard survey to ask about the establishment year of the firm, the number of employees, the age of the founder…
In their study, Colombo & Delmastro (2002, p. 1120) explain that there was not much information that time about business incubation, but they did comparisons between on- and off-incubator firms and the differences between the samples were remarkable concerning technical collaborations with universities.

Ideas for future research
Patton (2013, p. 16) suggests that future research needs to investigate how the incubation process creates a context, which encourages and empowers founders to proactively engage with those who can effectively assist and inform the accumulation of the essential knowledge to develop a commercial business model. Finally his paper highlights the importance of reflection to knowledge assimilation and exploitation arguing this to be a dynamic recursive process. He adds that future research needs to concentrate upon these dynamic practices that enable founders to combine new and existing knowledge and in addition, those mechanisms which might assist them to apply this to their ventures.

4.2.5 Summarization

During this point of the bachelor thesis a little overview of the business incubators was given. Some facts from the incubation and post-incubation period were given to understand the idea of business incubation.
As it has been stated here in above, this is a recent approach inside the high-technology start-ups that need and extra help to grow in the market. Talking about the period of incubation, after checking different studies (Aernoudt 2004; Akçomak & Semih 2009; Flanschger, Winkler & Reinisch 2012; Lewis, Harper & Molnar 2011; Patton 2013; Schwartz 2008; Virtanen & Kiuru 2013), a standard period of post-incubation cannot be set. Some studies support Aernoudt's (2004, p. 129) approach of three years but it is not a standard number.
The main idea of the post-incubation is that firms use the things they have learnt during the years of incubation to be able to grow. In this way the usefulness of incubations can be measured by checking how good firms use the lessons learnt.

For a future research, after reading the different studies, a study about the post-incubation taking into account the factors that influence the incubation period would be a good approach. The idea would be to check the performance of the incubation period in order to find factors that can facilitate the prediction of firms' future.

5 Investigating Management control systems (MCS)

5.1 Introduction

Stauß & Zecher (2013, p. 235) explain that the terms “management control” and “management control systems” emerged in order to give insights into its origins because this supports the understanding of past, current, and future developments in the fields of Management control systems (MCS). The main protagonists of the change from accounting to management control are Ross Walker and Robert Anthony from Harvard Business School.
Another definition from Asel, Posch & Speckbacher (2011, p. 214) says that management control can be defined as the set of mechanisms designed and implemented by top management in order to influence and control the behaviour of subordinate managers and employees to better attain organizational goals.

Management control systems aims
Stauß & Zecher show (2013, p. 236) the definition of management control from Anthony’s book. He defines management control systems as “the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization’s objectives”.

Simons (1995, p. 5) has a wider understanding of management control systems and according to him management control systems are the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities. Davila & Foster (2007, p. 908) say that management control systems help managers leverage their attention, liberate managers from decisions that can be delegated and controlled by exception, and supply information when the informal network is overloaded.

Management control of growth and innovation
Davila & Foster (2007, p. 909) focus their study in the idea that management control systems facilitate growth to help companies overcome the limitations of informal management styles. They defend that the use of management control systems within start-up companies is really important during the growth phase.

Henri (2006, p. 533) shows that the essence of management control systems is to manage the inherent organizational tension between creative innovation and predictable goal achievement.

Quoting Mundy (2010, p. 500), the controlling role of management control systems is associated with predictability, efficiency, formality, and the importance of meeting short-term targets. At the same time enabling the use of management control systems relates to spontaneity, transparency, adaptation, information sharing, enterprise, and adaptability.

Literature research

There is a study that presents a review of literature and a theoretical framework for future researches in the field of management control systems (Abdisamad Hared, Abdullah & Mohammed 2013, p. 1). There is a conventional perspective that research on the internal processes within an organization but, on the other hand, current perspectives attempt to address the behavioural issues within and outside organizational operations.

The research on management control systems has shifted from the objective economic transactions approach into a socially constructed and more subjective point of view.

5.2 Interest for an upcoming study

5.2.1 What do we know?

Management control systems and entrepreneurship

Sandino (2007, p. 2) defends that managers of early-stage firms introduce formal management control systems to increase the number of information and to avoid loss of control because of the lack of monitoring. In this kind of firms (early-stage firms) the selection of the adequate management control system is very important because management control systems are costly and time-consuming. In this study Sandino (2007, p. 2) shows that studying management control systems in early-stage firms is not the same as studying them in a mature firms. There are three main reasons for this approach. The first one is that mature companies usually have an extensive amount of formal systems already in place, and they are less concerned about running “out of control”. The second reason is that the first management control system provides the base for the future development of management control systems in the firm. The last reason is that early-stage firms use informal control systems more intensely than mature firms.

According to Lövstål (2008, p. 15) there is always the idea that management control systems are a contradictory force to entrepreneurship and some of them have been accused of having negative effects on entrepreneurship. On the one hand these systems search for the

creation of order and make the process more efficient but on the other hand, entrepreneurship aims renewal and the creation of innovations. The main idea is that management control systems are based on stability and predictability whereas entrepreneurship is about uncertainty, chaos and ambiguity.

Management control systems types

Stauß & Zecher (2013, p. 248) show different types of management control systems from the researches of Merchant & Van der Stede (2003), Anthony & Govindarajan's (2007), and Simons (1995).

Talking about Merchant & Van der Stede (2003, p. 76), the main management control systems shown in the book are results controls, action controls, personnel controls, and cultural controls. The first one fixes the employee's behaviour as the objective of the management control system. The second one concentrates on the action controls, and the third and fourth ones are related to the personnel and cultural controls, which are in a direct relation.

The second authors Anthony & Govindarajan (2007) do not classify the management control systems because they go deeply into the concept of management control systems.

In the third book Simons (1995, p. 6) classifies again the management control systems with his levers of control approach. This approach is really interesting to use nowadays within the start-up firms because it defends the balance of opposing forces to integrate different kinds of controls.

5.2.2 Are there any similar studies?

Evolution of management control systems

Aforementioned, Stauß & Zecher (2013, p. 248) have an article talking about the evolution of management control systems and different approaches found in the research. At first they focus on three main textbooks and they explain the approaches from Merchant & Van der Stede (2003), Anthony & Govindarajan's (2007), and Simons (1995).

The first book (Merchant & Van der Stede 2003) presents an object-of-control framework in which management control systems are based on the objects of control that encompass results, actions, and personnel/culture.

In the second book (Anthony & Govindarajan 2007) the authors focus on strategic formulation, management control, and task control. Mentioning Anthony & Govindarajan's book, Stauß & Zecher (2013, p. 246) explain that with this system the informal control

mechanisms are excluded as parts of management control systems and causes that management control systems are just one tool for implementing strategy and interact with the organizational structure, culture, and human resource management of the firm. Finally, the last book (Simons 1995) develops a wider understanding of management control systems and shows different forms of control.

5.2.3 What do we don't know?

Simons (1995, p. 184) explains that the information delivered by new technology is not always useful to managers. He defends that, in order to be successful, return-on-management (ROM) must increase by leveraging scarce organizational attention. The aim here is to try to align the power of information technology with manager's needs, taking into account possible configurations depending on the levers of control.

Simons (1995, p. 191) says that, while information technology offers significant opportunities to improve diagnostic control systems, designers must remember that the purpose of these systems is to allow the achievement of goals and objectives without constant senior management attention.

According to Simons (1995, p. 195) the main uncertainty with the use of these systems is the way in which senior managers use formal systems to control strategy. The main problem could be the failure to recognize different usage patterns that could lead to the end of information technology use.

5.2.4 What should we look on?

According to Strauß & Zecher (2013, p. 262) Simons' Levers of control framework reflect his innovation and control approach that allows strategies to emerge bottom-up. Although Simons' approach focuses on strategy implementation by top management, there is an improvement margin because management control system framework allows a variation of human behaviour that can result in new strategies. Strauß & Zecher (2013, p. 264) add that there are several opportunities for future research. They say that future studies can address the limitations of their study and make a bigger survey. The second approach according to them would be to investigate which definitions and understandings of management control systems (MCS) will be used in academe. Stauß & Zecher (2013, p. 265) defend the study of management control systems in new organizations, forgetting about the "classic industries" that use traditional approaches.

During the early stage of the firm development new start-ups face relevant situations and deal with decisions that may affect their future. In this sense it is very important to be

opened to different possibilities and innovative ways of facing the problems. Here is where Simons' possibilities about creating new strategies might be a great tool to search for solutions in early-stage firms.

5.2.5 Summarization

During this point different approaches on Management Control Systems (MCS) have been shown. The main idea and aim of these systems is related to the overall efficiency and performance of a company. Nowadays, Management Control Systems (MCS) have to take part in the entrepreneurship process in order to manage the tension between creativity and goal achievement. This point gives some of the new ideas to create future studies and evaluate the use of control systems in a proper way.

At the same time an evaluation of several management control systems is given in order to know about the different approaches along the years. In this point, the main management control system investigated in this bachelor thesis is introduced. A little overview of the 'Levers of Control' framework is given, but along the next point a detailed description of this management control system will be presented.

6 Using the ‘Levers of Control’ framework as a priori specification of constructs

6.1 Introduction

The Levers of Control are one of the tools used to control a business strategy (Mundy 2010, p. 500). A lot of researchers (Simons 1995; Stauß & Zecher 2013; Pavlovska & Kuzmina-Merlino 2013; Tessier & Otley 2012; Lövstål 2008) have been working in this field for several years and have developed approaches to face the problems.
In order to develop a theory within the ‘Levers of Control’ framework, it is crucial to compare and evaluate the data obtained from different sources such as case studies, books, reports and research papers. Eisenhardt (1989, p. 536) wrote a document explaining the development of theories from a case study research.

Accoding to Eisenhardt (1989, p. 534) case studies represent numerous levels of analysis, complemented with data collection (interviews, questionnaires, and observations) in a single document. His approach tries to help researchers to get introduced into new fields of studies to build new theories from the existing data.

Following Eisenhardt’s approach of building theories issued from real data, Simons (1995) conducted a research analysing diverse companies and, consequently, different kinds of managers, then developing a theory out of real cases. According to Simons (1995, p. 4), the business main approach changed from a Top-down strategy to a customer/market driven strategy. He realized that the market was focused on a standard strategy but afterwards, the situation turned into a customize point of view.

An explanation of the ‘Levers of Control’ by Simons (1995) will be given, but first Simons (1995, p. 4) expose the main questions that managers of new firms face while trying to implement management control systems:

“How can organizations that desire continuous innovation and market-driven strategies use management controls that are designed to ensure no surprises? How can empowerment and customization be reconciled with management controls that seek to standardize and ensure that outcomes are according to plan? ”

(Simons 1995, p. 4)

At this point, the current innovation period has to be taken into account while developing the research, and new sources have to be checked. Few years ago companies followed a "Keeping things on track" philosophy having everything under control, but nowadays the situation is becoming more and more innovative getting close to an uncertainty paradigm.
In table 4, Simons (1995, p. 4) summarizes the differences between the old and the new theories of control and management:

Old	New
Top-down Strategy	Customer/Market-Driven Strategy
Standardization	Customization
According to Plan	Continuous Innovation
Keeping Things on Track	Meetings Customer Needs
No Surprises	Empowerment

Table 4: Differences between old and new theories. Simons (1995, p. 4)

6.2 Interest for an upcoming study

6.2.1 What do we know?

Basic Levers of Control

The management concept of the Levels of control is based on 4 fields: Belief systems, Boundary systems, Diagnostic control systems and Interactive control systems. In Figure 10 Simons (1995, p. 7) shows the main levers of control:

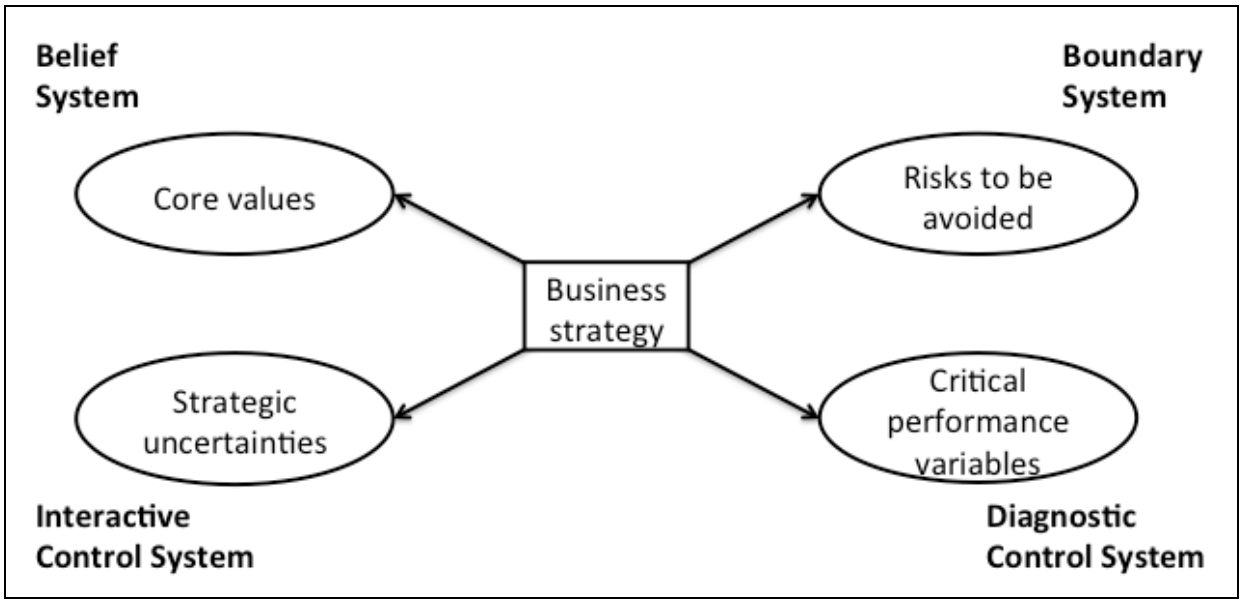

Figure 10: Levers of Control. Simons (1995, p. 7)

Belief systems

Simons (1995, p. 34) explains that a belief system is the explicit set of organizational definitions that senior managers communicate formally and reinforce systematically to provide basic values, purpose, and direction for the organization. The idea is that the belief systems are created and communicated all over the company to motivate the employees and show the main ideals of the company.

All these motivations lead to inspire and guide organizational search and discovery in a way. Simons (1995, p. 36) defends that formal belief systems are innovative and the complexity of today's business is blocking the perfect combination to lead a company. Nowadays most of the business' aims are related to the competitive point of view.

The key to be successful is to focus on the management department. Managers must be able to identify every employee's characteristics and make clear the main goal of the company in order to adapt the whole system and create a cohesive output.

Simons (1995, p. 37) says that these kind of systems are vital for managers who are engineering organizational change because the systems are based on communicating and understanding the beliefs rather than follow strict rules. The idea of having discussions between the employees and the managers, create a commitment atmosphere that would be difficult to get otherwise.

Boundary systems

Comparing to the Belief systems, the Boundary systems fix the limits based on the overall view of the business' risks. The idea of the boundary systems is to foster people initiatives to keep the employees' creativity and their ability to innovate. This rule is the basis to maintain the level of welfare.

Simons (1995, p. 40) quotes Chester Barnard (1968, p. 24) and his idea that setting limits is essential to be effective in the field of organizational decision-making. In terms of entrepreneurial behaviour, in this kind of management is better to let people improve their skills achieving high levels of flexibility and creativity. The combination of belief and boundary systems help the companies to transform a lot of opportunities into a focused domain in which everybody can be encouraged to exploit. Boundary systems are quite important in the overall performance of a company because they allow managers to develop the company in a way that everybody is committed with the goals and the "philosophy" of the whole firm.

Simons (1995, p. 47) defends that, in this kind of systems there is a strategic boundary focus on opportunity-seeking behaviours to reinforce company strategies. Strategic planning is often used to stipulate what search activities are not acceptable and should not be pursued.

As a summary (Simons 1995, p. 55), according to Donaldson and Lorsch (1983), says that Boundary and Belief systems are fundamental in terms of establishing the vision of a company. Everything in a company is related to its vision and the ability of the manager to know what can-and cannot- be accomplish.

Interactive control systems

It is very important to have a stable structure taking care of both creative innovation and predictable goal achievement (Simons 1995, p. 91; Freeman & Engel 2007, p. 96). Simons affirms that effective managers are constantly searching for the possible changes that may occur in order to react as fast as possible to keep the company structured and organised.

Simmons (1995, p. 92) explains that the idea of these systems is to manage the competitive pressure that acts in opposition to innovation and opportunity seeking. As this bachelor thesis refers to entrepreneurial organizations, these systems should be taken into account. One of the main functions of these systems is to stimulate search and learning in order to get innovative strategies and new ways of organizing a company.

The main enemy here is the uncertainty caused by the lack of information when performing a task. According to Simons (1995, p. 94) most of the uncertainties derive from senior management's perception of the known and unknown contingencies that could threaten or invalidate the assumptions underlying the current strategy.

Interactive control systems are formal information systems managers use to involve themselves regularly and personally in the decision activities of subordinates. Taken from the 'Levers of Control' book, in Table 5 there is a distinction of the uncertainties that managers face and the principal questions they ask themselves to implement their strategies.

	Critical Performance Variables	**Strategic Uncertainties**
Recurring question	What must we do well to achieve our intended strategy?	What assumptions or shocks could derail the achievement of our vision for the future?
Focus on	Implementation of intended strategy	Formation of emerging strategy
Driven by	Staff analysis	Top management perception
Search for	The correct answer	The correct question

Table 5: Distinctions between critical performance variables and strategic uncertainties (Simons 1995, p. 95)

Diagnostic control systems

The main idea of these systems is the fact that within a company you have different kinds of complex operations that must be controlled by someone. Managers need to take care of this feature because it is important for the company performance.

According to Simons (1995, p. 59), three features distinguish control systems: (1) the ability to measure the outputs of a process, (2) the existence of predetermined standards against which actual results can be compared, and (3) the ability to correct deviations from standards.

There is a direct comparison between the diagnostic control systems and the thermostat of a house. The idea is that you want to reach a level and you are getting different inputs to get the info and try to stabilise the parameters you need to get to this levels.

From the Levers of Control book Simons (1995, p. 61) explains that profit plans and budgets are the most pervasive diagnostic control systems in modern business firms. There are some alternatives for these diagnostic control systems. In general, diagnostic control systems focus on monitoring and measuring the outputs but sometimes managers need to get some information about the inputs or the processes that create these outputs.

Simons (1995, p. 62) adds that, as a safe way to ensure the outputs, managers can control the inputs to find the best combination possible to get a higher performance. There are different ways to diagnose management controls such as input controls and process standardization. Standardization is based on creativity and the innovation world whereas input controls allow maximum creativity but are too costly.

Simons (1995, p. 63) emphasizes that diagnostic control systems are crucial to implement business strategies measuring the output variables that represent the important variables in a strategy.

Simons (1995, p. 70) explains that another utility of the diagnostic control systems is the possibility to set the standards and measure outputs for individual managers contributing to organize the whole business parts. The idea of these control systems is to organize the whole company in order to avoid the constant management oversights and controls.

Levers of Control use

The whole 'Levers of Control' concept deals with the organization and management of a company. It is a tool used by leaders to retain control on their organizations.

Simons (1995, p. 15) defends that managing the tension between creative innovation and predictable goal achievement is the essence of management control. Concerning the entrepreneurial world and it is creative and innovate perspective, there is a direct relation between both concepts.

Regarding the use of 'Levers of Control' in the entrepreneurial world, there is a chapter talking about the Levers of Control in action (Simons 1995, p. 127). Simons says:

"In the start-up phase, there is little demand for formal control systems. Because employees are in constant face-to-face communication with each other, it is possible to control key aspects of the business without formal reporting structures. Internal accounting controls to ensure that assets are secure and accounting information is reliable are the only formal control systems needed."

(Simons 1995, p. 127)

Start-up growth

Talking about the growing period of the start-ups the idea is to create responsible departments within the company to assign some decision-making authority to other employees. All these changes require a bigger control over the whole organization. That is when the diagnostic control systems are implemented for the first time according to Simons (1995, p. 127).

How managers choose the levers to implement their strategies

Examining how managers pick and choose the levers to implement their strategies, Simons (1995, p. 128) shows an overview of how control systems are implemented over the life cycle of the firm (Figure 11). Simons exposes that in the start-up phase there is a little demand for formal control systems. Employees are in constant face-to-face allowing the control of key aspects of the business without formal reporting structures. Simons adds that internal accounting controls to ensure that assets are secure and accounting information are the only formal control systems needed. Simons (1995, p. 127) explains that the stage of growth requires more decision-making importance in lower levels. As a result, formal, measurable goals, and the monitoring of participant's activities become more important. In this stage diagnostic control systems are implemented to meet the information and control needs of senior managers.

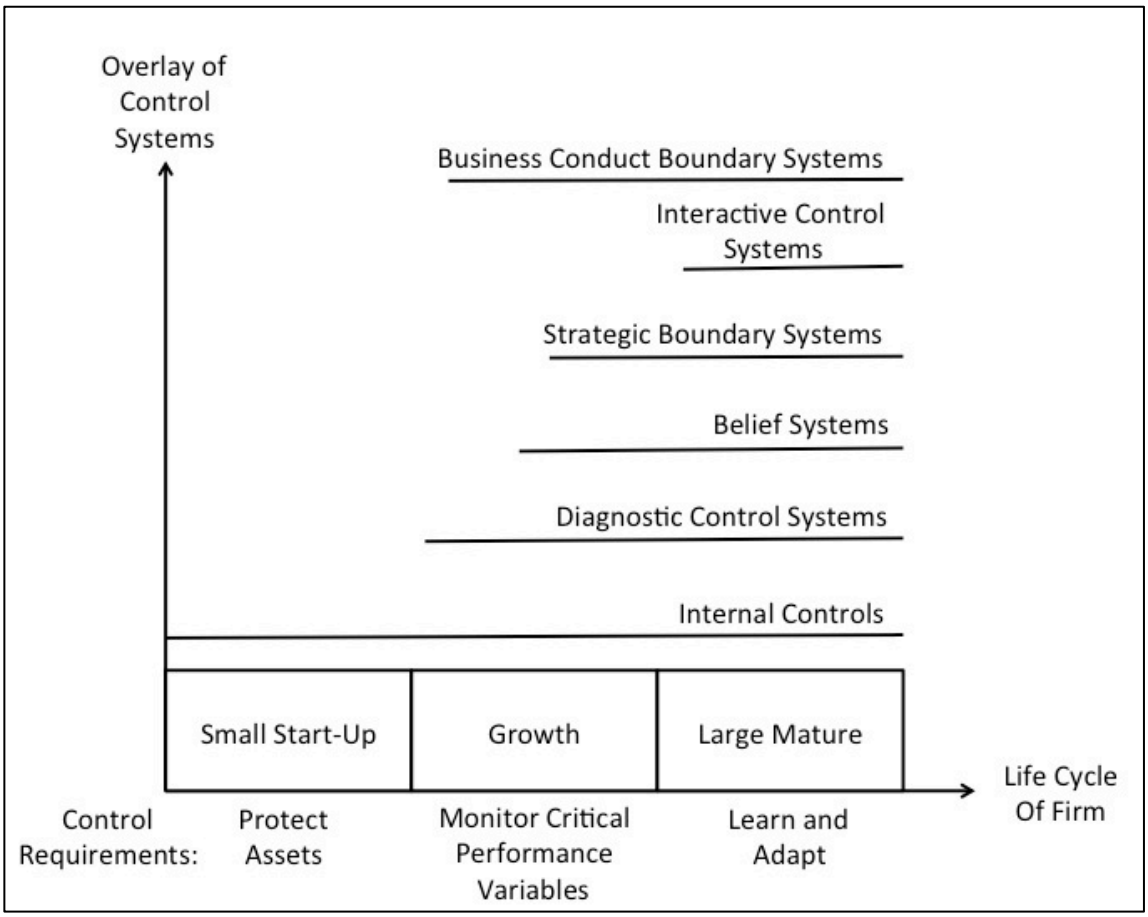

Figure 11: Evolution of management control systems over the Life Cycle of the Firm (Simons 1995, p. 128)

As Simons explains (1995, p. 128), by the end of the growth stage the company operates in multiple markets with a variety of locations. Mission and vision statements are created and communicated to motivate, empower, and supply direction. At the same time, managers learn that certain types of activities should be declared off-limits. Bad investments and failed projects result in the new strategic that delimit opportunity space.

In mature firms, senior managers learn to rely on the opportunity-seeking behaviour of subordinates for innovation and new strategic initiatives. At this stage managers begin to use selected control systems interactively. Belief systems, strategic boundaries, diagnostic control systems, and interactive control systems start to work together to control the formation and implementation of strategy.

Finally Simons (1995, p. 128) adds that business conduct boundaries are imposed any time that a crisis demonstrates the costs of errant employee actions. Simons (1995, p. 129) defends that in Figure 11 control levers are static and lifeless. This Figure fails to reveal the power and timing of techniques employed by managers to maintain or alter patterns in organizational activities.

6.2.2 Are there any similar studies?

Simons Levers of control development within a company

Simons (1995, p. 129) develops a subsection called "How ten new managers use the Levers of Control?" In this section Simons explains that implementing management control systems to guide a strategy is manager's most critical part. Without proper systems to analyse the existing data inside a company, it will be very hard to make the strategy work.

In this subsection Simons developed a study tracking ten managers for the first eighteen months of their tenures. All managers in that study used management control systems to guide their organizations. The sample had two main clusters according to the mandate for change perceived by each of the managers. Simons (1995, p. 131) explains that the first cluster was made up of four managers who were implementing revolutionary change whereas the second cluster was basically focused on maintaining the success and momentum of the business.

This study was focused on asking managers questions about the use of formal control systems. Some of the questions are found in Simons' book (1995, p. 131). The main questions are:

"How much time was allocated to each system? How and why did the focus of attention change? Where did the initiative for change originate? Who participated in substantive issues such as goal setting, incentive compensation formula, development of new missions and strategies, and planning guideline and targets? What was the pace and order of these interventions? What were the respective roles for senior managers and staff groups in these processes? What aspects were delegated, and what aspects were handled personally by senior managers?"

(Simons 1995, p. 131)

As a summary, management control systems are critical levers for the strategic change and the innovation within a company. Simons (1995, p. 152) explains that there are more tools to produce a renewal in a company but these systems can be used in many ways to fit in an existing company strategy. According to Lövstål (2008, p. 16), Simons' levers of control may be seen as another control system that considers entrepreneurial aspects such as innovation, renewal and development.

Lövstål's quote is not directly related to business incubation, but it mentions the idea of using the levers of control in the field of innovation. As new start-ups are connected with innovation and new technologies during their incubation period, it would be interesting to study the levers of control framework inside business incubators.

6.2.3 What do we don't know?

Negative impact of management control systems (MCS)

According to Lövstål (2008, p. 17) some researchers suggest that management control systems have a negative impact on entrepreneurship because they do not let entrepreneurs to grow up in terms of innovation and creativity. These systems are used in different control processes such as planning and decision-making, but there is an uncertainty concerning the idea that management control systems affect differently depending on the system.

Even though there are examples from different studies (Henri 2006; Davila & Foster 2007), there is not an exact point of view to analyse the whole management control systems (MCS) influence in the entrepreneurial world. Lövstal (2008, p. 17) defends that, in order to understand the relationship between entrepreneurship and management control systems, management control systems should be studied in their contexts and it is important to know how managers use them and why.

As a fact, Lövstål (2008, p. 20) suggests that the relationship between organizational control and innovation was negative in the entrepreneurial sample, and positive in the conservative one. Miller & Friesen (1982) define conservative managers as the ones who may view innovation as costly and disruptive to production efficiency. In this sense, conservative firms will innovate only when competitors challenge them or when customers change their wants.

Lövstål (2008, p. 25) says that it can be argued the affirmation that there is some knowledge about how management control systems are used in entrepreneurial organisations. The author adds that there is also limited knowledge about the character of the use and how the use influences entrepreneurship. As a proposal, the author defends that the use of a balancing framework of management control will lead to an increased understanding of manager's use of management control systems in entrepreneurial organisations.

Uncertainties

Widener (2007, p. 758) develops an analysis to explore the antecedents of control systems costs in terms of consumption of a constrained resource. She defends that the efficient use of management attention and organizational learning is associated with higher levels of firm performance. Widener (2007, p. 763) defines the strategic uncertainties as "the emerging threats and opportunities that could invalidate the assumptions upon which the current business strategy is based". This uncertainty means that there is a difference between the information known and the aimed value.

6.2.4 What should we look on?

Managing entrepreneurship and management control systems

Lövstål (2008, p. 23) affirms that entrepreneurship and management are opposite concepts and it is really difficult to combine them in the context of corporate entrepreneurship. The point here is that, on the one hand, management control systems aim to organize and keep the balance within a system but, on the other hand, entrepreneurship face unknown situations where management control systems are not that useful.

Lövstål (2008, p. 23) quote a paper from Jelinek and Litterer (1995) called "Toward entrepreneurial organizations: Meeting ambiguity with engagement" explaining that entrepreneurship is about doing new things, whereas the existing organisation signals control, order and stable replication of the past. They also claim that entrepreneurship is inconsistent with traditional management and organisation theories.

In addition, Lövstål (2008, p. 23) says that new ways and new perspectives are needed to develop management models in the future. A paper analysing the Levers of Control framework (Eisele & Steinmann 2015, p. 184) defends that future case studies can contribute to further consolidation of the model.

Management control systems and social connection

Abdisamad Hared, Abdullah & Mohammed (2013) present a study talking about a theoretical framework for future researches in Management control systems (MCS).

This document is based on a socio-cultural perspective inside the management control systems. According to Abdisamad Hared, Abdullah & Mohammed (2013, p. 1), conventional Management control Systems (MCS) perspective is driven by short-term incentives and is based on control methods such as planning, budgeting, performance measure and motivation related issues.

During the years Management Control Systems (MCS) have become a product of its social setting that is constitutive in its social relations. Abdisamad Hared, Abdullah & Mohammed (2013, p. 1) say that Management Control Systems (MCS) main functions have changed from focusing on the objective economic transactions, within an organization, to socially constructed and more subjective disciple. With this new approach, new theories are appearing taking into account the importance of socio-cultural factors. Further on, Abdisamad Hared, Abdullah & Mohammed expose a little review of the control concept and the evolution on Management Control Systems (MCS). Their review explains the change from the control concept synonym of financial work and the new management control tendencies. Along the years new concepts have appeared in the management control world like: management accounting (MA), management accounting systems (MAS) and management control systems (MCS). All these concepts have been used with similar meanings.

6.2.5 Summarization

Simon’s Levers of control has been one of the most important management control systems. The main function of these systems is the control of the firm’s business strategy. As this system aims to control an organization, there is a thought that the entrepreneurship spirit is killed. This is because entrepreneurship is related to uncertain changes during the growth and, on the other hand, management control systems aim to get the things under control and organize everything.

Even though the aforesaid thought seems to be opposite to the entrepreneurial concept, according to Mundy (2010, p. 500) the Levers of Control framework is a useful analytical tool to explore the concepts of dynamic tension and balance because it is connected with different uses of Management control systems rather than their technologies, structure, existence, or design. After that, Mundy defends that implemented together, interactive processes and belief systems facilitate innovation, promote stability, and increase employee commitment to the organization’s vision.

7 Using the controlling process as a process oriented view on the 'Levers of Control' framework

7.1 Introduction

Bürgel, Hess & Bauder (2006) and Giese (2012) state that controlling (management accounting or managerial accounting) was created by industry needs. There exists no clear definition of the term of controlling and its purpose. In this study the definition of controlling as seen by Horváth, Gleich & Michel (2012) and Blazek & Eiselmayer (2007) is shown. They define controlling as the process of defining goals, creating plans to achieve these goals and creating corrective activities in order to ensure the achievement of these goals, which is done based on a target-performance comparison.

There are different definitions of controlling in German literature vs. management accounting in English literature, but most of them contribute to three steps: Define, Plan and Control. These three steps are illustrated in the next image where the controlling process is understood as to define or set goals, to plan those goals and to control those goals.

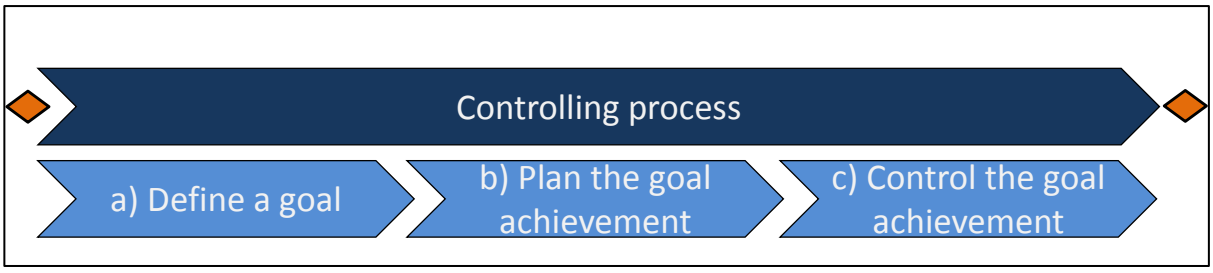

Figure 12: Controlling process based on the definition of (Horváth, Gleich & Michel 2012; Blazek & Eiselmayer 2007)

The word 'Controlling' has a lot of meanings and different connotations according to Pavlovska & Kuzmina-Merlino (2013, p. 1045). Quoting Pavlovska & Kuzmina-Merlino large investments are made in Management Controlling (MC) but there is always a risk that investments do not lead to the expected benefits. Controlling was defined as a system to coordinate management and control efficient.

7.2 Interest for an upcoming study

7.2.1 What do we know?

Controlling process phases

Aforementioned in Figure 12, the main controlling process is based on three phases but according to Mundy (2010, p. 499), Management Control Systems (MCS) have two complementary and interdependent roles. On the one hand MCS are used to exert control over the attainment of organisational goals but, on the other hand, they are used to enable employees to search for opportunities and solve problems. The idea is to give employees enough space to improve and take decisions having in mind the main goals of the organisations.

Managing the uses of Management control systems

Mundy (2010, p. 499) says that during the development of the enterprises, there is a problem while balancing the different uses of MCS. Mundy (2010, p. 500) defends that the capacity of organisations to balance controlling and enabling the uses of management control systems (MCS), depends on the specific individual and organisational attributes. These include trust, autonomy, power relations, and professionalism, elements that are difficult to identify and replicate. Mundy shows that most of the studies take a static and fragmented approach that underspecifies the interrelations between different roles of management control systems (MCS). According to Mundy some studies (Fisher 1995; Selto, Renner & Young 1995, p. 673) regard managers as passive participants with limited choice in how they use management control systems (MCS) to achieve the organization's goals.

Aforesaid, the 'Levers of Control' framework deals with the idea of facilitating creativity while providing constraints on employees (Mundy 2010, p. 500; Simons 1995, p. 15). This framework is used to explore how managers deal with the situation of controlling and enabling uses of Management Control Systems (MCS) in order to generate the dynamic tension that contributes to the organisation's capabilities. According to Mundy (2010, p. 501) belief systems provide employees with a stable environment, but also play an important role in challenging organisational inertia and political processes through the communication of values that may not be reflected in routine management control systems. Talking about the boundary lever of control, Mundy says that it is an explicit set of organisational definitions and parameters, expressed in negative or minimum terms. The idea off this lever of control is prevent employees from wasting the organisation's resources. Financial data establish boundaries that protect an organisation from financial risks, whereas non-financial data indicate the strategic boundaries which managers should operate.

Evolution of management control framework

Pavlovska & Kuzmina-Merlino (2013, p. 1047) paper focuses on the evolution of the controlling management framework. It shows ideas about the first revolution, Simon's Levers of Control, Otley's Performances Management Framework, and Ponssard and Saulpic extension of Simon's framework.

- First revolution

During the first revolution the control system for decision-making as a new knowledge, was developed by Johnson and Kaplan (Johnson & Kaplan 1987). Palovska & Kuzmina-Merlino (2013, p. 1047) defend that management control was often mentioned as 'young' comparing to other kinds of management. At the beginning, the main actors of the control system were gatekeepers (accountants, sales planers, engineers or quality controllers) who focused only on mismatching. They kept linear managers informed about the negative variances, but it was not the best way to keep or increase employees' motivation. Later on, the concept was related to the Strategic management, but after years of research it was considered a negative impact on management control systems.

- Simons' Levers of control

The next stage was the Simons' Levers of Control (1995). According to Pavlovska & Kuzmina-Merlino (2013, p. 1048) that was the first well-describe framework based on huge number of case studies from different enterprises. Simons provides two extreme benchmarks to classify the use of management control systems: interactive versus diagnostic. The first dimension is the degree of involvement of the top management. In the interactive benchmark, top managers intensely involve themselves in the process, whereas in the diagnostic benchmark, they remain at a distance. According to Simons' 'Levers of Control', the main actors in a diagnostic control system are the gatekeepers (accountants, sales planers, engineers or quality controllers), who have to focus the attention of the managers on the mismatching; for interactive use, the main actors are operational managers. Although Simons also stressed an important role of the middle managers, the authors present that Simons did not discuss much the patterns of motivation and behaviour that were necessary for middle managers to successfully perform a task.

- Otley's Performance Management Framework

The next period explained by Pavlovska & Kuzmina-Merlino (2013, p. 1048) explains Otley's Performance Management Framework.

Pavlovska & Kuzmina-Merlino (2013, p. 1049) say that Otley's (2003, p. 316) agrees with the approaches that presupposed the use of non-financial measures of performance for two main purposes (motivate people and report a company's results). Otley focused on five central issues: key objectives, strategy and plan, level of performance, rewards, feedback and feed-forward loops.

Ferreira & Otley (2009, p. 278) developed eight criteria related to the management performance. The points were: vision and mission of an organization, key success factors, strategies and plan to achieve success, organization structure, key performance measures, level of performance, performance processes, financial and non-financial indicators of performance.

Explanation of the criteria

Talking about the vision and mission, Ferreira & Otley (2009, p. 267) defend that performance management begins with purposes and objectives. According to them the fundamental requirement for control is the existence of objectives, which are used to evaluate performance. Vision and mission statements are landmarks that guide the process of deciding what to change and what to preserve in strategies and activities.

Explaining the key success factors, Ferreira & Otley (2009, p. 268) behold that these factors are those activities, attributes, competencies, and capabilities that are seen as critical pre-requisites for the success of an organization in its industry at a certain point of time. They need to be achieved in order to achieve its vision.

Ferreira & Otley (2009, p. 270) explain the strategy as the direction the organization chooses to pursue over the long term as the means of achieving organizational objectives.

According to Ferreira & Otley (2009, p. 269), organization structures are formed as means of establishing formally the specification of individuals to act within their sphere of responsibility. There are multiple forms of organization structure and they involve choices regarding decentralisation/centralization of authority, differentiation/standardization, and the level of formalisation of rules and procedures, as well as configuration.

The key performance measures are the financial or non-financial measures used at different levels in organisations to evaluate success in achieving their objectives, key success factors, and strategies and plans.

In relation to target setting, Ferreira & Otley (2009, p. 271) say that this is a critical aspect of performance management. In relation to it, they add that it should be no surprise that the

issue of setting targets and using them for evaluating and rewarding performance has been the subject of discussion in the literature.

According to Ferreira & Otley (2009, p. 272), performance evaluation represents a critical point in control activities. In general, managers tend to be most affected by areas that senior managers signal because these areas determine the status and progression of the organization.

In relation to reward systems as financial and non-financial indicators of performance, the authors explain that these are typically the outcome of performance evaluations. Rewards are meant to be expressions of approval and recognition by senior management, through financial rewards to long-term progression and promotion. By the end of their explanation, Ferreira & Otley (2009, p. 273) add the thought that relationships between rewards, motivation and performance are complex to study.

- Ponssard's extension of Simons' framework

Ponssard ran the last study as an extension of Simons' framework (Ponssard & Saulpic 2005). The first idea is that strategic vision used to select the area for interactive control has an impact on the management tools. The relationship between the control system and the compensation policy is introduced. It makes a difference whether the emphasis is on internal coordination or on a better alignment with financial objectives. From that classification there are some questions:

How is the control tools constructed? What is the degree of customisation of the control tools? Are they rather: generic or customized?

What is the relationship of the control system with the compensation policy? Is the reward system based on the indicators defined in the control system: objectively or subjectively?

Simons (1995, p. 160) defends that the only difference between the diagnostic control and the interactive control is in the use of control systems. In Table 6, the differences between diagnostic control systems and interactive control systems presented by Simons (1995, p. 124) are shown:

	Business Strategy	
Strategy as…	Target	Vision
Focus	Critical Performance Variables	Strategic Uncertainties
	Diagnostic Control Systems	*Interactive Control Systems*
Purpose	Provide motivation and direction to achieve goals	Stimulate dialogue and organizational learning
Goal	No surprises	Creative search
Analytical reasoning	Deductive (flying by instrument)	Inductive, sensory (flying by feel)
System complexity	Complex	Simple
Time Frame	Past and present	Present and future
Targets	Fixed	Constantly reestimated
Feedback	Negative feedback	Positive feedback
Adjustment to	Inputs or process	Double loop learning
Communication	Eliminate need for talk	Provide common language
Staff role	Key gatekeepers	Facilitators

Table 6: A comparison of Diagnostic and Interactive Control Systems Simons (1995, p. 124)

Ponssard & Saulpic (2005, p. 242) suggest that an interactive process would more naturally rely on a customised tool, and a diagnostic process on a generic tool. Another main point of Ponssard & Saulpic's (2005, p. 245) approach was the time-scale decomposition of the decision making process.

" Time is discrete and divided into periods. At each period, the firm buys some quantity of input at some input price, and uses it to produce some quantity of output, which is available for sale at the next period. Prices are uncertain, they do not depend on the behaviour of the firm"

(Ponssard & Saulpic 2005, p. 245)

Time-scale decomposition lead to defining usability and limitations of several already know tools. By the end of the explanation, Pavlovska & Kuzmina-Merlino (2013, p. 1050) suggest analysing the roles of a management control system in implementation of strategic change through a four-grid dimension: use of control system, management tool, compensation system, and organisational structure. In Table 7 there is a comparison of Controlling Frameworks with a little overview on each one.

Authors	Scope	Outcomes	Used Tools	Main Contradiction
Initial approach: Jonson and Kaplan (1987)	Accounting data aggregation and comparison	Only finance statistics. Able to see working result, but cause and effect are not predictable	Not in focus, but only accounting value based	Does not give enough overview of the context for decision making
Simons' Levers of Control (1995)	Beliefs, boundary, diagnostic control, interactive control	Mission, vision, finance, statistic, advises for decision making style	Not in focus, but accounting value based, balanced scorecards (BSC) and Key Performance Indicator (KPI), Return of investment (ROI), undefined area for mission, vision, and decision making style	Interactive control is poorly defined, low level of prediction. More intuitive, than quantities/qualitative.
Otley's Performance Management framework (2003)	Organization objectives, strategic plan, level of performance, rewards, information flows, organization structure, evaluation of personal, feedback types and ways	Mission, vision, finance statistics, performance connected with rewards, Key Performance Indicator (KPI), organization structure, deep monitoring of all activities	Partly in focus, accounting value based, balanced scorecards (BSC) and Key Performance Indicator (KPI), Economic valued-based (EVA)	Overflow of information, slow and expensive for big organizations
Ponssard and Saulpic extended Simons' framework (2005)	Belief, boundary, diagnostic control, interactive control, tools, relationship between the control system and the compensation policy, organization structure	Mission, vision, finance statistics, customised tools, performance connected with rewards, advanced planning, Key Performance Indicator (KPI)	In focus, accounting value based, balanced scorecards (BSC) and Key Performance Indicator (KPI), Activity-based Costing (ABC), agency theory approach Customization and adjustment of tools. Self-adjustable tools.	Enough for operational management, but not for innovation and other extended activities.

Table 7: Comparative analyses of Management Controlling Frameworks (Pavlovska & Kuzmina-Merlino 2013, p. 1050)

7.2.2 Are there any similar studies?

Aforementioned in the introduction of this point, there is a study from Mundy (2010, p. 499) that shows how organisations balance controlling and enable uses of management control systems. Mundy (2010, p. 500) defends that a unidimensional view of the use of control systems (used in traditional approaches) has hindered the systematic research into the natures of dynamic tension and balance.
According to Mundy (2010, p. 505) the directors use the levers in both controlling and enabling ways that facilitate the attainment of short-term goals by empowering managers to search for 'optimal' solutions.

As Simons defends in his book (1995, p. 153), control of business strategy is achieved by integrating the forces of belief systems, boundary systems, diagnostic control systems and interactive control systems. According to Simons the power of the levers of control does not lie in how each is used alone but rather in how they complement each other when used together. Any theory of control must be sensitive to the distinction between intended and emergent strategy. The challenge is to develop theories of control that recognize the roles of these various types of strategy.

Simons (1995, p. 155) defends that Interactive control systems give managers tools to influence the experimentation and opportunity seeking that may result in emergent strategies. Thus interactive control systems facilitate and shape the emergence of new strategies.
Diagnostic control systems clearly emphasize control and efficiency, but setting goals, measuring outcomes, remedying variances, and assigning rewards involve elements of innovation and learning. Simons (1995, p. 160) explains that it is mostly single-loop learning, but, occasionally, double-loop learning occurs.
Talking about the control concept Simons (1995, p. 161) shows a difference between tight/loose controls. Tight control implies severe limits to an individual degree of freedom. Loose control implies that individuals have a great deal of autonomy and freedom.

7.2.3 What do we don't know?

Different perceptions of the controlling concept

According to Tessier & Otley (2012, p. 175) sometimes it is difficult to perceive the control as a universal concept inside a company strategy. Employees can have different perceptions in some cases and these perceptions can create a misunderstanding. There is an uncertainty

on how employees will react to an order. For example, Tessier & Otley (2012, p. 175) show that controls implemented in departments accustomed to them were perceived more positively than controls implemented in departments with less knowledge about them.

As the perception of controls by employees seems to be an important fact while managing control, the authors propose to make a deeper research on that in order to understand what affects employees' perception of controls and the impact of these perceptions on organisational performance.

7.2.4 What should we look on?

Simons' revised framework

Tessier & Otley (2012, p. 182) present a revised version of Simons' Levers of Control framework. The result is a framework that separates managerial intentions for controls and employee perceptions of controls. Tessier & Otley (2012, p. 173) show a picture of their revised framework in Figure 13:

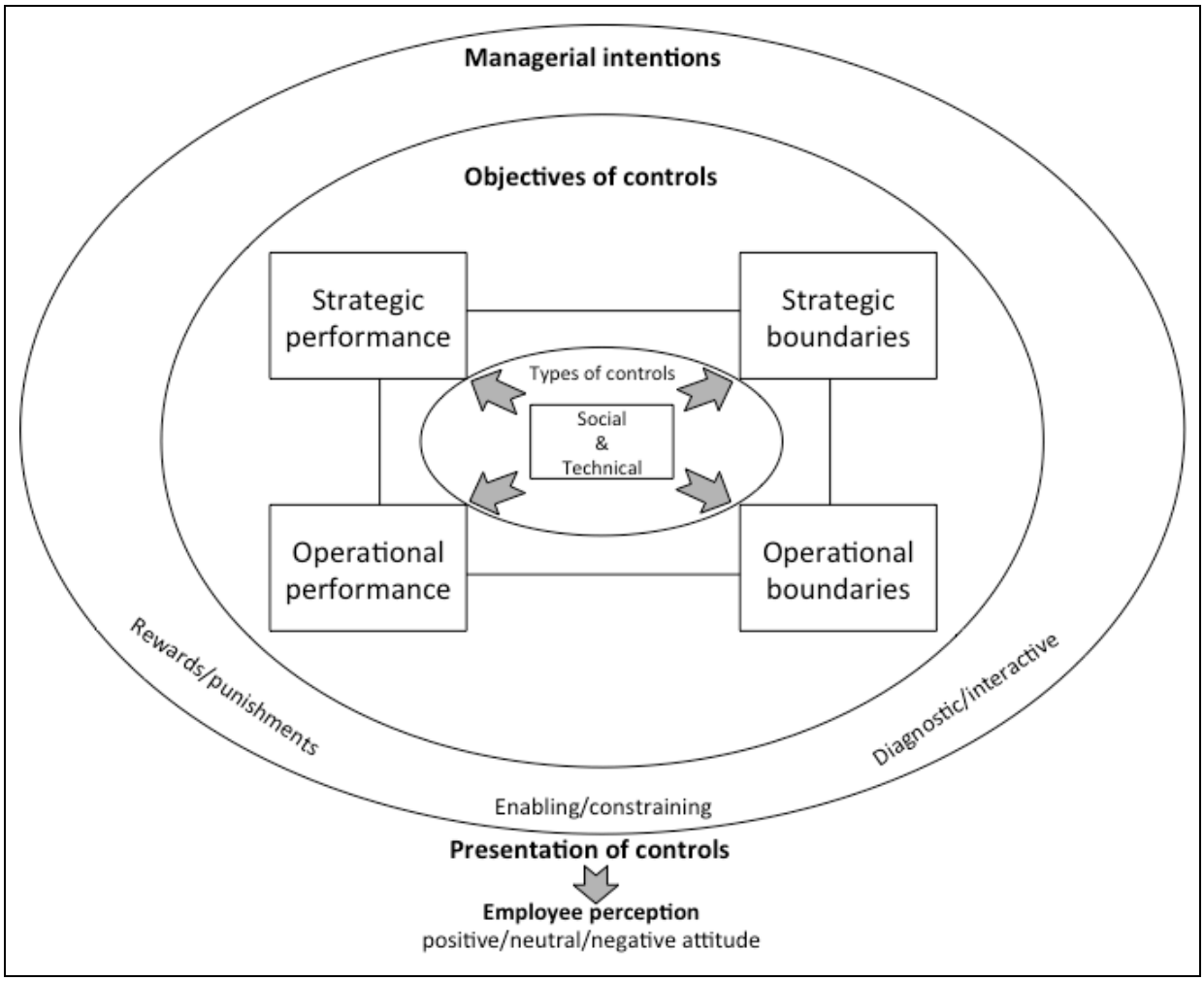

Figure 13: The revised framework. Tessier & Otley (2012, p. 173)

Tessier & Otley (2012, p. 182) defend Simons' theory that describes diagnostic and interactive controls as ambiguous concepts. Tessier & Otley (2012, p. 177) quote that some authors have attempted to provide a clearer definition of interactive controls, based on Simons' writings but they add that there is no consensus about the definition. Tessier & Otley (2012, p. 182) suggest the consideration of the employees' contribution to the design of Simons' framework so that they will not be passive actors anymore. Tessier & Otley quote other uses of controls, identified in the literature (Henri 2006), that have been excluded from the framework such as the legitimising and learning uses of controls.

Tessier & Otley (2012, p. 182) defend that, in the future, it would be interesting to explicitly explore possible links between the revised framework, the literature on organisational learning, and institutional theory. They also defend that a research on the perception of controls could be done to understand what affects employees. Perception of and attitude towards controls could also be investigated in light of the literature on employees' participation. Empirical research of control efficiency could be done as well referring to the quality of controls (excluded from the revised framework).
As a conclusion Tessier & Otley (2012, p. 182) defend that other concepts apart from the Levers of Control framework could be improved. They add that more work has to be done to unite the different studies that make up the Management Control Systems (MCS) literature and to build a coherent body of knowledge.

Interactive use of MCS in product innovation

There is another study (Lopez-Valeiras, Gonzalez-Sanchez & Gomez-Conde 2015) that focuses on the interactive use of management control systems (iMCS) and how they affect processes and organizational innovation.
According to Lopez-Valeiras, Gonzalez-Sanchez & Gomez-Conde (2015, p. 3), despite the importance of the process and organizational innovations in firm's competitiveness, Management control systems (MCS) literature has focused on the analysis of interactive management control systems on product innovation.
Along the book, Simons (1995) gives some aspects of the interactive Management Control Systems (iMCS). As a result, iMCS have also specific strategic outcomes such as encouraging the generation of new ideas, initiatives and strategies. With all of these approaches Lopez-Valeiras, Gonzalez-Sanchez & Gomez-Conde (2015, p. 3) say that interactive Management Control Systems (iMCS) become an instrument for guiding experimentation and learning, favouring a proactive response to threats and opportunities in the environment.

Nevertheless, some authors notice the ambiguity in the theoretical framework of Simons (1995) regarding the nature of the relationship between interactive Management Control Systems (iMCS) and innovation.

Lopez-Valeiras, Gonzalez-Sanchez & Gomez-Conde show a study based on an analysis from companies with more than 10 employees. To measure interactive Management Control Systems (iMCS) the respondents were asked to indicate how they used their control tools, paying special attention to: cost accounting, balanced scorecard, and budget systems.

Lopez-Valeiras, Gonzalez-Sanchez & Gomez-Conde (2015, p. 12) talk about Simons' Levers of Control framework and they quote the idea that an organization must use one control system interactively to avoid superficial analysis, lack of perspective, and potential paralysis. In addition, the variable interactive Management Control Systems (iMCS) was built using the score of the specific control system that reports the maximum interactivity across the sample.

7.2.5 Summarization

There is not much information about the controlling process in relation to the Levers of Control framework but in this study some information has been shown. The controlling process has three main stages: goal definition, plan for the goal achievement and control of the goal achievement.

As explained in this point, the main approach is shown in Julia Mundy's paper (2010). The idea is that managers use Levers of Control not only in the controlling oriented way but also in other directions to facilitate the fulfilment of short-term goals.

8 Investigating at existing and failed Start-Ups

8.1 Introduction

Nowadays organizations that have been in a Business Incubator (BI) during some years are more likely to survive in the post-incubation phase, but it has not been demonstrated at all. According to Kailer (2004, p. 5) and his study about young entrepreneurs, during the first stages of developing their ideas, firms find different difficulties:

- Acquiring starting capital
- Financial risk
- Legal problems and “bureaucracy”
- Lack of experience
- Lack of industry-related know-how of contacts with potential suppliers and customers

Some studies (Mas-Verdú, Ribeiro-Soriano & Roig-Tierno 2015; Lewis, Harper & Molnar 2011; Schwartz & Hornych 2010) defend the use of Business Incubators as a positive tool, but others foster totally the opposite. This section will analyse different cases related to growth/survival of companies.
In order to facilitate the understanding of point 8.2, aforementioned in point 1.2, the words Business Incubator (BI) and Science Park (SP) refer to the same concept.

8.2 Interest for an upcoming study

8.2.1 What do we know?

There are different kinds of studies that analyse the influence of business incubators (BIs) in different firms. On the one hand a lot of studies defend the benefits of being in a business incubator but on the other hand there are studies defending just the opposite. In the next pages the author of this bachelor thesis will give an overview of these studies. While researching about business incubation, data from different countries can be found in order to have different points of view. Business Incubators have different levels of development depending on the countries. It is know that for example, United States has been working with them since the creation of the first business incubator in New York (1959). In Europe the situation is different and has less years of development. According to Aernoudt (2004, p. 128) the first Business Incubator (BI) in Europe was set up by the United Kingdom in 1975.

8.2.2 Are there any similar studies?

8.2.2.1.1 Ferguson & Olofsson

Ferguson & Olofsson (2004) develop a study from Sweden that explains the Growth and Survival of firms after being in a science park.

Ferguson & Olofsson (2004, p. 1) defend that formation, survival, and growth of New Technology-based Firms (NTBFs) has been a policy issue for some time now. The authors add that firms exploiting emerging technologies are seen as means to realize returns on academic research, and are recognized for their high-growth potential as significant contributors in the general economy. This perception has motivated national and local policy initiatives aimed at supporting the growth and development of New Technology-Based Firms (NTBFs).

As Ferguson & Olofsson (2004, p. 5) show in his study, science parks have been defined as property-based ventures with clear links to university or other research institutions where firms can be offered well-suited facilities from which to conduct their business.

There is no much information about what and how firm development is being supported through a science park location. Ferguson & Olofsson (2004, p. 5) found few consistent benefits beyond a “prestigious address” (Westhead & Storey 1994), ”social signalling” (Felsenstein 1994, p. 95), or “Image effects” (Ferguson 1999).

Study in Swedish New Technology-based firms (NTBFs)

Ferguson & Olofsson (2004, p. 5) mention their survey conducted in 1995 from a population of Swedish New Technology-based Firms (NTBFs) located both on and off science parks in two city areas. The authors asked firms about their choice of locating where they did and what benefits the perceived. Thanks to that it was possible to understand few differences between Science Park’s on and off-park firms. One of the main discovers was that firms inside science parks were, on average, younger and smaller than the others. From a qualitative point of view there were image benefits from two points of view. On the one hand, firms thought that everyone saw firms more advantageous due to the fact of being in a science park. On the other hand, the fact of being in a science park helped the company and its members to be encouraged with the business.

Image factor

Ferguson & Olofsson (2004, p. 6) developed a hypothesis about the image factor and its importance. One of the points was that a positive image benefit from their location could help the companies to gain legitimacy in the marketplace and thereby contribute to their survival and growth. To test that hypothesis, the authors took info from 1991 until 2000 of the New Technology-based Firms (NTBFs) that were analysed in 1995. With that evidence, they could analyse the evolution in a 10 year-period. After the analysis they conclude that being in a science park is a benefit for the survival of the company.

Talking about New Technology-based Firm (NBTF) survival, Ferguson & Olofsson (2004, p. 7) have a thought about the small size of these firms and their "liability of newness". This liability increases due to the lack of legitimacy in the new firms. To develop legitimacy, new firms need to gain some recognition. With this, the hypothesis is that "firms located on science parks will show higher survival rates that firms located off science parks".

Factors that influence growth

There are different factors that influence the growth of a company. Ferguson & Olofsson (2004, p. 8) mention (Westhead & Storey 1995) and the factors they explain on their article (1995, p. 347). Some of the factors are: firm age and size, ownership, founder's background/skills, industry sector, and regional location. The most significant parameters are the firm size and firm age. Another point mentioned is the manager's degree of studies. Normally managers of firms located in a business park have higher degree of education than off-park firm founders (Löfsten & Lindelöf 2002, p. 870; Westhead & Storey 1995).
Finally, the authors get to the hypothesis that "Firms located on science parks will tend to have higher growth rates than firms located off science parks".

The conclusion from Ferguson & Olofsson study (2004, p. 9) is that, comparing to new technology based-firms (NTBFs) developed outside a science park, the ones that were inside should have higher growth level.

8.2.2.1.2 Mas-Verdú, Ribeiro-Soriano & Roig-Tierno

Talking about business incubators (BIs) and their influence in the new firms, there is a study from Mas-Verdú, Ribeiro-Soriano & Roig-Tierno (2015, p. 793) that analyses the efficiency and impact of incubators on the survival rate of firms that employ them. In this study there are some influential factors identified such as degree of business innovation, firm size, sector, and export activity affect firm survival.

-Business incubators' impact on firm survival

Mas-Verdú, Ribeiro-Soriano & Roig-Tierno (2015, p. 793) defend that incubators produce succesfull firms. All these firms can leave the incubator once they are independent and financially stable, that is the stage called graduation. During the incubator years, aforementioned along the other points, the main objetive is helping the firms in terms stimulating them with innovation and regional development.

From Mas-Verdú, Ribeiro-Soriano & Roig-Tierno (2015, p. 794) there are several propositions to test incubators impact.

Proposition 1. Using an incubator does not ensure firm survival.

-Technology-based firms and survival

Some studies posit the existence of a positive relation between survival and degree of innovation. Technology-based firms are businesses with high growth and survival potential according to their innovative nature.

Proposition 2. Technology-based firms have a better survival rate than non-technology-based businesses.

-The influence of firm size and sector on survival

Larger start-ups are more likely to grow than firms that start small. There is a positive influence of the initial firm size in the company survival.

Proposition 3. Firm survival increases in accordance with business size.

-Firm sector is an explanatory variable of survival likelihood

Firms in growing sectors have themselves greater growth potencial, and therefor better chances to survive. Some researchers argue that new firms find positioning themselves in the market and maintaining that position easier than new businesses in other sectors.

Proposition 4.The survival of a firm depends on its sector.

-The influence of export activity on firm survival

Some studies investigate the link between firm survival and international trade activities. Export firms tend to acquire particular characteristics that increase their survival portential versus non-export firms. Internationalizaiton has a favorable effect on growth and firm survival.

Proposition 5.Export activity influences firm survival.

All of these facts have been recovered from 47 spanish firms operating within the European Business and Innovation Center in the region of Valencia.

8.2.2.1.3 Michael Schwartz

Incubation period and firm survival

There is an empirical study from Schwartz (2008, p. 17), which justify a negative correlation between the age of the Business Incubator (BI) at the time firms moved in the incubator, and the probability of incubator firm survival after the graduation. This quote is just the opposite from the rest of the researches because most of them defend the importance of being in an incubator to increase the probability of survival.

Schwartz (2008, p. 8) mention different studies and he shows a difference between managed and non-managed science parks, adding that non-managed science parks have a lower failure rate.

Schwartz (2008, p. 11) shows a study about the firm's survival. He explains the hazard rate that is firm's probability that a market exit occurs in a given interval after the graduation from the Business Incubator (BI), under the condition of having survived until the beginning of that interval. In addition to this study, in Figure 14 Schwartz (2008, p. 12) shows the hazard function for the 149 graduate firms analysed.

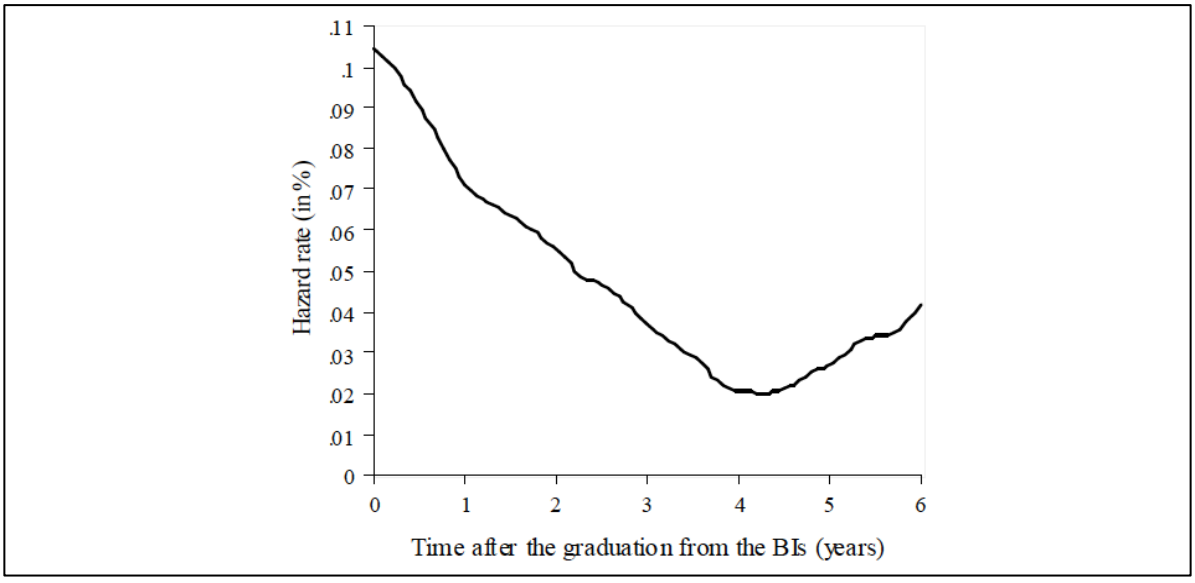

Figure 14: Smoothed hazard estimates for the graduate firms (N=149, with 36 failures)
Calculation and illustration IWH (Schwartz 2008)

To conclude this research there are two main hypotheses. The first one is that "The age of the business incubator has a positive impact on the probability of survival after graduation". Talking about this fact, Schwartz talks about the German tenant companies that have to leave the Business Incubator (BI) within three to five years (Sternberg 2004).

The second hypothesis is that “Firms that stay longer in the incubator, i.e. a time span above the samples average, will have higher probability of survival after graduation”.

8.2.2.1.4 Oe & Mitsuhashi

Oe & Mitsuhashi (2013, p. 2193) defend that founders’ prior trial and error experience is a critical factor in accelerating the growth of start-ups. In this case it is said that while founders’ start-up and managerial experiences cause significant negative and positive impacts on subsequent firm performance, respectively, their education levels and work experiences in the business sectors of their start-ups have no significant effect. This study also mention the “liabilities of newness” and the idea that new start-ups have a greater risk of failure for several reasons like the high cost of building ties with suppliers, establishing an organizational identity, determining the social roles of the organization, and formulating standard operating procedures and organizational routines.

Afterwards, Oe & Mitsuhashi (2013, p. 2194) say that literature suggests three forms of pre-founding experience: (1) founders’ previous experiences in launching start-ups, (2) job experience, and (3) experience in the same industry.

8.2.2.1.5 I. Peña

This study tries to find those factors related to human capital and organizational resources, which help in overcoming barriers to survive during the infancy period of firm start-ups. To get some conclusions, the study analyses data from 114 start-ups that are part of a business assistance program.

Influence of different factors in the survival/growth

Taking into account different studies about business survival and growth, Peña (2004, p. 224) defines the success level achieved by new venture as a function dependent of the entrepreneur’s Human capital, the firm start-up characteristics, the external factors, and an extra error. Peña defends the level of education, the business experience and the motivation of entrepreneurs as something important for the capital elements during the launch of a new venture.Talking about the first years of a start-up company, Peña defends that they are relevant to ensure survival and future growth. According to Peña (2004, p. 227) public policies aimed at encouraging new business creation are expected, not only to promote firm formation, but also to enhance venture survival and growth.

Peña focus on the Basque country region as one of the pioneer regions with Business Incubators (BIs) in Spain. He believes that his study will be a good example of EU cases.

Entrepremeurs' education and Business experience

Apart from normal cases, Peña finds different variables worth of studying related to entrepreneur's education and business experience. The first idea they had was that higher education level, managerial and start-up experience, and previous exposure to running an entrepreneurial business would have a positive impact on firm growth.

Peña (2004, p. 229) explains that companies starting with a larger amount of financial resources are capable to prolong business activities for a longer period of time. At the same time, companies that have been operating longer accumulate experience and get immersed in a learning process through continuous experimentation.

There is a regression study within the whole research that examines three dependent variables to measure firm growth: employment growth, sales growth and profit growth. Finally, the profit model is discarded because of its performance but, anyways, there is a belief within the academic community that profit is not an accurate measure to capture venture growth during the first three/four years.

As a conclusion of the study Peña (2004, p. 234) affirms that the most influential determinants for new business survival and growth are those factors representing the human capital of the entrepreneur.

8.2.2.1.6 Massimo G.Colombo, Marco Delmastro

There is a study from Colombo & Delmastro (2002) investigating about Business Incubators (BIs) in Italy with an analysis of different firms and the effectiveness of these tools.

In their study, Colombo & Delmastro (2002, p. 1103) analyse the New technology-based firms (NTBFs) knowing that this kind of firms face greater obstacles than other firms.

Colombo & Delmastro (2002, p. 1111) defend that survival rates are higher among on-park firms in comparison with their off-park counterparts. Talking about the size incubated high-technology firms start with a size that is similar to that of other New Technology-based Firms (NTBFs). However they say that survival rates should substantially differ between on- and off-incubator firms.

8.2.2.1.7 Lewis, Harper & Molnar

There is a study from the U.S. Department of economic development administration (2011) analysing the incubation best practices that lead to successful new ventures. In one of the sub-points of this study, Lewis, Harper & Molnar (2011, p. 33) talk about the firm survival and defend that businesses start and fail in the Unites States at an increasingly staggering rate. In this document there is a mention to (Gerber 2007, p. 1) and his data that over a million

people in that country start a business each year. The Statistics from Gerber's study (2007, p. 2) show that, by the end of the first year, at least 40% of new firms will be out of business. Within five years, more than 80% of them (800.000) will have failed. The bad news does not end there; more than 80% of the small businesses that survive the first five years fail in the second five.

8.2.2.1.8 Virtanen & Kiuru

In this paper there is an analysis of firm's post-incubation performance, especially those ones known as gazelles.

The study is based on firms located in the Aalto University Small Business Centre. According to Virtanen & Kiuru (2013, p. 1) post-incubation firms perform well compared to the whole population of businesses. Moreover, 70% of post-incubation firms fulfilled the criterion of profitability during the period 2008-2011. The analysis of the gazelles reinforces the idea that the turnover of post-incubation gazelles grows continuously and they increase their jobs substantially.

8.2.3 What do we don't know?

What happens after incubation?

Insufficient attention has been paid to what happens to the firms when they leave the incubator organizations. Do they survive all?

There are studies comparing firm's development within an incubator and firm's development without an incubator. From these studies it is known that firms working within an incubator have higher growth rates in terms of employment and sales (Schwartz 2008; Colombo & Delmastro 2002; Löfsten & Lindelöf 2002) and a wider market distribution.

According to Schwartz (2008, p. 5) one of the key questions is to know about the performance of the Business Incubators (BIs) measuring it after incubation time in order to know if the firms survive. He also defend that little is known about the survival or exit dynamics of firms after leaving the Business Incubators (BIs), and what are the support-specific factors that actually determine the probability of survival/failure after graduation. In that study Schwartz analyses the survival of 149 graduate firms from five German technology-oriented BIs in the post-graduation period.

Business Incubator synonym of success?

Comparing the firms working within a business incubator, and the ones working on its own there is a clear distinction concerning innovation.

Schwartz (2008, p. 8) says that in general Business Incubators (BIs) suppose an advance in the business development but there are some cases where being in an incubator is not a synonym of success. Storey and Strange researched along 6 years different enterprises (183 enterprises) and found that 38% of the on-park firms failed comparing to the 32% of the off-park firms. There are successful examples in Sweden, where being in a Business Incubator (BI) is synonym of success and improvement.

8.2.4 What should we look on?

Track longer periods

According to Virtanen & Kiuru (2013, p. 14) researches should take into account that, in order to get reliable results from their growth studies, the time span of the studies should be lengthened and the development should be followed during a longer than four year period if the data is available.

Schwartz's results indicate a negative relationship of staying longer in a Business Incubators (BIs) on post-graduation firm survival; this might be explained by the risk for an incubated firm to become over-dependent on the incubator support components. This study speaks in favour of controlling the incubation duration.

Search for correlations with new parameters in different sectors

Schwartz (2008, p. 20) suggests a future research on firm survival according to different parameters. He says that a decrease in the time budget and the intensity of counselling can affect negatively the survival of the supported firms in the Business Incubators.

Within the framework of the incubator life-cycle, the result of Schwartz's study (2008, p. 21) highlight the need of Business Incubator (BI) management staff capable of securing both long term survival and sustainable growth of their supported businesses. At the same time it is important to have an actively participation, regarding the integration of the Business Incubators (BIs) into the wider and more general economic and political landscape of the city/region.

Another point worth studying according to Schwartz (2008, p. 21) is the graduation policies within the companies and the different sectors. There are important sectorial factors that influence exit rules. Talking about the biotechnology incubators, tenants will require longer incubation stays than 3-5 years.

Grimaldi & Grandi (2005, p. 115) defend the individualization while studying the companies inside business incubators.
Schwartz (2008, p. 22) also proposes the investigation of his results with more studies about graduate firm survival in different fields. His study is limited to technology-oriented incubators from Germany so the idea would be to research about this or other field in different locations. By the end of his study he defends the idea of researching new parameters to measure the incubators performance. Nowadays most of the studies, including his study, are measured only through the incubation time of the firms. The final idea is to identify those elements that might contribute to the long-term graduate survival, and more importantly to determine components that hamper survival.

8.2.5 Summarization

In this point a research about different studies was made to justify the influence of business incubators in the survival of a company.
Most of the authors (Hackett & Dilts 2004; Mas-Verdú, Ribeiro-Soriano & Roig-Tierno 2015) biggest concern is the lack of adequate theoretical frameworks to analyse business incubator's effect.
There is a general trend that defends the use of business incubators during the first years of the development of a start-up. Aforementioned, new start-ups experiment some liabilities in the first years of existance and they need to find a way to overcome these problems.
Business incubators add the experience to the new start-ups that need to get into the market. The main issue is that some start-ups fail after being in a business incubators and nowadays studies are starting to research about the post-incubation phase that seems to be crucial for the survival of the firms. Some of the approaches that are mentioned nowadays, deal with the idea of adding a post-incubation service to guide new start-ups. The main idea is to increase the probability of survival by helping new businesses in the post-incubation years because it seems that the incubation period is not enough in some cases. Due to this fact an upcoming study should analyze the most problematic scenes that start-ups face after the incubation period.

9 Stakeholder orientation on management control systems of High-Technology Start-Ups

9.1 Introduction

Stakeholders play an important role on organizations related to social responsibility. There are studies (Durden 2008) that try to justify and find information about the relation between management control systems (MCS) and the role of stakeholders within an organization. In this point some information about these issues will be given to show an overview of the subject.

As Durden (2008, p. 674) shows in his paper, selecting activities and directing resources implies an important role for the management control systems, which are aligned with stakeholder's interests.

According to Hasnas (1998, p. 16) managers should manage the business for the benefit of all stakeholders. Hasnas adds that the firm is seen as a vehicle for coordinating stakeholder interests and sees management as having a trustful relationship not only to the stockholders, but also to all stakeholders. As a summarization, management must give equal consideration to the interests of all stakeholders.

9.2 Interest for an upcoming study

9.2.1 What do we know?

Stakeholder management and management control systems

There is a study from Asel, Posch & Speckbacher (2011, p. 213) that talks about the association between stakeholder management and management control systems. To analyse this approach the authors take into account the economic crisis framework. First they analyse the impact of economic crisis on firms' control strategies. Then, they take into account the viewpoint of stakeholder theory and the use of stakeholder management within a crisis period. The third point deals with the idea of taking short-term measures to ensure liquidity and cutting costs and, at the same time, pursue stakeholder strategy with a long-term survival of the firm.

Asel, Posch & Speckbacher (2011, p. 213) define management control as the set of mechanisms designed and implemented by top management in order to influence and control the behaviour of subordinate managers and employees to better attain in order to

better attain organizational goals. Asel, Posch & Speckbacher explain that, as far as organizational goals are not restricted to shareholder interests but also include stakeholder concerns, management control systems need to take account of such stakeholders. The authors add that stakeholder relationships are not only the basis for firms value generation, they are also important for managing the distribution of value and the allocation of risks.

9.2.2 Are there any similar studies?

Orientation of Stakeholders on Innovation

There is a study from Flammer & Kacperezyk (2013) that researches on the orientation of stakeholders on innovation. The mechanisms stakeholders use to foster innovation are explained during the study.

Flammer & Kacperezyk (2013, p. 4) say that there are different opinions about the relationship between stakeholders-friendly policies and innovation. As a summary, leveraging a research design that provides a clean causal estimate is central to understanding the impact of a firm's stakeholder orientation on innovation.

Flammer & Kacperezyk (2013, p. 4) get to the conclusion that stakeholder orientation leads to an increase in firms' innovative output by fostering job security and enhancing the satisfaction of key stakeholders such as employees and customers. Stakeholders play an important role in fostering innovation and try to enhance firm's ability to innovate.

Management of Stakeholders within an organization

Ranängen & Zobel (2014, p. 128) address the research question of whether the adoption of established management systems is useful for putting stakeholder management into practice. To answer this question they consider a Swedish company from mining and metals sector.

Ranängen & Zobel (2014, p. 129) mention the idea that all organizations have stakeholders and they must take stakeholders groups into account in order to be successful in both the current and future environment. The authors talk about the concept of stakeholder management and its relation to the corporate social responsibility (CSR). Within the management side of corporate social responsibilities there is the idea of formalized management systems and stakeholder theory.

Economic crisis impact on Management control systems and stakeholders

Asel, Posch & Speckbacher (2011, p. 215) present a study with three research parts. The first part is based on a study of the actual economic crisis and its impact on firms' control strategies. The second part, from stakeholder's perspective, analyse how firms can cope

with economic crisis using active stakeholders management to ensure firm survival and continued value generation. The last part, studies the relation between some control strategies and their stakeholder policies. All this study used the survey data from 204 major Austrian corporations.

There are some hypotheses along the study. The first one defends that crisis' impact is positively related to the shortening of reporting cycles.

The second one defends that crisis' impact is positively related to interactive use of control-relevant information. The third hypothesis defends that crisis' impact is positively related to employee autonomy restriction. The last one defends that crisis' impact is positively related to a focus on liquidity and cost cutting.

In the conclusion of their study, Asel, Posch & Speckbacher (2011, p. 225) say that their study provides evidence on the impact of recent economic crisis on management control systems and stakeholder management activities. From stakeholder theory they defend that firms acknowledge the need to actively manage their stakeholder relationships in times of pressure to cut costs and preserve liquidity.

Employee's own performance

Later on, Asel, Posch & Speckbacher (2011, p. 217) explain one of the problems of management control. The idea, as Merchant showed in his book (Merchant & Van der Stede 2003, p. 25), is that employees often take actions that improve their own performance at the expense of long-term stakeholder relations of the organization.

Management control systems and stakeholders: evidence from a study in Lithuania

There is a study from Jurkštienė, Darškuvienė & Dūda (2008) that analyses the introduction of modern Management Control Systems (MCS) in Lithuanian enterprises controlled by foreign owners. In this context the paper takes into account which Performance Management Systems (PMS) are effective within Lithuanian telecommunication companies.

Jurkštienė, Darškuvienė & Dūda (2008, p. 99) mention that the classical interpretation and further development of the theory[1] lead to shareholder primacy model. According to this model, formal and informal contracts keep the organization oriented towards the owners' interests. Shareholders are just one group of stakeholders, having possibility to execute claims against residual assets but their interests should not enjoy priority over the interests of other stakeholders.

[1] Agency theory (Jensen & Meckling 1973, p. 308)

Jurkštienė, Darškuvienė & Dūda (2008, p. 100), define the characteristics of Performance Management Systems (PMS) from a survey made in 2006 about 78 top and middle managers of two telecommunication companies. In their opinion, Performance Management Systems (PMS):

- Help managers of different levels of authority and different functional responsibilities to identify common priorities among organisational success factors.
- Have sufficient complexity-number of performance indicators to identify the goals of organisation from the main performance measurement perspectives: financial customer, business process, learning and growth.
- The majority of performance measures reflecting primary goals of different groups of stakeholders of the companies, are used interactively (ensure support for decision making) rather than diagnostically (reporting) by the managers.

Quoting Jurkštienė, Darškuvienė & Dūda (2008, p. 100):

"The support of existing formal systems to the local managers in decision making, ensuring goal congruence between groups of stakeholders, is the main criterion to distinguish between effective and ineffective PMS"

(Jurkštienė, Darškuvienė & Dūda 2008, p. 100)

According to Mundy (2010, p. 516), when managers fail to employ a particular lever of control, suppression appears. This suppression has a controlling effect because, in an organisational level, it may represent rational behaviour for organisations that must achieve particular processes or goals in order to satisfy their stakeholders.

9.2.3 What do we don't know?

Lack of research on aspects from stakeholders and management control systems

According to Asel, Posch & Speckbacher (2011, p. 214), the importance of incorporating stakeholder concerns into management accounting systems has been acknowledged but there seems to be relatively little progress on how this can be accomplished. There is a lack of research in management accounting that goes beyond performance measurement and accountability aspects of stakeholder management. In particular, there is a lack of research on how stakeholders management systems relate to management control systems and how both systems might be integrated.

Asel, Posch & Speckbacher (2011, p. 214) also defend that there is scant evidence on the interrelationship between stakeholder's management and management controls but, it is known that Management Control Systems (MCS) play an important role for managing stakeholder relations giving decision-relevant information.

9.2.4 What should we look on?

Asel, Posch & Speckbacher (2011, p. 226) suggest to yield deeper inside stakeholder management policies. They add that inclusion of case-based evidence seems quite promising. By the end, they say that it might be interesting to analyse the reasons why some firms see a contradiction between short-term and long-term needs and why others not.
According to Durden (2008, p. 674) and the stakeholder theory, organisations should be managed ethically in accordance with the needs of identified stakeholders. This means that management should consider the interests and wishes of those stakeholders.
According to Durden (2008, p. 675) a performance measure framework proposed by (Rouse & Putteril 2006) reinforces the need for a greater internal accounting focus on stakeholder interests.
Durden (2008, p. 676) reveals that only limited attention has been given to management control systems design issues in relation to social accounting research. The author propose that a broader conceptual basis to the social accounting field, which recognises the need for alignment of external and management control system perspective, would offer a more logically consistent position in relation to the design and operation of accounting systems orientated towards social responsibility concerns. As a conclusion, Durden (2008, p. 686) proposes a framework that provides for the integration of the management control systems with social responsibility goals and outcomes. Particularly, the author proposes to develop further the studies that talk about the need for a greater focus on internal and micro dimensions in relation to stakeholder factor.

9.2.5 Summarization

As we have seen in this point, management control systems should take into account the approach of stakeholders because they influence an organization's goals (Durden 2008, p. 672). It is important to research about employee's own-benefit performance because it is an issue that can affect the performance of a company (Asel, Posch & Speckbacher 2011, p. 217). Along this point of the bachelor thesis, most of the studies defend that the overall idea is to take into account stakeholders' ideas from a corporate social responsibility approach.

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List of Figures

List of Tables

Abbreviations

BIs	Business Incubator
NTBFs	New Technology-based Firms
MCS	Management Control Systems
EVA	Economic value-based
ABC	Activity-Based Costing
BSC	Balanced Scorecards
KPI	Key Performance Indicator
NBIA	National Business Incubation Association
UTBIs	University Technology Business Incubators
EBN	Business Innovation Network
BICs	Business Incubator Centres
SP	Science Park
iMCS	Interactive Management Control Systems
IT	Information Technology
BBVA	Banco Bilbao Vizcaya Argentaria
ICT	Information and Communication Technology
CIO	Chief Information Officer
B2B	Business to Business
B2C	Business to Consumer
ROM	Return-on-Management
MA	Management Accounting
MAS	Management Accounting Systems
MC	Management Controlling
ROI	Return of Investment
IWH	Institut für Wirtschaftsforschung Halle

CSR	Corporate Social Responsibility
PMS	Performance Management Systems
AWS	Austria Wirtschaftsservice
BMWFW	Programm zur Förderung von Gründung und Aufbau junger innovativer technologieorientierter Unternehmen
LIAS	Libya Institute for Advanced studies
ABDC	Australian Business Deans Council