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ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

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OPERATIONAL FUNCTIONS FOR INNOVATIVE STARTUPS IN FRANCE

SÃO PAULO
2016

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ABSTRACT

This thesis will try to understand the importance of operational functions in French startups. A huge flexibility in tasks to be covered and a horizontal management characterize startups. Thus, it is very uncommon for newly created companies like startups to have a clear human resources management policy. Indeed, every partner or people in the startup may be brought to think about very large issues such as sales, business development, commercialization, marketing and technology or product development.

This thesis will not scrutinize each task or the time spent at working in each of these tasks. It will rather look for the perception of the allocation preferences regarding each key function of the newly company. Whatever the sector in consideration or the startup stage of maturity, key functions that are perceived to make the startup successful are research & development and commercialisation. Managerial functions are not the most important ones. Technology-oriented startups consider the "CEO function" as key whereas services startups do not put so much importance in it. Serial entrepreneurs might put more attention to marketing and fundraising functions rather than management function. Indeed, as experienced entrepreneurs, they also anticipate middle-term issues. Finally, entrepreneurs often have a bias regarding their academic background because they overestimate functions they think they can do compared to functions they are able to do.

This thesis will try to show the link between operational functions exercised by a partner and the shares he owns in the startup. This link depends on the number of partners (known as shareholders), the type of partners (principal shareholders or secondary shareholders) and the impact of corporate governance regarding equity distribution. This work will lead to quantify and measure the importance of each basic function in newly created companies.
In the end, it appears that partners' responsibilities can explain equity distribution even if this criterion is not unique and sufficient enough. Indeed, functions' importance is only one of the factors explaining equity distribution. Entrepreneurs perceive R&D and commercialization as Moreover, the thesis has also pointed out some limits (non-operational partners are neglected and assuming linearity of equity distribution based on functions' respective weight might not be the best approach).

Key words: *Entrepreneurship, startups, functions, equity, human resources*

RESUMO

Nessa tese, é buscado um maior entendimento sobre a importância das funções operacionais nas startups francesas. Uma grande flexibilidade das tarefas a ser coberta e uma gestão horizontal caracterizam as startups. Desse jeito, não é muito comum para as empresas recentemente criadas como as startups ter uma politica clara de recursos humanos. Na verdade, cada participante na start-up pode ser levado a pensar de forma diferente em termos de vendas desenvolvimento de negócios, comercialização, marketing, tecnologia ou desenvolvimento de produto.

Essa tese não vai explorar cada uma dessas tarefas. Mas vai procurar para identifcar a percepção sobre a alocação ótima de recursos para cada função chave da nova empresa.

Qualquer seja o setor de mercado em consideração ou o estágio de amadurecimento da startup, funções chaves que são percebidas como sendo a base para start-ups bem sucedidas são pesquisa & desenvolvimento e comercialização. Funções de liderança não são tão importantes. Somente a startup focada na tecnologia tem uma "função de chefe executivo" com maior importância do que as startups médias. Além disso, empreendedores em série, bem sucedidos ou não, focam predominantemente aspectos relacionados ao marketing e à captação de recursos em detrimento de aspectos ligados à gestão do negócio. No final, os empresários, muitas vezes tem um preconceito ao respeito da sua formação acadêmica porque ele sobrestimam funções que eles pensam poder fazer em comparação das funções que eles são capazes de fazer.

Nessa tese, intent-se demonstrar a relação entre as funções ocupadas por um sócio e as ações que ele possui na startup. Essa relação depende do número de sócios (conhecido como acionistas), o tipo de sócios (acionistas principais ou acionistas segundarias) e o impacto na administração corporativa a respeito da distribuição do capital próprio.

Palavras-chaves: empreendedorismo, startups, funções, capital, recursos humanos

CONTENTS

1. Introduction

Entrepreneurship and innovation are often seen as a solution to economic stagnation in period of high unemployment rate. Historically, economic crisis have given great innovations. As an example, IBM, Disney, Microsoft and Apple have been created during an economic recession. Economists and politicians have understood the role of entrepreneurship during hard times: productivity increase, innovation, employment and growth. A favourable ecosystem might even be created in order to make people create their own company. Main predispositions to foster entrepreneurship are a well-educated population, not afraid of taking risks and able to spot promising business sectors and niches. These predispositions also need an environment with low regulatory constraints. In the US, only six proceeds and only six days are necessary to create a company. There is not the same flexibility in the French context (The World Bank Databank, 2015).

[Annex 1 – Favorable environment for the development of innovative startups]

Determinants						Entrepreneurial performance	Impact
Regulatory framework	Market conditions	Access to finance	Knowledge creation and diffusion	Entrepreneurial capabilities	Culture	**Firm based**	Job creation
Administrative burdens for entry	Anti-trust laws	Access to debt financing	R&D investment	Training and experience of entrepreneurs	Risk attitude in society	**Employment based**	Economic growth
Administrative burdens for growth	Competition	Business angels	University/industry interface	Business and entrepreneurship education (skills)	Attitudes towards entrepreneurs	**Wealth**	Poverty reduction
Bankruptcy regulations	Access to the domestic market	Access to VC	Technological co-operation between firms	Entrepreneurship infrastructure	Desire for business ownership		Formalising the informal sector
Safety, health and environmental regulations	Access to foreign markets	Access to other types of equity	Technology diffusion	Immigration	Entrepreneurship education (mindset)		
Product regulation	Degree of public involvement	Stock markets	Broadband access				
Labour market regulation	Public procurement						
Court and legal framework							
Social and health security							
Income taxes; wealth/bequest taxes							
Business and capital taxes	Patent system; standards						

Firms	Employment	Wealth
Employer enterprise birth rates	Share of high growth firms (by employment)	Share of high growth firms (by turnover)
Employer enterprise death rates	Share of gazelles (employment)	Share of gazelles (by turnover)
Business churn	Ownership rate start-ups	Value added, young or small firms
Net business population growth	Ownership rates business population	Productivity contribution, young or small firms
Survival rates at 3 and 5 years	Employment in 3 and 5 year old firms	Innovation performance, young or small firms
Proportion of 3 and 5 year old firms	Average firm size after 3 and 5 years	Export performance, young or small firms

French employment is highly dominated by SME (small and medium-sized enterprises): 24% of French employed population works in a company with less than 10 employees and 45% of

French employed population works in a company with less than 50 employees. In the US the majority of active workforce is employed in a big company (more than 250 employees). Thus, French employment structure is specific but there still is difficulty for French companies to reach a critical size (INSEE, 2014).

French people have a positive vision of entrepreneurship: 65% of 18-25 years old French people believe starting a company is a good choice (INSEE, 2014). The "auto-entrepreneur" status has enabled a swift increase in startup creation in France: the number of company creation has doubled between 2006 and 2009. French minister of Economics and Finance has just announced - on January 22nd, 2016 - he will triple the turnover limit of the "auto-entrepreneur" status (meaning auto-entrepreneurs can now triple their activity and still take advantage of fiscal niches awarded by this status). Unlike general believes, France is the most dynamic country for startup creation in Europe: startups creation has rose by 20% in United Kingdom between 2006 and 2009 whereas it has decreased in Germany between the same 3-year period. However, there is psychological blockage in France regarding fear of failure: only 35% of French people believe they have the core competencies to start a business (as opposed to 55% of American people). Another big obstacle is the difficulty to raise equity in France. As an example, French SMEs equity is half as big as UK SMEs.

However, we cannot ignore the impact of 2009-2011 financial crisis in Europe. Over this 2-year period, there has been a stagnation in startup creation. Today, it is still very difficult to measure the positive impact on the French economy of the "auto-entrepreneur" status.

The startup phenomenon needs to be put into perspective with the ICT (Information and Communication Technology) revolution. It has enabled to develop technical innovation or/and organizational innovation in an unstable and under-competitive environment ("disruptive innovation"). It has also enabled the development of innovation models in already well-developed companies. Indeed, big companies have progressively moved from a closed innovation model to an open innovation model. Companies have encouraged startups to emerge through intra-entrepreneurship quickly with the promise of quickly resell the startup if the startup technology keeps its promises. The number of serial entrepreneurs has risen considerably in France the last years (Pierre Kozusco-Morizet with PriceMinister, Xavier Niel with Free, Jacques-Antoine Granjon with vente-privée etc.). As a consequence, the number of business angels has also risen quickly in France for the last 15 years. They take advantage of market opportunity to develop as quickly as possible a technology that will change the way French people consume and buy. After reselling their company, they invest in

promising startup at their first stage of development ("early stage"). Since the dot.com bubble and the numerical revolution, startups in France have become an important eco-system in the collective imaginary.

Key literature regarding startup innovation is full and diverse, especially in the US. However in France, most of studies have tried to understand the ecosystem in which startup creation happens but not the process of creation itself. This can easily be explained by the lack of public information collected regarding French newly created companies, compared to other countries. Literature is very mature regarding the first aspect but only starting regarding the second aspect (especially the functions of each operational partner/founder). Moreover, very few literatures have tried to understand the link between both aspects. In order to search for the optimal balance between key functions in a startup, I have realized a survey (online through the website SurveyMonkey and offline through interviews) of more than 150 startups founders.

This thesis will first look at better understanding founders priorities in their day-to-day activities based on the function they ensure. Then, this thesis will question equity distribution between shareholders through two specific perspectives: each partner's responsibilities in the startup (without taking into account financial contribution or contribution in kind) and the factors startup literatures highlight (corporate culture, previous experience, sector-specificity skills, etc.). The goal here is to allow new factors to emerge explaining equity distribution while refining existing factors.

In this thesis, the objective is to better understand founders priorities in their day-to-day activities based on the function they ensure. Then, it is to question equity distribution between shareholders (each partner's responsibilities in the startup and what factors literature is highlighting). With literature review materials, a theoretical framework will be proposed to link external factors (such as targeted market, development stage, entrepreneur profile and team profile) to equity ("what" and "how" compared to equity). After explaining the thesis methodology and testing hypothesis, main findings will be exposed and main conclusions pointed out.

2. Preliminary notes and definitions

In order to delimit the reflexion, key elements will be defined such as the innovation concept, the startup typology and also the sweat equity concept.

2.1. Innovation as the match between market and ingenuity

It is hard to completely define innovation. There are different forms of innovation. The Oslo Manual (The Organisation for Economic Co-operation and Development's, 2015) has developed the following typology:

- "Product innovation: a good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics";
- « Process innovation: a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software »;
- « Organisational innovation: a new organisational method in business practices, workplace organisation or external relations »,
- « Marketing innovation: a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing";
- "Technological innovation: this only corresponds to product and/or process innovations".

Therefore, an innovative company can be seen as a company putting in place or trying to reach in the short-term one (or simultaneously several) of the precedent innovations.

In "Capitalism, Socialism and Democracy" (1950), Joseph Schumpeter identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities, and market power. He sought to prove that innovation-originated market power could provide better results than the invisible hand and price competition. "He also argues that technological innovation often creates temporary monopolies, allowing abnormal profits that would soon be competed away by rivals and imitators. These temporary monopolies were necessary to provide the incentive for firms to

develop new products and processes" (ibid). According to Joseph Schumpeter, innovation can take several forms:

- As the introduction of a new product or a new key characteristic for a existing product;
- As the introduction of new production method in a large industry;
- As the opening of a new market, that was not existing before or that was not seen as viable before;
- As the use of new raw material sources or components for the manufacturing of a new product;
- As the creation of a new model in an industry.

Innovation is not equal to invention. An innovation can be defined as an invention that has met an appropriate market.

Here, innovation will be defined "a process that delivers added value and newness to an organization, suppliers and customers by the development of new processes, procedures, solutions, products, services, new methods of commercialization and/or business model by a small entrepreneurial or large established firm in an open or closed system" (McFadzean et al. 2005).

It was not detected in this research any specific tool used by French official statistics organisms in order to better evaluate innovation. Today, INSEE considers that "innovative sectors are linked to Information and Communication Technology (ICT), pharmaceuticals, biotechnologies and new materials. They are subcategorized in 41 type of activities". We can wonder whether or not it is a good idea to categorize innovative companies in closed sectors and not taking into account the smooth and multi-functional application of innovative startup. As an example, in which category would Google be put if we follow the French nomenclature? Google is a search engine company (google.com), as well as a connected-object company (Nest), a online advertising company (Google Adwords), a social network company (Google +), a software and a cloud computing company (Google for Businesses).

Finally, the key characteristics of the French innovator are far from the young and creative graduate that we can imagine. He is relatively old compared to USA/UK (the average age of founders in France is 39 years old), he is putting the technical and sectorial skills it has

developed through work experiences to develop a new product (very few student of just-graduated worker create their company in France). His characteristics are also the following ones: "an associative capacity, questioning behavior, the sense of observation, experimentation and networking skills" (J.H. Dyer, H. Gregersen, C.M. Christensen, 2010).

2.2. The startup phenomenon and its different types

Pierre Vernimmen defines a startup as "a company that has just been launched by managers and shareholders. It has no past or significant tangible assets and often operates in a highly moving technological environment. Finally, its cash flows are negative: their specific risk level is very high which is why it has no other choice but to be financed by equity" (P. Vernimmen, 2005). This financial definition highlights the fact that a start-up is a young company, which operates in a risky sector (its survival depends more on its rapid growth than on its technological lead). However, this definition does not distinguish the startup from any other business creation. Steve Blank, Stanford professor and serial entrepreneur, adds a strategic dimension. He believes a startup is a company created in order to seek a new business model that is repeatable and scalable. The two key concepts of "repeatable" and "scalable" that clarify the definition of P. Vernimmen are essential. The reproducibility refers to an innovative aspect. The startup opens up a market in which other companies (both new and mature companies) will rush, as they will be able to replicate a model or technology, or integrate a new market. Scalability refers to another distinctive feature of startups: the concept of growth. A startup aims to grow very rapidly on an exponential model. This growth is explained not only by the attractiveness of its product/service in its home market, but also a natural tendency to early internationalization. To sum-up, an attempt to define a startup could be a young company, innovative about its product or its marketing method, which is experiencing rapid growth in sales and the value of its equity.

Besides innovation, managing uncertainty and risk is another key feature for startups. If any business is inherently risky (and more especially new business), startup carries a higher because of the innovative aspect of its project. The failure rate will be high. For example, McKinsey estimates the failure rate of startups (after at least three years of existence) is closed to 75% in France. The entrepreneur will do everything to reduce this risk and uncertainty in the future.

We must also understand entrepreneurship as the allocation of scarce resources to strategic objectives in order to reduce the risk associated with the value of capital gathered by the partners. Alexander Osterwalder tried to shape the business model of as start-up following the previous definition.

[Annex 2 – How to build a business model?]
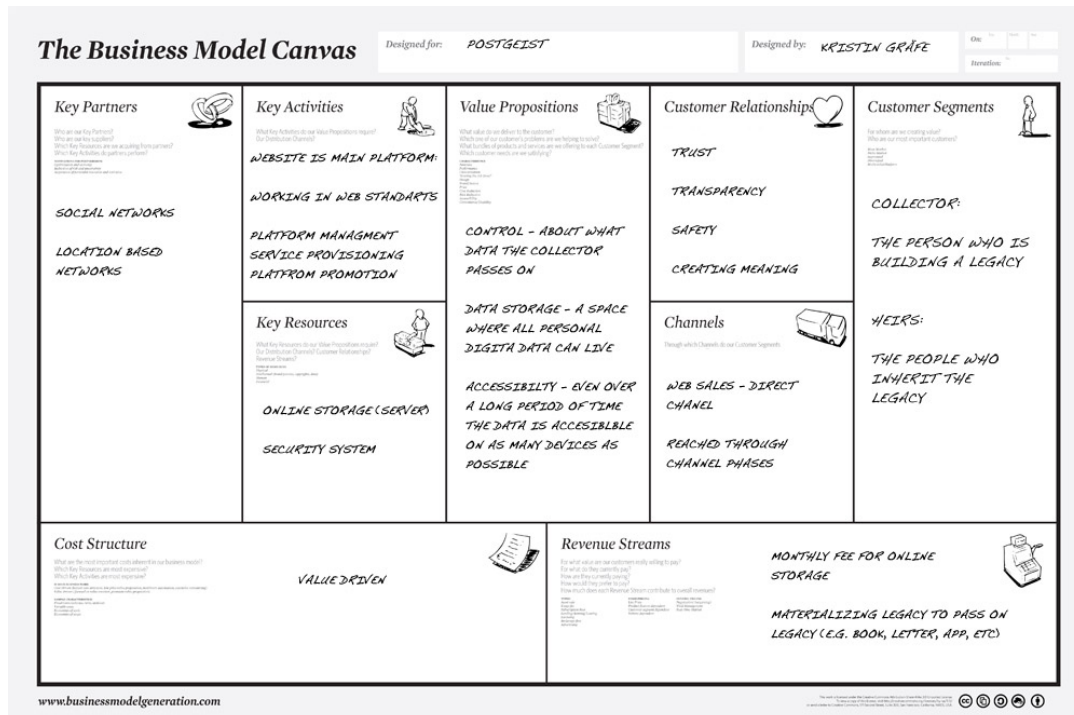
The startup phenomenon is not measured or inventoried in France. First, it is because the very definition of a startup is legally complex/ To give an idea of the number of innovative startups in France, we can take into account the number of companies that collect funding from venture capital funds: 678 in 2013, 983 in 2014, 1456 in 2015. This represents a very small sample of potential startups. Indeed, being financed in France means these companies have reached a critical size and have greatly reduced the risks inherent to the business' development (product development, customer acquisition, first contracts, etc.). However, more than 500,000 businesses are created each year in France, all sectors included, innovative or not. This lack of inventory is primarily linked to the perception of innovation.

Finally, the startup refers to an idea of size, number of employees and turnover. As a reminder, the INSEE defines the companies from the number of employees according to the following definitions: "TPE for companies with fewer than 10 employees; SMEs to those of 10-249 employees and large businesses if they have at least 250 ". A startup can ne ranked in

TPE's or SME's: its growth will be the key factor whatever the group you pick. However, to limit the size characteristic, it is reasonable to consider that from a certain size (but which one?), the definition of startup is no longer viable even if growth remains strong. Indeed, beside the size, a startup is primarily a management model, a lack of binding structures and informal links between employees. In France, small companies that become mid-cap companies often share the same characteristics as successful startups: strong growth, advanced internalization (70% of cases, according to KPMG) and close links with large companies. Reaching this critical size would be a paradigm shift for the company, which would pass to a new stage of development and a new internal organization.

From a purely financial perspective, a startup is characterized by a relatively low initial equity, which quickly takes significant value through partners' efforts to make it grow. This is called sweat equity.

2.3. Sweat equity as operational partners' equity

Originally, sweat equity was used to indicate capital gain made in real estate through the work begun by an amateur investor to create a property value and resell it. By extension, the term is applied to equity for startups. The sweat equity is different than simple shares remuneration. It reflects a real link between equity (and higher risk), and partner's resources. The founding partner, operational partners and only some employees may get sweat equity. The sweat equity is opposed to "financial equity", that is gathered from non-operating partners. Boylan (1999) has justified the concept of sweat equity through Intellectual Property (IP): the IP creator must have access to his property (morally speaking). This access is guaranteed by equity. Talati (2004) points out that modern form joint stock companies allows employees' intellectual contributions to be recognized. The sweat equity was primarily a compensation value for an intellectual production that traditional wages could not fairly compensate.

We must also consider sweat equity with the perspective of the agency theory. In this case, founding entrepreneur's interests and his partners' interests are aligned. Research has shown the greatest ability for entrepreneurs to complete a project when they are financially interested (Bateman and Strasser, 1984; Shaw et al., 2003). The founding entrepreneur must acquire appropriate resources around him to serve its business. A better alignment between partners' interests will also mean better incentives to create a successful startup. A new partner joining the company at the beginning will not accept to be a partner is the projected equity value he

gets is not greater than an average salary he will get outside this startup. Wang et al. (2009) showed that economic considerations were a key factor behind an employee devotion to a large company. Giving equity instead of salary to new partners is a way to build trust and retain them. Projected equity is the perception of the startup potential future success. According to several researches, technical expertise (Hisrich et al, 2010. Roberts, 1991; Starr and MacMillan, 1990), talent management (Bruno and Tyebjee, 1985), and previous entrepreneurship experience (Hisrich et al, 2010;. Sandberg and Hofer, 1987) are parameters that explain the success or failure of a startup. These criteria are by extension the key factors for understanding a employee's propensity to accept equity instead of salary in a startup. Another centeal factor is the degree of involvement of startup stakeholders (Laumann 1982; McAllister, 1995). Studies have shown the importance of strategic human resources management (particularly key technological experts) and the need for the entrepreneur to retain these skills in the company.

We must also consider equity distribution from the perspective of game theory (with asymmetric information). In a startup, the stakeholder holding "financial capital" (most of the time, investors like VCs) and the stakeholder that holding "human capital" do not have same resources and expected returns. Both "holders" will negotiate to find satisfaction in order to optimize the use of resources in order to create as much financial value as possible. Equity is a mean to reach this satisfaction.

Equity is an expensive resource. For example, a sweat equity contract for a new partner could be up to ten times the original bet if you believe some evaluators. Sweat equity contracts are useful for entrepreneurs who need cash. However, such contracts are very costly. Indeed, value of distributed equity represents 7 to 10 times value of such contract (in cash). Details are explained on Annex 3. Considering the average return expected by VC (around 20% per year over the next five years), evaluators tend to overvalue startup equity. Nevertheless, it shows equity is scarce and expensive.

[Annex 3 – Sweat equity deal structuration]

Sweat equity contracts are useful for entrepreneurs who need cash. However, such contracts are very costly. Indeed, value of distributed equity represents 7 to 10 times value of such contract (in cash).

Contract characteristics

Contract value: 10 000€
10% is paid now (1 000€)
Remaining value is converted into equity

Equity is valued on following criteria:
        Exit in 3 to 5 years
        Return expected @20% per year (PE or VC type)
        Success rate of startup creation: 1/3

Cash-flows

Contract value	10 000€						
Paid in cash	1 000€						
Paid in capital	9 000€						
Exit	5 years						
Return	20%						
Success rate	33%						

Years	0	1	2	3	4	5
Amount ('000€)	9,0	10,8	13,0	15,6	18,7	22,4

Contract value   10 000€
Paid in cash   1 000€
Equity value   22 400/33% = 62 7000€

A 10 000€ contract costs the startup around 70 000€

An entrepreneur will also see equity as a way to control the company or at least as an instrument of control. Cohan (2012) reminds us the entrepreneur will seek external equity funds only if it is vital for the startup development. Indeed, the main risk after letting a VC funds acquire some equity is the lost of control. The venture capital firm will then have other power such as a member in the steering committee (at least one member representing the venture capital firm), appointing a new managing director is the startup performance is not good enough, and even replace the founding entrepreneur and/or CEO. Equity is the most precious resource for an entrepreneur but equity dilution can threaten its control and its future financial gain.

Regarding previous remarks, my research question will be:

In a startup, which functions should be considered as crucial in order to search for the allocation preferences of available resources for the founding-entrepreneur and its partners?

Looking at several aspects that innovation can take, the place of startups in French innovative eco-system and the importance of equity in any entrepreneurship adventure, we will also wonder about equity distribution between existing partners and the potential link between a partner's equity and the functions he has/will cover in the startup.

3. Literature review and hypothesis

3.1. The importance of key functions in companies

3.1.1. Key functions' characteristics in companies

As Keating remind Brise and Olivares (2007) have explained, the research focused on human resources have little or no consideration for startups. They almost never have dedicated departments or a formal policy regarding startups, and are more interested in large companies. At the same time, research I could find on entrepreneurship turned away from human resources management, seen as antithetical to growth and flexibility because perceived as bureaucratic and cumbersome.

Human resources are nonetheless a key parameter for the success of a startup (Aldrich and Eangton, 1997. Heneman, Tansky and Camp 2002; Katz, Aldrich, Welbournc and Williams, 2000). However, as explained by Leung (2003), the entrepreneur will have to face the difficulty of recruiting staff, and allocate useful tasks to the growth of the company. This is already true for the recruitment of partners (equity-interested member of the team), but also employees who will soon be necessary for the company. The reasons highlighted are the lack of resources, a lack of legitimacy (Barber, Wesson Roberson, and Taylor, 1999; Williamson 2000) or informal recruitment methods, based on personal "fit" or "feeling" (Heneman. Tansky, and Camp, 2000), and based on use of existing network at the creation of the startup (Aldrich and Eangton, 1997; Barber et al, 1999).

The main phenomenon described by research in a startup is the formalization and gradual crystallization of resources in dedicated department or branch based on the growth experienced by the company. Greiner (1998) showed the relation between the different stages of development in a startup and according human resources management. In his model, the startup is the first stage of development called creativity ("Phase 1: creativity"). At this stage, the company is small and its principal activity is to conduct a good or service from conception to market/commercialization, all being done in an entrepreneurial atmosphere. Internal communication is not formalized and pay is based on the promise of future gain. Greiner points out that the founder of the company has so far not a strong managerial role but uses his skills (technical skills) to initiate the development process. The entrepreneur leadership qualities are absolutely essential for the startup success, because they ensure that everyone works and share the same strategic vision. They also help to bring the skills necessary to

project the success (or not) of the startup (Bhide, 1994). The transition from the first phase to the second one is following what the author calls a "leadership crisis". As the company grows, the need for tasks formalization and working relationships arises. The founder will now be asked to tackle managerial and secondary tasks (not linked to operations and/or execution). It does not necessarily master this kind of tasks. Thus, in order to continue its growth, the company will no longer need a pure entrepreneur but rather a manager.

Thus, the most common issue which startup faces in the transition from phase 1 to phase 2 is:

- The lack of managerial skills from the founder-entrepreneur (familiar with horizontal management but not vertical management) and;
- The difficulty to access skilled-employees who can maintain the initiated growth (Drucker, 1994).

If the human resources management is underdeveloped because of its lack of formalization, some studies have examined the entrepreneur behavior according to the stage of development of the startup. As there is no tasks formalization similar to a mature company, researchers have studied what entrepreneurs actually do their startup development. This research have followed two paths:

- The first one is to determine which activities lead the startup emergence (hence an early stage for the startup);
- The second one is to determine the tasks performed by entrepreneurs when the stage of development of its startup is more advanced.

This distinction depending development stages is justified by studies highlighting entrepreneurs' change of behavior as the startup grows (for example one could mention to Hambrick and Crozier, 1985; McCarthy, Schoenecker and Krueger, 1990). These developments are in line with the life cycle of their product / service.

Activities executed by entrepreneurs at an early stage of are typically writing a business plan, build of the founding team, looking for an office space, hiring a first employee, etc. Main literature concerns was to define such activities more precisely to understand their impact on the startup success (search for good practices). For example, a research developed by Reynolds and Curtin (2010) worked on the various actions entrepreneurs can take at the time of the startup creation. They pointed out 34 types of activities. The most common actions were "thinking about strategy and product", "investing money" or "save money." Delmar and Shane (2004) have shown that writing a business plan and the legal setup of the company (writing and register articles of association or "statutes") are the first steps for the startup

development. These first steps will give the startup some legitimacy and increase the probability of reaching the stage of promotion and marketing/commercialization of its product. Besides this approach by activity, other authors have been interested in the allocation of time for each activity. Lichtenstein et al. (2006) measured the tasks performed by entrepreneurs in six different startups. They have highlighted the following tasks: investing funds, develop a prototype, determining in which market should the product be launched, build up a team, legally build the company, get an office (office, computers, telephones), open a bank account and seek funding. McCarthy et al. (1990) and Cooper et al. (1997) also put forward eight main activities in terms of time spent: manage employees, keeping accounts, contact customers, manage the production, taking care of maintenance, maintenance supplier relationship, seek funding and make a detailed schedule.

In conclusion, we can see that almost all entrepreneurs' tasks at the early stage are either unique tasks (or at least not recurring) in the life of the company, or either tasks that have an unreasonable weight compared to mature business tasks (knowing the startup tends to reach a "mature" phase)

At a more advanced stage of development (growth stage here), entrepreneurs' tasks will change from the previous early stage. As already mentioned above, in the context of human resources, Hambrick and Crozier (1985) noted that as soon as the startup team expands beyond the founding team and becomes a company with differentiated and formalized functions, the founders are faced with change in their tasks and in their requirements with new stakeholders. Specifically, Hank and Chandler (1994) have suggested that the entrepreneur will go from product development to commercialization between the two phases. Van de Ven, Hudson, and Schroeder (1984) have compared startups "launch phase" and "growth phase", and have highlighted that entrepreneurs in "growth phase" are more focused on strategic plan and decision-making activities.

[Annex 4 – Common management and behavioral patterns of entrepreneurs across life cycle stages]

	Start-up stage	Growth stage
Churchill and Lewis (1983)	Entrepreneur as a spider in his web	Recruiting professional staff who take on supervisory roles
	Obtaining customers and delivering the product	Marshaling resources to finance rapid growth
Van de Ven et al. (1984)	Entrepreneur works on average 47.7 hours/week	Entrepreneur works on average 63.0 hours/week
	Entrepreneur focus on internal activities (e.g., product development)	Entrepreneur focus on external activities (e.g., strategic alliances and relationships with supplier)
Scott and Bruce (1987)	Obtaining customers	Managing and financing growth
	Economic production	Maintaining control
Kazanjian (1988)	Technology development	Produce, sell and distribute in volume;
Kazanjian and Drazin (1990)	Set up task structure, gearing up for first marketing	overcoming functional crisis; growth related personal problems
Hanks and Chandler (1994)	Broad overlapping roles	Specialized roles
	Specialization limited to research and development, and sales	Additional specialization in manufacturing, marketing, and administrative roles
McCarthy et al. (1990)	Dealing with customers	Dealing with employees, arranging financing, planning future activities
Lichtenstein et al. (2006) for start-up stage Andersson and Tell (2009) for growth stage	Investing personal capital, developing a prototype, defining an opportunity, organizing a founding team, purchasing major equipment, asking for funding	Employee empowerment, strategic management, management of culture and vision, personal networking

Thus, entrepreneurs do not have the same tasks in all development phases of their startup. At the stage of creation, they focus on the opportunities that may bring their business, they pay attention to the development of their product / service. At this stage, the most important challenges are the product development and finalization and customer acquisition (Churchill & Lewis, 1983). This is all the more important if the product development is not smooth and will retain creative entrepreneur' attention (Kazanjian & Drazin, 1990). Therefore, entrepreneur has also role as an innovator. The small size of the company allows direct management with the entrepreneur being at the center. Communication is smooth with few rules and standards. Decisions are taking very quickly. As internal resources are minimal, the entrepreneur is working closely with its suppliers and its first customers to develop and improve its product. As the company growths, the entrepreneur's attention will focus on growth levers and financing. Production, sales and distribution require new skills in marketing or logistics, but also administrative staff (Chandler and Hanks, 1994). The company's employees will no be specialized, the company will seek to formalize and optimize processes.

Decisions will be following more formal procedures. The entrepreneur will then turn away from activities directly related to the development and commercialization of the product in order to focus on more managerial tasks. However, other activities (accounting / finance, relationships with suppliers, for example) will remain in its scope.

Hence, the thesis will deeply takes into account this two specific aspects.. For the first part, it will not try to gather specific tasks of the startup partners. Rather, it will look to use the organizational framework of mature companies to understand how they divide their resources. This allocation will not be based on time spent (as in many research studies) but instead according to the company's global resources (time, capital, etc.) by asking entrepreneurs how much credit they give to each function based on a specific scenario. By associating tasks by function, we can compare each startup to one another but also compare startups with mature companies. The second part will be to study the different proportions of allocated resources to each function of the company, and to estimate optimum perceived by entrepreneurs. There is a real advantage for entrepreneurs, to better understand how to allocate the resources of their startup (and then by growing, their company), not strictly as an urgency or issue to be solved but in a medium-term vision to achieve generation revenue and growth.

The purpose of this tasks distribution will be to build an average empirical mapping and explain the greater or lesser volatility of each function. This mapping will be explained by taking into account three key criteria: the startup sector, the stage of development and the startup entrepreneur's profile.

3.1.2. Influence of sector, stage of development and entrepreneur profile in the function distribution and their respective weight

To build a task distribution map, the first stage of reasoning will concern the functions that are not directly strategic for the company. Management functions, financial control, human resources, administrative work will be allocated to the smallest part of human and financial capital. Indeed, entrepreneurs prefer a horizontal structure rather than pyramidal management. One reason that pushes a manager to become an entrepreneur or join a startup is the work flexibility (Zanakis, Renko, and Bullough, 2012). The entrepreneur is not a manager but a

leader (Greiner, 1998). These tasks will therefore appear subordinates. We can assume they represent a small share of allocated resources. The volatility of this share will be low depending on sectors but higher depending on the stage of development. Indeed, with the search for funding and recruitment needs, the startup will gradually acquire control structures to improve efficiency. For functions that could be considered central to the success of the startup, we can bring out two main profiles, dependent on the technological and innovative aspect of startups (using an "a priori" reasoning). In the case highly technology-oriented startup, research and development as well as production functions will overwrite other functions like marketing or sale. Conversely, in the case service-oriented startup, marketing and business development will be dominant.

Here is the theoretical framework summarizing above literature and taking into account several parameters that will be thesis' core hypothesis:

Figure 1 – Graphic representation of research hypotheses and research dynamic
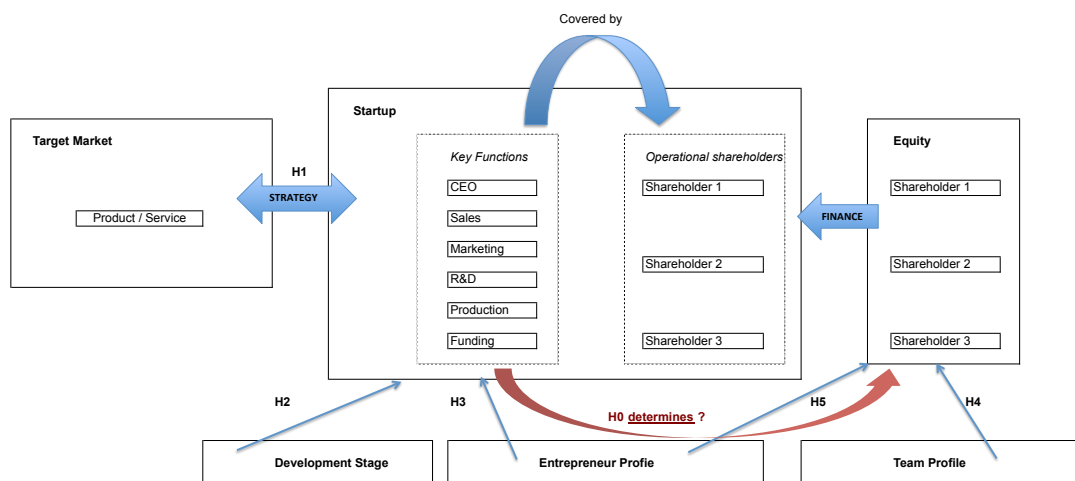
H1: The importance of each function in the startup is positively correlated with the importance of this function for the startup strategy (based on entrepreneurs' point of view).

Of course, this analysis needs to be dynamic. As argued above, the development stage of the startup has a direct influence on founder efforts and the aspects of the project on which it will focus. Within the same sector, it may be interesting to analyze the evolution of the weight of each function in relation to the stage of project development. Regarding the literature, the following hypothesis can be formulated:

H2: The weight of each function in the startup will progressively reach a balance depending of the development stage of the startup (reaching a balance being defined as equal weight for each function in the long-term).

Another parameter to consider is the entrepreneur's profile. Indeed, past experience and the entrepreneur education (mainly his degree) will overweight certain criteria in relation to others.

H3: The weight of some functions will be positively correlated with the archetypal functions of the entrepreneur's profile.

Hence, from the literature, the function distribution can be modeled as follows:

Resources allocated to an operational function = F (sector, stage of development, partners' profile, team profile)

3.2. Functions distribution between operational partners and equity distribution

3.2.1. Linking functions and equity distributions

Once functions mapping is established, the next step is to study the link between these functions and equity distribution.

Our reasoning will focus on the allocation of capital in the start-up and determinants of the latter.

Startup creation can also be defined as resources aggregation to achieve a goal (to develop a new product, entering a new market, etc.). The first constraint of the entrepreneur is the financial constraint: he will seek equity (together with additional resources to its inputs, such as the ability to identify opportunities, market knowledge, technical expertise), as bank financing is unlikely without several years of balance accounts and financial statements (credit manager in banks do no like risks). The only bargaining power of the entrepreneur is equity. The main question is about the resources the entrepreneur needs to gain at first, and at which price. Most of the contributions that will add to the entrepreneur's project are non-financial ones. They can also take many forms (which makes them very difficult to assess as they are essential to the survival of startups). Hesterly and Hite (2001) or Khayesi and George

(2011) emphasized the importance of having diverse and abundant resources to allow the initial development of the product. To maximize its resources, the entrepreneur will appeal to other individuals who will assist him in the development of the company, with or without financial contribution. Those who join the startup will be part of the founding team. At the beginning, the dilemma is who will receive equity and how. Kotha and George (2012) proposed a tree of choice according to the willingness of the entrepreneur to distribute equity.

[Annex 5 – A model of perceived fair equity distribution in startups and its impact on team interaction and outcomes]
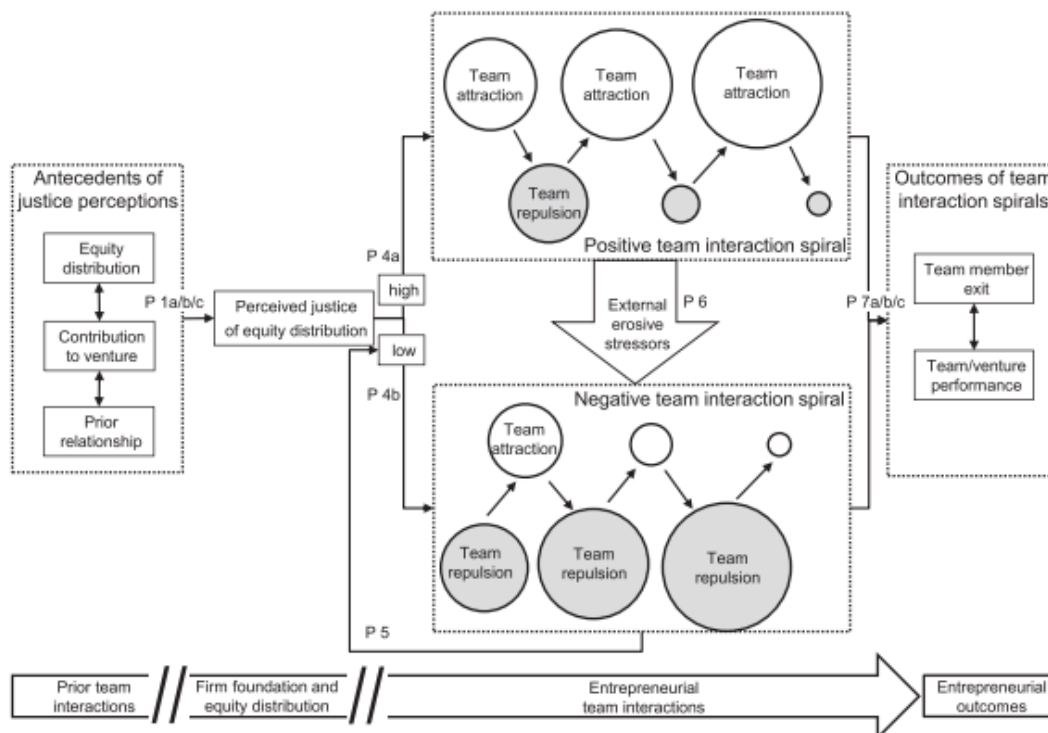
This tree should go from an equal distribution between partners (meaning a very little selective distribution) to the use of other mean of payment for the resources provided (in order to avoid dilution of the founding partner). Both authors then tried to understand why equity distribution is not equal between partners. Because of the lack of cash, the entrepreneur pays future contributors/new partners with equity (a financial option) based on the future success of its business. However it is not riskless for the entrepreneur: the new partners can benefit from the success of the startup, whether they really contribute to it or not, leading to a "stowaway" phenomenon (Holmström, 1982). Indeed, equity distribution does not necessary guarantee that expected resources will be delivered. Above all, we must consider that the

entrepreneur has evaluated ex ante the resources needed and the contribution of each of the resource to the success the startup, that being done in a risky and changing context (Alvarez and Barney, 2005). Therefore, there is no obvious and/or unambiguous and/or operational link between resources added at the beginning of the company and equity distribution. The literature highlights other factors than contributions in equity distribution (developed below).

From here, the reasoning is twofold:
- Knowing that it is quite difficult to assess today newly added resources to the startup, we can consider equity distribution as depending on theoretical distribution of past (partner ability to solve issues so far) and future tasks (depending on partner's profile), based on their strategic importance for the startup;
- Conversely, it seems easy to assess added resources so that equity distribution depends on each partner's contribution. In this case, partners with most important added resources will be in charge of the most critical functions.

Hence, this link between equity and partner's role can be added to additional criteria highlighted by literature to explain equity distribution: entrepreneur's previous experience (who probably makes more cautious when deciding equity distribution) links between team members, governance considerations (control vs. equality) etc. Therefore, an additional hypothesis needs to be added:

H0: There is a link between the startup key functions covered by a partner and the equity he owns in the company.

3.2.2. Team typology and entrepreneurial experience linked to equity distribution model

<u>Team's creation and characteristics</u>

Team is key for the success of a startup. It rarely depends on one man or woman. 70% of innovative companies created in the US were created with a team of two or more peoples (Ruef et al., 2003, Davidson and Honig, 2003). Above all, startups launched by numerous teams are overrepresented in the "success stories". We must therefore introduce here the

distinction between founding entrepreneur (the literature called it "focal entrepreneur") and the team of partners who joined him. The founder- entrepreneur has the original idea to create a business. He surrounded himself by attracting a more or less constricted and committed team (part-time work or full time, partner or employee, etc.). Lazear (2002) highlighted the fact that entrepreneurs are often generalists with skills in various areas, and an important aspect of their work is to combine different talents. The entrepreneur is able to identify investment opportunities, knows how to combine existing resources in an innovative way, but he is lacking of accurate knowledge and needs specialists to develop his project. The team construction is central in the initial stages of his entrepreneurial adventure.

Thompson (2011) developed a three-step model for team constructions. The first step is to analyze the task (task type, autonomy of the team, interdependence with other tasks in the startup, etc.). Then, the manager must determine who are the people best able to fulfill this task (technical or managerial skills, interpersonal skills, team members complementarity). The last step is to put in place explicit or implicit standards to carry out this task. From the beginning, the founding partner has to link the core tasks for the startup develoment with members of his team. His goal in building up the team is to find the best partners / collaborators that will complement the resources they already have (financial, technical, or other). An essential condition for the startup success is the entrepreneur's ability to quickly detect the most critical resources for the development of the startup and to unite the team around him in order to obtain the resources promised by each to achieve his goals. The literature uses several analytical frameworks to understand how to gather these two objectives.

Taking the perspective of social capital analysis (defined as an organization which depends on its environment to obtain resources) several studies have investigated whether interests' matching of the founding team was done based on the confidence the team gave to the focal entrepreneur (related to previous relationships), or based on the focal entrepreneur's resources and profiles (equity, expertise, previous experience of entrepreneurship, etc.) or both. The results showed a correlation with the latter hypothesis (Binks et al., 2006; Lin et al., 2006; Mosey et al, 2006), highlighting the importance people gave to entrepreneur's ability to mobilize resources other than its own ones. This is what creates confidence (Alix & Krieger, 1999; Krieger, 2001).

The "grid management resources" (Barney, 1991. Ray et al, 2004) confirms this point. The mission of the founding entrepreneur is to combine all of the team's resources to obtain a comparative advantage for the startup in its market. The difficulty is twofold: find the missing

skills for the startup and integrate various resources for a common purpose. Again, the notion of trust is very operative. Wu et al. (2009) emphasize the importance of trust not only to acquire strategic resources for the company, but also to increase all team members' involvement. Therefore, it will increase the comparative advantage of the startup.

There have been work about startup creation in the Sociology field. Ruef, Aldrich and Carter (2003) have highlighted five different aspects to explain team formations:

- "Hemophilic" aspect, which considers that teams are built up because of similarities between individuals (age, sex, ethnic criteria);

- "Functional" aspect, which takes into account the characteristics used by individuals to achieve a goal (leadership, specific skills, etc.);

- "Social" aspect, which highlights the fact that individuals with the highest social status will attract more than those with lower social status (network);

- "Ecological" aspect, which gives importance to the ecosystem surrounding the team (geography, industry). The constitution of a team within the framework of a business creation will take into account these different shades with varying degrees of salience.

To sum up, team constitution responds to a strategic problem for a startup while being modulated by sociological considerations. Studies have questioned the type of resource needed at first such as the link between the homogeneity or heterogeneity of the team (and resources) and the performance of the startup. The results are mixed. While some studies highlight the homogeneity as a key criterion for success in the early stages, heterogeneity appears to be a more creative value from a certain stage of development (Steffens, Terjesen, Davidsson, 2012). Other studies showed the link between university degrees and past management experience of the team for the startup to be successful (Colombo and Grilli, 2009). Degrees in management schools combined with industry expertise are the two features that stand out.

Thus, literature emphasizes that team constitution reflects a problematic acquisition of key resources for the start-up brought by new partners (resources being understood in the broad sense, whether inputs, knowledge and/or networks). This question cannot be analyzed without considering the focal entrepreneur's profile and governance constraints. Indeed, resources assessment does not fully explain equity distribution. Literature talks about team typology.

Team typology and corporate culture

We can distinguish several human resources management styles in an innovative startup. Baron and Hannan (1996) pointed out informal human resources policy startups. By conducting interviews, the authors realized that the majority of entrepreneurs had no formalized ideas on recruitment policy. From three criteria, (employees' motivation, the selection process and the control on the labor force), the two authors have developed five unconscious models of human resources management: the star model, the engineering model, the commitment/relationship model, the bureaucracy model and the autocracy model. Above all, they have shown that founding team's characteristics at the time of creation have an influence on the informal policy implementation. Human resources policy appears as a reflection of the culture of the company and links built between partners and employees.

[Annex 7 – Teams typology in startups]

Basis of Attachment & Retention	▪ Compensation ("money") ▪ Qualities of the work ("work") ▪ Work group as community ("love")
Criterion for Selection	▪ Skills ▪ Exceptional talent/potential ▪ Fit with the team or organization
Means of Control & Coordination	▪ Direct monitoring ▪ Peer and/or cultural control ▪ Reliance on professional standards ▪ Formal processes and procedures

DIMENSIONS			EMPLOYMENT MODEL
Attachment	Selection	Coordination/ Control	
Work	Potential	Professional	STAR
Work	Skills	Peer/cultural	ENGINEERING
Love	Fit	Peer/cultural	COMMITMENT
Work	Skills	Formal	BUREAUCRACY
Money	Skills	Direct	AUTOCRACY OR DIRECT CONTROL

These different human resources management types help to give an accurate collaboration typology for the startup. They have an impact by deciding which spirit will embody the company. They reflect the personality and the objectives of the focal entrepreneur. They represent relational capital (Clark and Mills, 1979; Fiske, 1992):

- Equality scheme, which tries to balance resources between partners;
- Authoritarian scheme, which allocates resources based on hierarchy;
- Value scheme, which distributes resources based solely on their intrinsic value (monetary);
- Community scheme, where resources are divided into functions individual needs.

Thus, the different types of teams highlighted by Baron and Hannan (1996) may unconsciously adopt these relationship patterns.

From there, one can imagine that equity distribution is influenced by each of these models at the startup creation. Depending on the focal entrepreneur vision of his desired team (ideal team), on priority gave to recruitment and corporate culture, his willingness to allocate equity will be more or less egalitarian.

H4: Team typology is correlated (positively or negatively) with the ablity to fairly allocate equity.

Management and governance within the team

Previous hypothesis H4 must be linked with team governance. A major aspect of equity distribution is to allow both founding entrepreneur control on the startup governance (thus on shares structures: majority vs. voting rights) and the right pay (only in equity at the beginning, assuming the startup cannot afford at its creation to give a salary to its partners) for other partners regarding the work they have already done or the work they will do. Equity will be modulated in relation to these issues. For example, in case of strong family ties, Kotha and George (2012) showed a greater propensity to use highly egalitarian distributions. This is explained by emotional ties but also by the desire to avoid frustration by creating symbolic differences between the shareholders. In contrast, serial entrepreneurs are able to distribute their equity in a very selective way, as they can convince their partners that even a small share of capital greatly remunerate their efforts. Again, a perceived fairness is at the heart of the distribution process. Marquis and Margolis (2012) gathered interviews from entrepreneurs regarding equity distribution in their businesses. Entrepreneurs recognized that equity issue does not expect a rational and accountable answer, but rather a practical and partly emotional processing. They even call to use an arbitrator to avoid future disputes.

In total, team typology and entrepreneur's profile have been highlighted to explain distributions (hypothesis H4). However, a model trying to determine the fair equity allocation should take into account partners' objectives: to give a partner a clear control over the company, to maintain strict equality between the partners and all intermediate situations that may exist.

The focal entrepreneur's profile

Shane (2000) noted that prior knowledge of existing markets from entrepreneurs (sector knowledge, how to enter the market, main customer issues etc.) give them the ability to think about a product/service that will meet market's current needs. In this case, entrepreneurs will know how the market works. This knowledge can take many forms: customer and/or supplier relationship, master of marketing and cost structure, etc. So lots of startups are based on ideas from a previous professional experience (Bhide, 2000). Wiedenmayer and Aldrich (1993) showed that previous entrepreneurs' employers are often associated with the startup, as a customer or a supplier, for example. The sector's previous experience allows startups to

integrate into its business network in a quicker and more user-friendly way, which will ensure the success of the company.

Merz, Schroeter and Witt (2010) tried to determine more precisely what kinds of experiences would be most useful for startup founders. Their results have highlighted the importance of previous experience in the industry on the same level as previous entrepreneurial experience. They have concluded that a one-year experience in a specific industry is enough for a substantial effect on the startup newly created.

The impact of prior entrepreneurial experience in a new entrepreneurial adventure has been studied from many angles. According to studies, between 22% and 50% of startups created each year in the US are made by serial entrepreneurs. Abetti and Stuart (1990) showed that prior experience of the founder, in the case of technology companies (whether entrepreneurial or managerial experience) had a positive impact on the startup performance at initial stages of development. The success or failure of a startup creation enables learning the rules of this specific process. Not only an experienced entrepreneur will not repeat the same mistakes, but he will have greater access to resources that are necessary for its newly created company. For example, Zang (2009) showed that experienced entrepreneurs - if venture capital firms had already financed their previous startup – have risen more funding than new entrepreneurs and earlier in the life of the startup. He adds that it is not only the network acquired with financial circles that seem to explain this phenomenon, but also better performance from the entrepreneur itself. Thus, the experienced entrepreneur will benefit from the skills acquired, but also networks that he will exploit accordingly. Entrepreneurs with several entrepreneurial experiences were given a quick learning curve due to their exposure to specific business creation process (Gompers et al., 2005; Sorensen, 2007; Ucbasaran et al, 2009). In particular, these entrepreneurs are likely to experience more accurately their needs in terms of resources and thus can capture these resources more effectively. These entrepreneurs will be able to raise funds from financial investors with greater ease (Gompers et al., 2005). They will be more selective in how they distribute equity (Kotha and George, 2012), and will also be able to recognize more easily the most promising investment opportunities than new entrepreneurs (Shane, 2000). They will be carrying a profitable project (Bhide, 2000), especially if one considers that experienced entrepreneurs will select projects that really create value (Gimeno et al., 1997). An experienced entrepreneur inspires more confidence in his team, which aligns its goals with the hope to see its startup being another success.

H5: Past entrepreneurship experience is negatively correlated with the capacity to allocate equity equally.

Thus, literature points out several factors to explain equity distribution variation within a startup (other than pure contribution assessment). We can model the equity allocated to each partner as follows:

Equity = F (importance of functions covered in the startup, personal contribution, team typology, focal entrepreneur's profile, startup governance's goal, number of partners)

For simplicity purpose, we will neglect personal contribution in this model. Even if they are an essential element of negotiation between partners, we will only consider startups where contributions are negligible (either because they are of equal value or because they are small). Above all, early stage startups have very little equity. For example, in the United States, initial equity for startups is quite low: 26% of start-ups have less than 5000$, 60% have under 50,000$ at the beginning (K. McCaffrey, 2003). Startups for which our assumptions are limited represent a good proportion of startups cases.

Thus:

Equity = F (importance of functions covered in the startup, team typology, focal entrepreneur's profile, startup governance's goal, number of partners)

3.3. Summary of research hypotheses

H0: There is a link between the startup key functions covered by a partner and the equity he owns in the company.

H1: The importance of each function in the startup is positively correlated with the importance of this function for the startup strategy.

H2: The weight of each function in the startup will progressively reach a balance depending of the development stage of the startup.

H3: The weight of some functions will be positively correlated with the archetypal functions of the founder profile.

H4: Team typology is correlated (positively or negatively) with the ability to equally allocate equity.

H5: Past entrepreneurship experience is negatively correlated with the ability to allocate equity equally.

4. Methodology

4.1. Startups sample

The startups sample used in the research is generally composed of two types of companies: startups with low technological dimension, from incubators of business schools (HEC, Audencia Nantes) and engineers (Centrale Paris); more technology companies from the Network Plus club (helping program for the creation of high tech companies). On the sample of 180 companies, 66 will thus belong to the category "High Tech", 101 to the category "Low Tech". 13 startups have been excluded because the information was not exhausted or not detailed enough to be useful. These 13 startups would probably have misestimated the main findings and conclusions if kept in the exploited sample. In terms of stage of development, the sample is composed of very young companies ("seed," or newly created companies) which have not yet sold their product or are still at the stage of product development and definition of their business plan (companies created from beginning of 2014 until end of 2015), to more mature companies that have already registered real commercial success (early / growth stage). The oldest company in the sample was founded in 1980, although this is anecdotal compared to the average age of the startups sample: 4.7 years. The aim of this dual sample is to measure clear differences in the perception of functions importance in relation to the intensity of technological innovation. The use of these structures (incubators, associations, clubs) can make a first selection on the typology of companies included in the sample: low technological orientation for business schools or engineering schools incubators but high technological potential for the Network Plus club. Structures like incubators have made a clear selection in the projects they choose to support in order to pick those with the highest potential. Part of startups funding in France goes through these kind of structures. Being incubated maximizes the probability of receiving funding, the incubator offering a brand and a label to the startup, as a privileged access to sources of funding (start-up contest, business angels, venture capital funds). This is a strong signal of probability of success (however, sometimes the project is still under-defined).

The sample will suffer from some biases based on startups background and origin. The incubated companies are innovative companies at a very early stage of development. Startups have often in their creative team several students from the school, so a differentiation (which is to be measured) can be made according to the school (engineer vs. business) and also according to the age of the startups founders in the incubators (often MSc. students without

concrete work experience). The incubated companies have not reached a certain stage of development and are still very risky. Although we can easily say they have a higher probability of success compared to startups that are not advised by this kind of structure, we cannot allow to straightly conclude from this sample of incubated startups the idea of "success" or the idea of "optimal structure". The founders' team of incubated startups is often the only to command and execute, knowing that startups have not yet significant financial resources (and incubators are often a paying service for providing different kind of help to startups). This observation needs to be tempered by the gain of visibility well-known French incubators are starting to have (seeing the success of their previous incubated startups): the HEC Incubator was founded in 2007, Audencia incubator in 2003, the incubator of Centrale Paris in 2000. However, the bias is different for the Network Plus club: startups incubated are quite mature, the founders are generally more diverse and experienced and financial resources are higher. As a conclusion, if biases exist per "sub-sample", the entire sample is representative of innovative start-ups in France.

A total of 169 startups have responded to the survey. If some responses were not complete (very few startups have skipped one answer or not entirely answer to it), all had exploitable data for the whole thesis or some part of the thesis.

4.2. Variables

4.2.1. Independent variables

Several independent variables will be used to test the research hypotheses: the startup sector, the stage of development, the number of operational founders, the type of team and the previous experience of founders. These are nominal qualitative variables.

4.2.2. Dependent variables

In the protocol research, two dependent variables were studied: the weight and distribution of operational functions between the founders and equity distribution between the founders. These variables are quantitative. They can be assumed to follow a normal distribution. Indeed, averages of random variables drawn from independent distributions converge in distribution to the normal, that is, become normally distributed when the number of random dependent variables is sufficiently large. The normal distribution might be representative of

early investors (small equity share with little or no operational functions), operational partners (large equity share with high operational functions in the startup) and late investors (small equity share and little or no operational functions).

4.3. The survey

4.3.1. A simplified survey in order to measure a perception

The survey (available in Annex 8) was designed to capture the perception of an optimum. The survey structure has been designed for the entrepreneur to be influenced by his own experience to capitalize on its expertise. Thus, the survey starts by questioning the company itself, then the entrepreneur's profile, before leaving reality in order to ask fictional questions: how would you do today? This methodology limit is that it does not measure a real phenomenon but a fictional one. It would have required using more intrusive questions and conducting face-to-face interviews with the entire sample, in order to precisely measure the distribution of each function using the time spent on it and by classifying each job afterwards. Similarly, in order to get an average equity distribution between founders, it would have required asking for actual repartition between those founders. This approach has two significant limits: it is very time-consuming, and above all it is limited by the unwillingness of founders to provide such sensitive information as equity distribution. In order to maintain simplicity and to maximize the scientific value of obtained results, concessions had to be made.

A requirement related to the implementation approach concerns the person of the startup that had to answer the survey. For reasons of consistency and convergence of perceptions, the survey was sent to operational shareholders of the startup. Indeed, only the latter have an overview of the startup and are at the heart of all issues studied: equity distribution, strategic importance and the distribution of functions.

4.3.2. The measure of the startup characteristics

To determine the impact of technology on mapping functions distributions, the first approximation that was used is to take into account the origin of the start-up (Incubators, Network Plus), and the startup sector. To comply with this simplicity, the survey proposed five sectors, taken from the "top 100 startups to invest in France," from the Challenges

magazine [1] (a reference in France for business and startups): Services, Social Network/Collaborative startup, Technology and Telecom, Health and Biotech, Sustainable Development and "others". By combining startup origin and type of sector, the sample has been divided into 2 categories depending of technological intensity: weak technological intensity ("Services" startups across all startups and from incubated startups in Business Schools) and high technology intensity (other sector and from Network Plus club).

The second startup characteristic that I have sought to measure is the startup's development stage. The approximation retained is the company's creation date. Indeed, after having considered a development stage based on clear segmentation (creation of business with founders association and business status filled // first recorded sales, development of customer panel, first hires // rapid growth sales, funds seeking), constraints linked to survey format lead to adopt the other approach.

4.3.3. The measure of the founders characteristics

A key parameter is the size of the team. The survey limits the number of founders to 5. This limit was estimated as being the one that was losing the lesser information while keeping a simple way to answer the survey (MCQs rather than enter a precise number). Before building up the survey, I have found on press release and public startup information that it is quietly uncommon to see newly created companies with more than 5 business founders at the beginning.

In order to simplify team typology proposed by the literature review, the survey was limited to define three types that correspond best to interviewed entrepreneurs: a Star model (a generalist background team), the Engineering model (a team of specialists), the Commitment/Relationship model (a team bounding by friendship relationship or other similar relationship like family). The other models have been neglected considering that they corresponded to more mature startups, not concerned with creation.

4.3.4. The characteristics of the "answerer" founder

It would have been interesting to take into account both the academic and professional background to measure both the education bias and the experience bias. To facilitate information collection, the survey is limited to a certain level of study (MSc / PhD) and a

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[1] http://www.challenges.fr/classements/start-up/2013.html

profile (management-business / engineering / medical). Another aspect taken into account is the entrepreneurial experience. To pursue my effort of simplicity, but also because the literature emphasizes that only the first year of experience is statistically significant, the question is limited to determine whether there was or not experience, not to deeper characterize this experience.

4.3.5. The determination of each function's weight in the startup

By cutting out each function, I have determined 6 generic functions that overlap concrete realities when creating a company. These functions are: general management, marketing, sales, research and development, production and fundraising. Other functions have their importance but have been neglected: human resources management (recruitment in particular), administrative management, supplier relationship management (purchases), etc., starting from the hypothesis that at an informal and creating stage, these functions would be naturally included in the first 6 functions and does not have the same prevalence when building up a company. In addition, it was important to limit the number of functions as 6 key functions in order to provide a minimum of theoretical volatility between functions in the allocation of a fixed number of points (question 8 of the survey, available in Annex 8). Indeed, in the survey, I have asked to allocate by priority 100 points of key resources (considering that the newly created startup has 100 points of key resources to allocate at the beginning) between the 6 detailed key functions (CEO – general management // Head of Sales // Head of Marketing and Public Relations // R&D and Technical Development – CTO // Production, Logistics and Quality Process // Fundraising and Financial Management). The allocation of scarce resources implicitly measures the perception of strategic functions needed to make the startup succeed (reaching commercialization for example for early stage startups). Regarding the distribution of key functions between operational founders, we reach a limit when there are 6 (or more) founders for the fictive startup. However, this is not statistically significant.

5. Results

5.1. Descriptive statistics

5.1.1. Independent variables analysis from the model

Figure 2 - Summary Table of the Various Independent Variables

Variable	Number of answers	Possible answers	Counting
Sector	167	Tech & Telecom	7
		Services	4
		Health & Biotech	3
		Sustainable Development	
		Social Network/Collaborative startup	
		Others	
Age	167	< 2 years	4
		Between 2 and 5 years	6
		> 5 years	6
Number of operational founders (existing)	166	1	1
		2	6
		3	5
		4	1
		5	
Type of team	158	A strong bounding team (friends/family)	4
		A generalist team with high potential	2
		A team of specialists with key expertise	8
Previous entrepreneurship experience	166	Yes	5
		No	11
Academic profile of the "answerer"	166	Engineering / Technical	3
		Management	5
		PhD/Pharma/Medical	3
		Double academic background	4
		Other	
Number of operational founders (desired)	165	1	
		2	5
		3	7
		4	1
		5	1

The sample is large enough so that each independent variable is statistically representative of the population studied. Indeed, the sample represents 180 startups answers while there are less than 30,000 companies created each year in France. This leads to a confidence level up to 95% as the number 180 startups is enough to statistically represent the whole startups

tendency in one year in France. This means that the information extracted form the sample is well representative of what would have been extracted if one could have interview the 30,000 existing startups in France. The correlation matrix (Figure 4) shows quite a few connections between the independent variables, highlighting their intrinsic explanatory nature of analyzed phenomena. However, there are some questions raised by the matrix:

- The link between the sector (and thus the technological aspect) and the academic profile and the answerers;
- The entrepreneurial experience and the profile of the entrepreneur;
- The startup sector and its stage of development;
- The age of the startup and its number of founders.

Figure 3 - Mean and standard deviation of a selection of independent variables

Variable	Description	Mean	S.deviation
1. Highly technological	Value of 1 if the startup is highly technological oriented	0,38	0,49
2. Age	Startup age since its creation	4,66	4,79
3. Number of founders (existing)	Number of founders in the current structure	2,58	1,01
4. Strong links in the team	Value of 1 if it is a family/friend team	0,28	0,45
5. Entrepreneurship experience	Value of 1 if the answerer has already an entrepreneurship experience	0,31	0,47
6. Management background	Value of 1 if the answerer has followed management courses	0,55	0,5
7. Change in number of founders (desired)	Difference between the actual number of founders and the number of desired founders	0,29	1,07

Additional analysis (Chi 2 test) was conducted on these four points, showing that the sector and the academic profile were not independent (the more the sector is technology-oriented, the more PhDs/Pharmas/Doctors are implied; conversely, the lesser the technology is key, the more management entrepreneurs have answered the relevant questions in the survey), as well as the entrepreneurial experience and the entrepreneur's profile (serial entrepreneurs are

clearly dominated by management profile entrepreneurs or dual background entrepreneurs), the startup sector and its development stage (the more mature companies are the most technological ones). Finally, the older the startup is, the more it has a high number of partners. The strong correlation between the number of real partners and the number of desired partners was expected. In the end, the risk of multi-collinearity between the variables can be ruled out, a test using the variance inflation factor has been practiced and proving conclusive (v_j no greater than 2).

Figure 4 - Correlation matrix of a selection of independent variables

Variable	1	2	3	4	5	6	7
1. Highly technological	1,00						
2. Age	0,21	1,00					
3. Number of founders (existing)	0,13	0,18	1,00				
4. Strong links in the team	-0,04	0,01	-0,08	1,00			
5. Entrepreneurship experience	-0,03	0,13	0,04	0,03	1,00		
6. Management background	-0,24	-0,09	-0,03	0,03	0,27	1,00	
7. Change in number of founders (desire	-0,14	-0,06	-0,61	-0,05	0,00	0,10	1,00

Note: Test r≠0, avec $p<0,05$

The sector

Regarding sectors, the sample is concentrated on three main areas: Telecommunications (34%, n = 44), Services (18%, n = 76) and Biotech (11%, n = 22). This distribution is particularly true in the Network Plus sample, incubators of business schools being largely dominated by services companies. Sectors where startups highly represented are rather limited. Especially, based on an historical perspective, on the one hand, samples tend to become more and more specialized and on the other hand, startup creations reflect fluctuant market needs and/or market conditions (as a consequence of new networks emergence, new technologies or the need for outsourcing, for example). Thus, startups from Network Plus club used to be mainly dominated by Telecom startups and are now dominated by Biotech startups if we take into account the last 2 years (among the 29 startups that have answered and that have over 5 years of existence, 49% were in the Telecom sector; among the 21 startups that

have answered and that have less than 2 years of existence, 61% were in the Biotech sector). The trend is similar in other sample: for the HEC Incubator, 59% of startups that have answered and that have less than 2 years of existence are focused on Services while 40% of startups with more than 5 years of existence were focused in the Telecom sector. This highlights entrepreneur's ability to identify investment opportunities and understand the market in which it operates.

Graphic 1 - Startups creation per year (total: 167 startups)
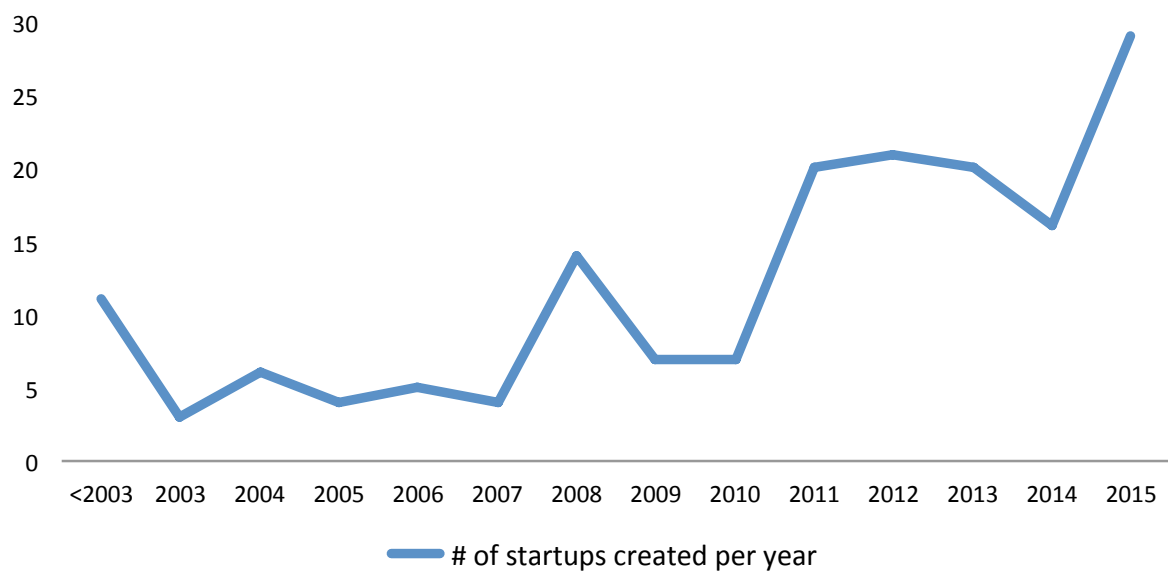
Graphic 2 - Sector distribution

Legend:
- Tech & Telecom
- Services
- Health & Biotech
- Sustainable Development
- Social Network
- Others
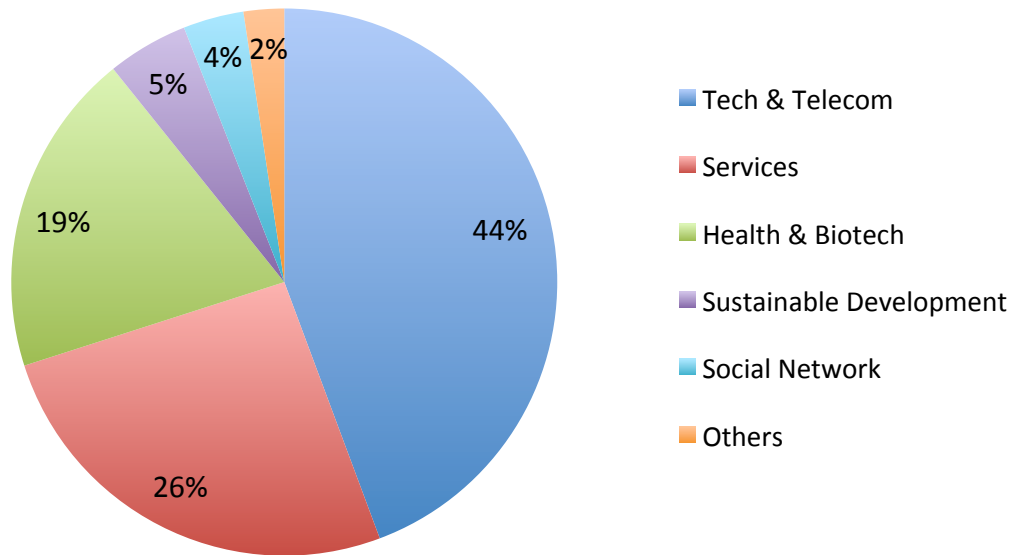
Graphic 3 - Startups distribution evolution per sector over time

Legend: Tech & Telecom | Services | Health & Biotech | Sustainable Development | Social Network | Others
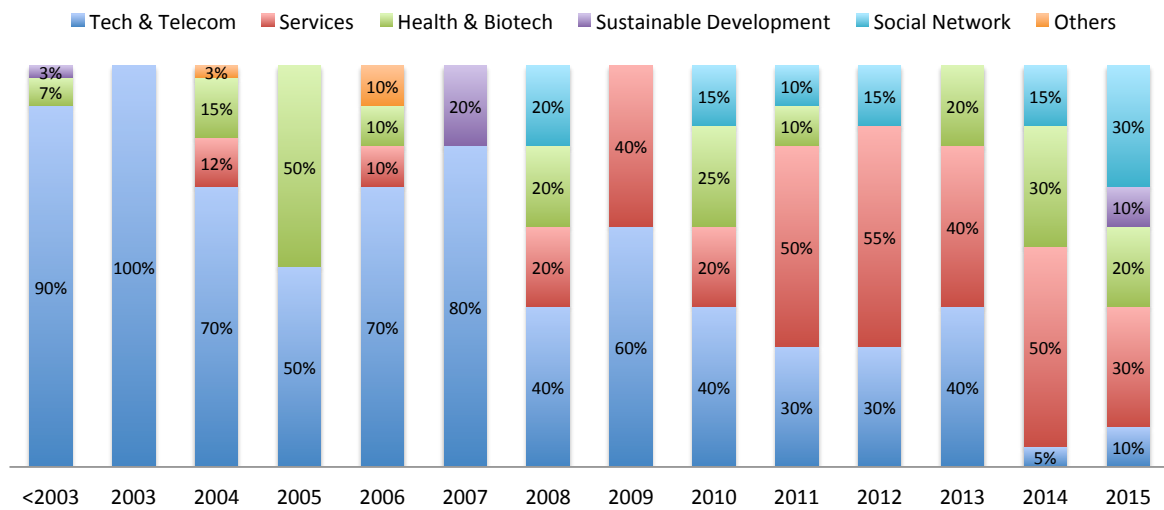
Age

The average age of startups from the sample is 4.3 years, which means that the sample is quite mature. 45% (n = 111) of startups have more than two years of existence. The older startup was created in 1990 while the younger one has not yet filled company creation statuses. Here again, a comparison between sub-samples is instructive: the Network Plus sample is more mature than the sample with schools incubators.

Graphic 4 - Startups distribution based on life existence
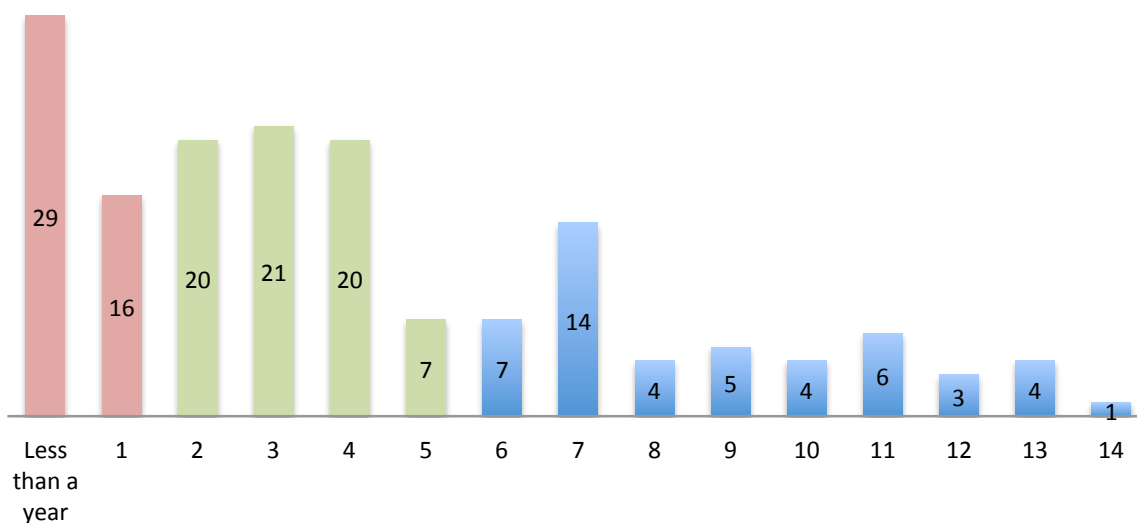
Number of operational founders (existing)

The average number of partners in the startups sample is 2.9 founders. 39% (n = 70) of startups sample are composed of 2 founders, 33% (n = 55) are composed of 3 founders. We can notice that the number of partners is linked to the age of the startup: on average, startups with 2 or 3 partners have 8 years old, those composed with 5 partners have more than 15 years old. This result could have been predicted because a new partner (meaning a new equity owner) is linked to new funding for the company (in order to finance the company growth) without threatening existing partners with an excessive capital dilution.

Another expected result is the difference in number of partners between Low Tech startups and High Tech startups: on average, the first ones will have 2,7 partners while the second ones will have 2,8 partners. In a High Tech startup, the cost of R&D (to develop the marketed product) is quite higher. Hence, High Tech startups need both additional financial and human resources compared to Low Tech startups. This can explain the difference we observe. Moreover, "tech skills" are scarcest (as for example a cloud computing architect or UX/product experience specialist) and thus more expensive.

Graphic 5 - Startups distribution based on existing partners

1 partner	2 partners	3 partners	4 partners	5 partners
19	69	51	18	9
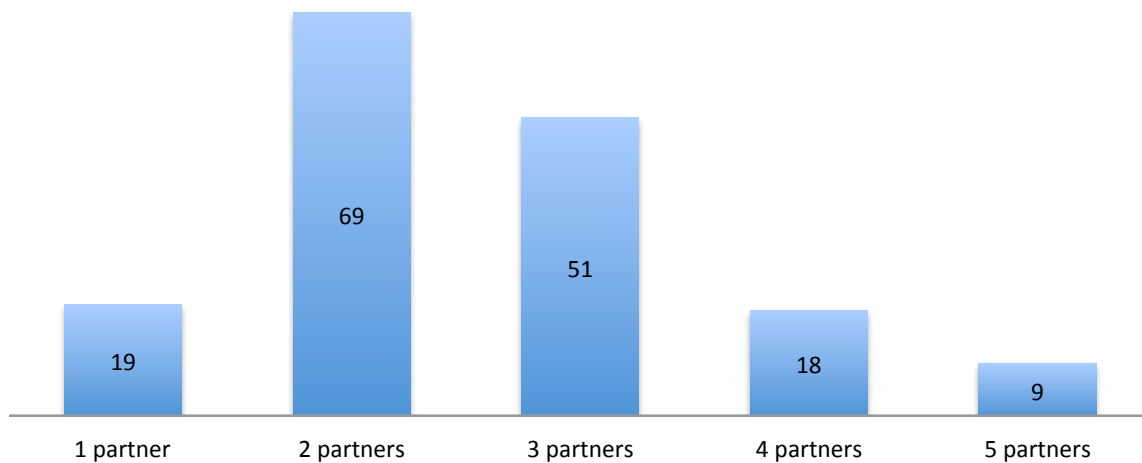
<u>Type of team</u>

Teams from the sample are mostly composed of specialists (66%, n = 77) whereas it is uncommon to see generalist teams, representing only 15% (n = 21). Logically, team typology is reversed between incubators and Network Plus group: for example, the "specialist" type accounts for 74% of answers from the Network Plus group whereas the "strong boundaries" only concern 29 % of answers; for the HEC incubator group, the "strong boundaries" typology concerns 23% of the teams, the "specialist" typology concerns 28% of the teams. This reverse phenomenon can be both explained by:

- The structure the sample groups (incubators gathered students from the same schools so they have more opportunities to link close relationships; the Network Plus network is mainly composed of work-experience entrepreneurs and links were mostly bounded through professional meetings);
- The business sector (high tech startups will favored tech skills rather than relationship skills whereas low tech startups like services startups will favored market opportunities and thus will not first look at both skills).

If we look at technological intensity in the sample, we observe that 68% of high-tech startups will be composed of specialists against 39% for low-tech startups. Another key point is the predominance of the "strong boundaries" typology: it concerns 29% of the teams, whatever the technological intensity is. The "generalist" typology serves as the adjustment variable, absorbing almost all the "specialist" typology's variance. More surprisingly, the entrepreneurial experience has no influence on the team typology. We cannot conclude that serial entrepreneurs perceive a specific typology as more efficient than another one.

Previous entrepreneurship experience

A previous startup experience is a minority phenomenon in the sample: only 29% of interviewed entrepreneurs have already been part of another startup team.

Academic profile of answerers

Answerers' profiles are quite diverse: 35% have a management-oriented profile (n = 64), 31% are engineers (n = 45) and 18% are physicians, pharmacists or doctor students (n = 29). Double competence answerers represent 21% of total answers (n = 60). The distribution profiles by sector shows an overrepresentation of strategic skills profiles: 66% of answerers working in the Biotech sector are doctors or pharmacists; 62% in Services sector are management-degree entrepreneurs. More surprisingly, engineer's profiles do not dominate in high tech sectors. Instead, double competence profiles and PhD students are the most represented in sector with high technological intensity.

Number of operational founders (desired)

The difference between real operational founders and desired operational founders is quite small: 27% (n = 49) consider a team of 2 members as optimal, 55% (n = 89) opt for 3 founders. 76% of answerers who do not change their number of founders over time when we compare the number of real founders and the number of desired founders are teams of 2 to 3 founders. Moreover, 41% of founders from a team of 4 founders or more believe that their desired team should be composed of 2 or 3 founders. Symmetrically, 67% of founders from a team of 2 founders or less consider a team of 2 or 3 founders as preferable. Thus, teams composed of 2 or 3 founders seem to be a clear reference or an "anchorage point".

High tech startups are composed of more diverse profiles and founders than low tech startups. This is showed by a more thick-tailed distributions, deviating from the average of 2,6 founders.

5.1.2. Functions distribution in the different startups

Means and standard deviations

Functions distribution allows to point out some functions over others. First, entrepreneurs sees product /service development as the central function (average score of 26,0 for R&D on 100 points to be distributed). Marketing/commercialization will also grab entrepreneur's attention (average score of 25,3 for marketing/commercialization function). However, CEO's function is not perceived as such an important function (average score of 11,5). As product is the priority, the startup does not need a manager but a leader who will sometimes take on management responsibilities. Nevertheless, these averages are inherently unrepresentative. The standard deviation is meaningful for functions like R&D (16,8 points), sales (12,4 points) and CEO (10,1 points). Several factors influence the perception of a function by the entrepreneur: the sector, entrepreneur experience and the stage of development of the product should explain this volatility. Marketing functions, production/operations and fundraising have obtained lower scores and especially tighter around the general mean (on average, 15,2 for marketing, 13,1 for production/operations and 11,7 for fundraising). The least volatile function is marketing/commercialization.

Graphic 6 - Functions' means and standard deviations within the startup
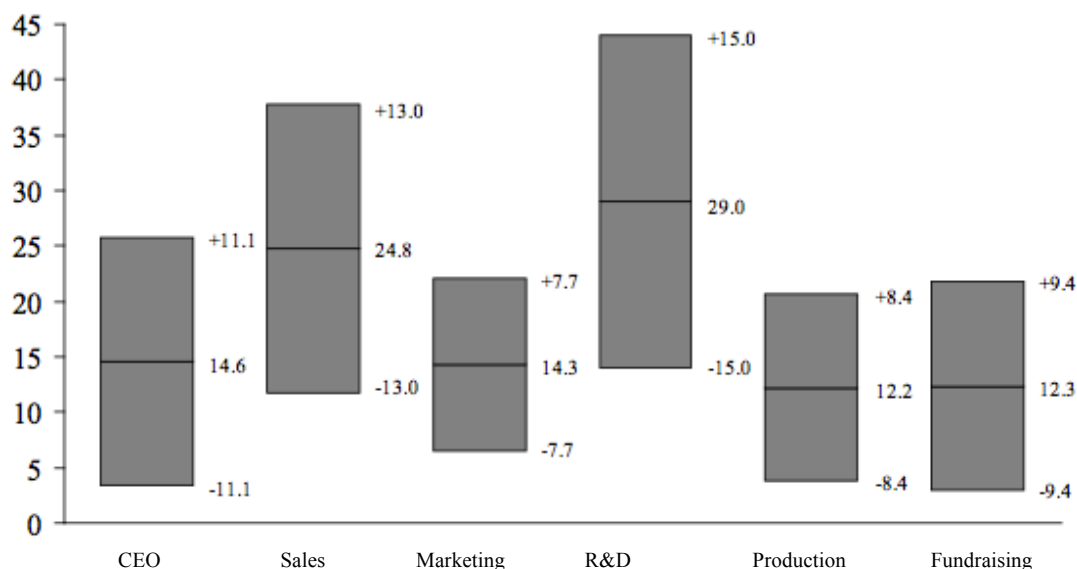
Score distribution analysis based on a decimal segmentation shows that functions have a Gaussian distribution, with tail-end distribution more or less thick (their values being more or less centered around the global mean).

Graphic 7 - Segmentation for CEO, Commercialization and Marketing
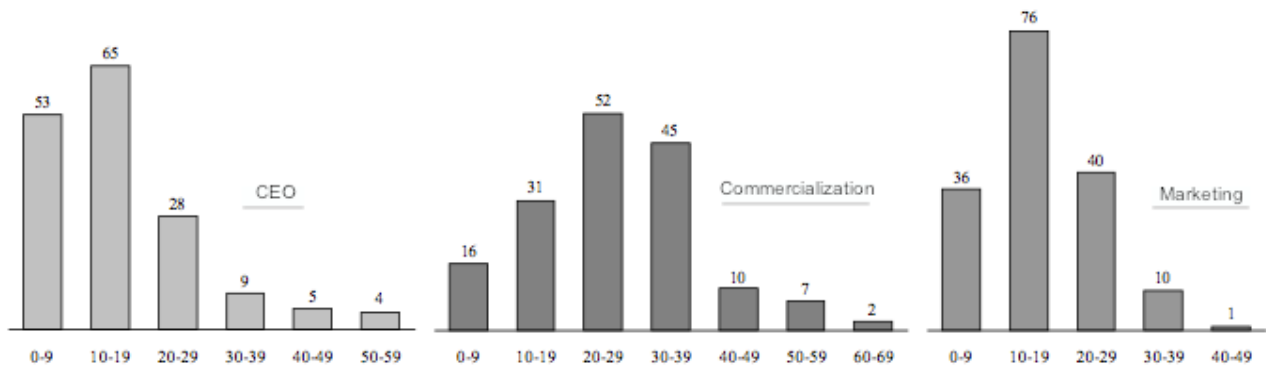
Graphic 8 - Segmentation for R&D, Production and Fundraising
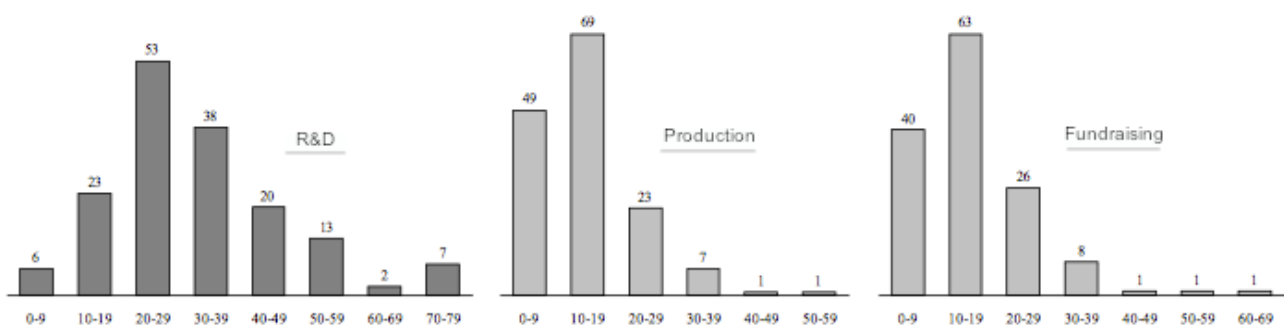
Please note the 3 above graphics (n°6, 7 and 8) are extracted from the survey software SurveyMonkey.

Matrix per partner

If we look at functions distribution per partner, it seems survey answerers have stressed out the importance of product development. When asking fictional functions distribution in the survey, 31,2% of answerers were directly associated with the issue of product development (n=189). 12,3% of partners combined product development and managerial functions (n=89). Commercialization is the second priority for startupers. 23% of interviewed partners

exclusively focus on sales (n=82) and 11,2% of partners are in charge of both business development and managerial functions (n=51). Conversely, only 9,2% of partners have only a role of pure manager. This matrix per partners confirms what have been deducted before: a clear attraction for sales/business development roles and disaffection for management duties.

Several partners can cover same tasks while some partners may only be assigned to one task only. As the team of partners grows, tasks covered by each partner become more and more differentiated. For example, in France, in a team of two or three partners, two partners can be managing directors of the company ("Directeur Général" in French). This never happens in bigger teams, where one partner is the CEO of the company. Conversely, several partners can cover the same functions. Two cases stand out: either the function is perceived as central for the startup (R&D, commercialization, marketing) and all partners are covering it, either the function is perceived as a minor one (fundraising) and available partners at the time of fundraising will endorsed this task.

However, the sample does not follow the non-specialization trend (at the beginning of the company) that has been highlighted by the literature: partners in youngest startups (under two years) are covering on average 2,7 tasks per partner while partners in more mature startups (over two years) are covering 1,9 tasks per partner.

The only exception concerns R&D. For young startups, R&D is coupled with another function (R&D/production represents 10% of all possible function combination, which is the highest score obtained of coupled functions, all functions being considered). In more mature companies, R&D is a specialized function (21% of partners will only cover R&D for companies between 2 and 5 years while coupled functions R&D/production represents only 8% of answers for startup between 2 and 5 years of existence).

5.1.3. Equity distribution in startups

The search for an optimum in equity distribution is one of the key result of this thesis. This optimum depends first on the number of partners. Whatever the size of the team is, the notion of control is primordial: direct control by a simple majority, or blocking minority (in France, above 33,3% of righting votes). Moreover, we observe an unbalance in the startup governance: on average, the founding partner has 1,6 times more equity than the partner who have the most equity share after him. The more partners the startup has, the more egalitarian equity distribution is among partners. The shareholder structure is "dual": founding partners (at least partners who worked on the project since the beginning) has more equity than

minority partners (their task is marginal or they have joined the company at a more advanced stage of development).

Graphic 9 - Mean of equity distribution based on total number of partners
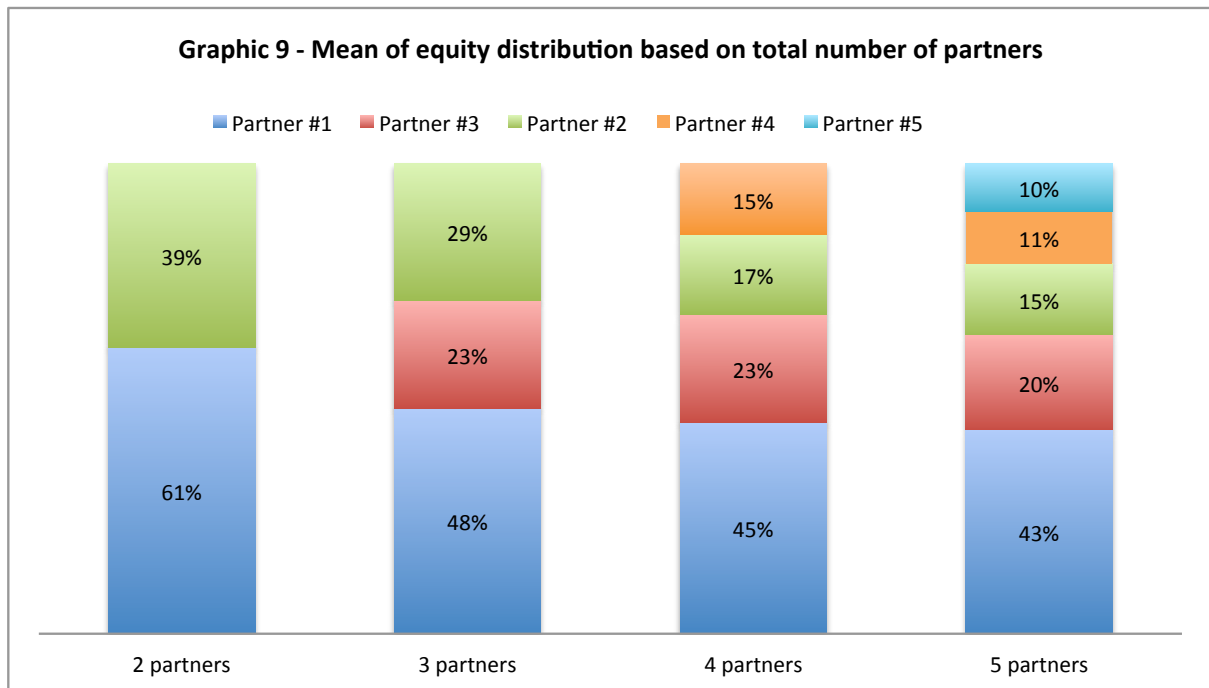
Graphic 10 - Means and standard deviations for equity distribution in a team of 2 or 3 partners
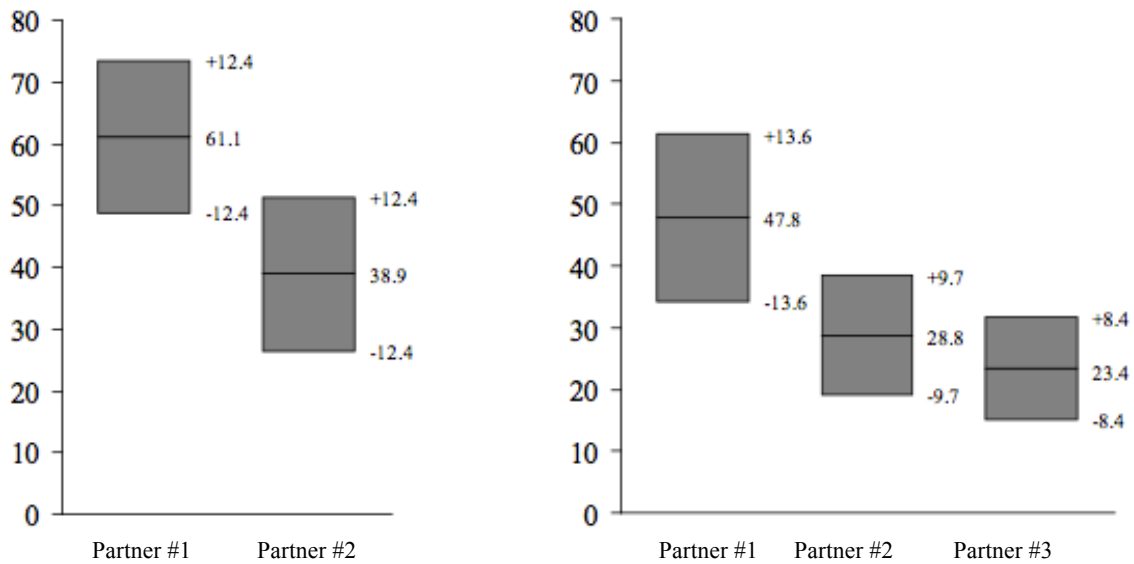
Graphic 11 - Means and standard deviations for equity distribution in a team of 4 partners
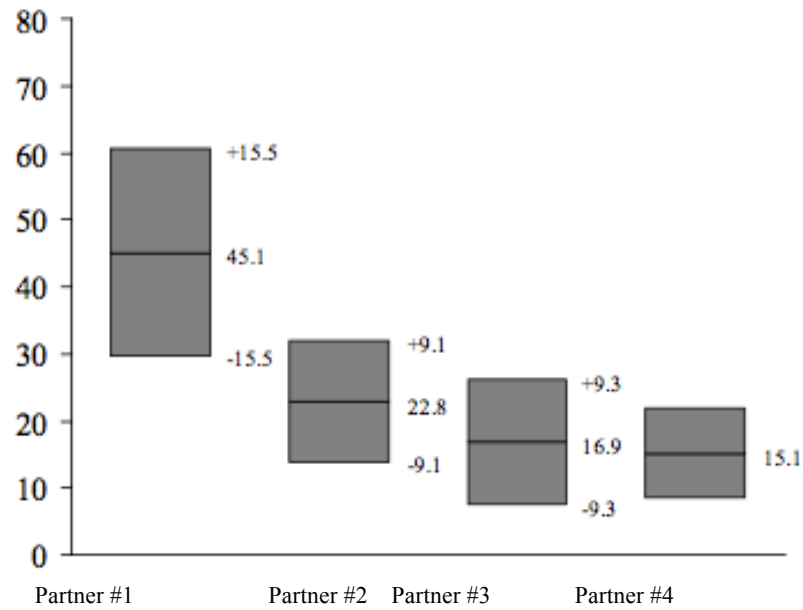
Graphic 12 - Means and standard deviations for equity distribution in a team of 5 partners
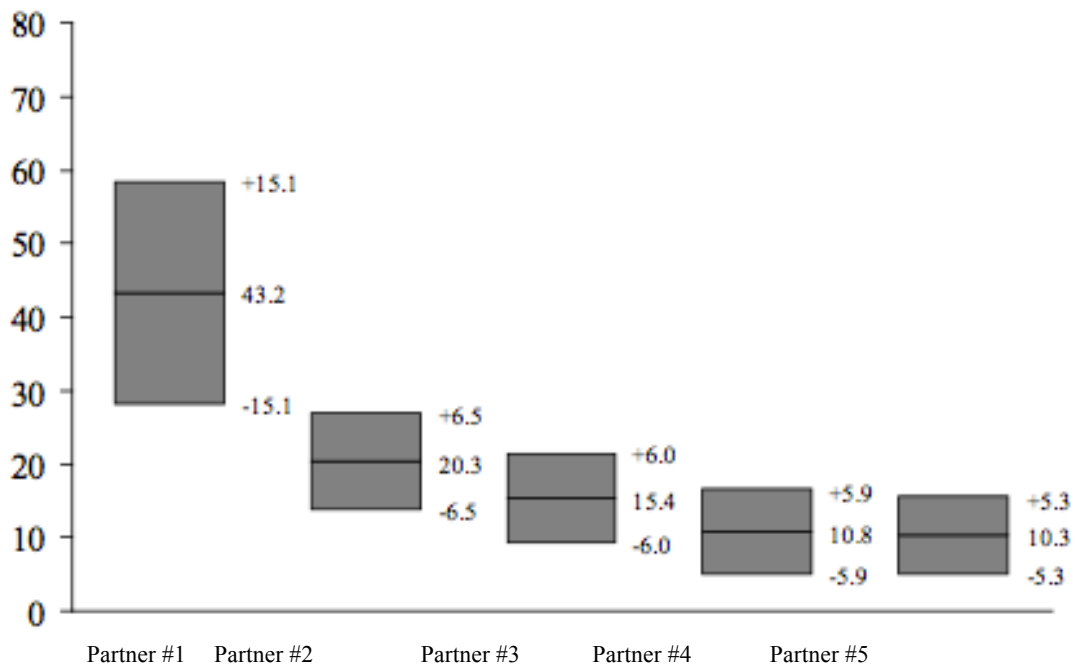
Please note the 3 above graphics (n°10, 11 and 12) are extracted from the survey software SurveyMonkey.

Based on previous graphics, equity distribution seems to be more or less egalitarian. 13,6% (n = 84) of answerers have opted for a perfectly egalitarian structure in equity distribution. Three other types of behavior can be pointed out:

- An equity distribution that gives on majority shareholder and other minority shareholders (19,2% of all cases, n=44);

- An equity distribution that does not give any majority for any shareholders (24,8% of all cases, n=56);

- A complete un-egalitarian structure, with control (31,1%, n=67) or without control (5,4%, n=14).

If the frequency of a purely egalitarian equity distribution is constant over the different stage of development (around 12% of answerers in the three-age category defined), partners in more mature companies prefer the egalitarian structure with control (8% for companies with less than 2 years of existence, 27% for companies with more than 2 years of existence). The desire of control by on shareholder is more central in mature companies. Indeed, in equity distribution proposition for startups with less than 2 years of existence, 29% of all distributions allow one shareholder to control the company. For startup with more than 5 years of existence, this number goes up to 78%. For the remaining equity, the egalitarian aspect is also more important for mature companies: for remaining equity distribution for startups with less than 2 years of existence, the un-egalitarian distribution represents 56% of all answerers. For startup with more than 5 years of existence, this number goes down to 39%. We observe the same results regarding past entrepreneurship experience. This can lead to the conclusion that past entrepreneurship experience (previously or accumulated) encourages entrepreneurs to define an equity structure when they have a majority stake while distributing evenly the remaining equity to others partners. Governance issues could explain this distribution scheme.

5.2. Inferential statistics

5.2.1. Functions distribution in startups

After describing the differences between the various operational functions in the startup and putting it in perspective with different independent variables, we must question the statistical validity of these differences. In order to do it, a Fisher test was conducted for each function (including all independent variables). The results are summarized below (Figure 5).

Figure 5 - Equity distribution in the startup based on the influence of several factors

Sector

	High Tech	Low Tech	Test
CEO	18,7	12,0	***
Commercialization	24,0	25,3	ns
Marketing	13,1	15,0	ns
R&D	29,0	29,0	ns
Production	11,9	12,3	ns
Fundraising	13,4	11,7	ns

Age

	<2 years	2<x<5	>5 years	Test
CEO	15,4	14,4	14,3	ns
Commercialization	24,6	25,6	24,1	ns
Marketing	13,7	13,3	15,7	ns
R&D	27,3	29,4	29,7	ns
Production	11,9	12,0	12,6	ns
Fundraising	14,2	11,6	11,7	ns

Team typology

	Strong links	Generalists	Specialists	Test
CEO	13,4	9,0	16,4	*
Commercialization	25,4	25,4	25,1	ns
Marketing	13,0	13,5	15,1	ns
R&D	28,5	27,5	29,6	ns
Production	12,3	13,9	11,4	ns
Fundraising	10,7	14,7	13,1	ns

Entrepreneurship experience

	Yes	No	Test
CEO	12,8	15,3	ns
Commercialization	26,4	24,0	ns
Marketing	16,2	13,4	*
R&D	30,5	28,3	ns
Production	11,9	12,3	ns
Fundraising	9,9	13,4	*

Academic profile

	Engineering	Management	Medical/ PhD	Test
CEO	16,4	10,1	21,3	***
Commercialization	24,9	28,2	20,1	*
Marketing	12,3	15,9	13,1	ns
R&D	33,0	24,6	31,9	*
Production	11,0	12,6	12,4	ns
Fundraising	9,5	13,0	14,7	ns

Note: Fisher test for variance analysis
* means a statistical confidence level > 95%
*** means a statistical confidence level > 99,5%

By analyzing results per function, it appears that CEO position is usually modulated by external parameters like the degree of technology of the startup, the type of team, or the

academic profile of the answerer. The more technology-oriented the startup is, the more the role of CEO will be considered as important and resourceful.

Depending on team profiles, we must emphasize the diversity of situations. Generalists team will see this function as a generic one, assuming everyone in the team can do it. Conversely, specialists teams will overweight this function, seeing the role of CEO as the need for coordination between different technical profiles to reach a common goal.

The academic profile of the answerer also has a significant influence on the perception of CEO's function. Management profiles consider this function must capture few resources, unlike technical profiles thinking it should concentrate much more resources (second position for doctors/pharmacists, third position for engineers).

Focusing on explanatory factors, two independent variables have an impact on several key functions: entrepreneurial experience of the answerer and its academic profile.

An experienced entrepreneur will tend to upgrade two functions: marketing and fundraising. If these functions are not critical for initial development of the product/service, they are at the heart of company's growth (developing product offer and customer acquisition on one side, financing this development on the other side).

Besides the CEO function, answerer's academic profile influences the role of R&D and marketing. Management profiles will ten to emphasize commercialization while technical profiles will do the same for R&D. This result should be seen as a relative conclusion as answerer's profile is not independent from the startup's sector. However, the lack of statistical link between the startup's sector and functions tend to support this result.

Thus, H1 hypothesis (correlation between functions' weight in the startup and the importance of this function for the startup strategy) is partially rejected. Indeed, only the CEO function is impacted by the sector and the technological intensity (other functions do not substantially fluctuate in relation to this criterion). Hypothesis H2 (functions rebalancing with the startup development) is also rejected. There is no real change in functions distribution linked to the startup maturity. Similarly, a two-criteria (maturity and sector) does not mean that there is a significant change in functions' weight towards a stable weight. Finally, H3 hypothesis (correlation between functions' weight and the entrepreneur's profile) is validated. The entrepreneur has a clear tendency to overvalue functions directly linked to his profile.

5.2.2. Equity distribution within the startups

Egalitarian equity distribution and the control issue in equity distribution

By looking at equity distribution between the different partners in the startups, it seems interesting to link each distribution type (strictly egalitarian, egalitarian with control, egalitarian without control, un-egalitarian with control, un-egalitarian without control) with previously defined independent variables. This allows studying two key characteristics: a partner's control on the startup and more or less egalitarian distribution between partners.

The importance of control cannot be explained by any considered variables. Thus, trends that seemed to emerge with the descriptive analysis of means and standard deviations are not confirmed with an independence statistical test.

By analyzing independent variables' impact on equity distribution (only the "egalitarian" aspect), results are partially contradicting literature on several points. Indeed, according to Kotha and George (2012), team's profile and entrepreneurial experience have a significant impact on the founding entrepreneur's behavior to selectively distribute equity to its partners. Here, these two variables have no meaningful impact. However, other variables have a concrete impact on distribution. In low-tech startups, there is a tendency to distribute equity in a more egalitarian way (for egalitarian distribution and non-egalitarian distribution, n=78 and n=29 respectively while n=28 and n=21 respectively for high-tech startups). Similarly, more mature startups experience the same tendency (in startups with more than 2 years of existence, 71% of equity distributions are egalitarian, 31% are not while the proportion is respectively 50% / 50% in startups with less than 2 years of existence). Finally, answerer's academic profile has a clear impact on equity distribution. Profiles with engineers, managers or both backgrounds are more attracted with equality between partners (on average, between 57% and 69% of distributions are egalitarian on these three categories). Doctors/pharmacists/PhDs are more represented under unequal distributions (52% of answers). To conclude, the sample tends to reject H4 hypothesis (correlation between equal/unequal equity distribution and team typology) and H5 hypothesis (past entrepreneurship experience and tendency to foster equity control in equity distribution).

Figure 6 - Independence test (about equity control, with defined independent variables)

	Equity distribution with control from 1 partner	Equity distribution with no control (equality between partners)
High tech / Low tech	ns	*
Startup age	ns	*
Team typology	ns	ns
Entrepreneurship experience	ns	ns
Academic profile	ns	*

Note: Khi 2 independence test

* meaning that independence hypothesis is rejected with a statistical confidence level > 95%

Equity distribution's model

The theoretical model previously set up aims to link functions distribution a partner will need to cover in the startup with its share of equity. The model takes into account several variables: theoretical equity a partner will get only based on the strategic importance of functions he has to cover, number of partners in the startup, governance issues (modeled by two variables: control and equality in equity distribution) and partners' type. These variables (although linked to each other) are too independent to be explanatory variables (Figure 7 shows a correlation matrix between equity distribution's model variables).

Figure 7 - Correlation matrix (based on model's variables in equity distribution)

	1	2	3	4	5
1. Theoretical equity	1,00				
2. Number of partners	-0,53	1,00			
3. Conrol	0,12	-0,21	1,00		
4. Equity equality	-0,09	0,11	-0,45	1,00	
5. Focal entrepreneur	0,28	-0,21	0,05	-0,04	1,00

6. Discussion

6.1. Main findings

6.1.1. Functions' weight within the startup

The results of this thesis allow to highlight two functions entrepreneurs see as fundamental in a startup: R&D and product commercialization. This result seems logical regarding startups specific issues. The first objective is the service/product development and new clients acquisitions in order to generate revenue quickly. More surprisingly, these two factors do not depend on the startup sector and thus on the technological intensity of the startup. Whereas Service startups should develop quickly and in a cheaper way (compared to high-tech startup, all other things being equal) their offer, entrepreneurs seems to continue focusing on their offer characteristics rather having a purely oriented marketing approach. We do not observe the breakdown highlighted by Hank and Chandler (1990) between a development stage focused on product development followed by another development stage focused on commercialization. Here, both aspects are part of the startup life at any stage of development.

This R&D and commercialization preponderance is smoothed over time and experience. If experienced entrepreneurs continue to give priority to these two functions, they allocate resources more intensively to two other key roles: fundraising and marketing. We can assume these entrepreneurs anticipate startup's issues problems in a mid-term vision. Startup product is swiftly changing depending on which market it is focusing on and also depending on customers/suppliers feedbacks. Marketing plays a key role for the ongoing development of the product in order to boost sales. Fundraising will quickly become critical for the company, which is using more and more liquidity without generating any cash. In order to prevent the startup from brutal growth slowdown, it could be useful to devote resources quickly to fundraising (which takes substantial time from first VC/PE/business angels/other approach to concluded deal). Success from experienced entrepreneurs - highlighted by Abetti and Stuart (1988) - often result from a different perspective regarding resources allocation.

Mature startups from the sample do not follow this trend. We can point out here a fundamental problem in startups development's model. Indeed, the team is spending at first time to develop the product (the stage development is product-oriented) and then will spend time to market and sell this product (the stage development is business-oriented). In this case,

innovation is often partially let aside (for example, from a push model to a pull model). The entrepreneur does not want to make any concessions regarding his product and then faces a dilemma: keep on perfect his product and launch it as it is on the market. By quickly select an executive committee - from people that do not work in the startup, people knowing the sector in question and its specificity, people that are often previous entrepreneurs themselves and interested in the success of the startup as highlighted by McCaffrey (2001)-, an entrepreneur can avoid this dilemma (and issues associated with it).

Resources dedicated to the "management" function confirm the entrepreneur definition of Greiner (1998): the entrepreneur is not a manager but a leader. Few resources are allocated to the manager function, mainly due to the informal aspect of this task and freedom given to partners at the beginning of the creation. However, as seen before, specialized teams in highly technological sectors devote substantial resources to the managerial function. This specificity is explained by the preponderance of project management in high-tech startups, where delay threatens the growth of the company in a fast-paced environment. At the startup creation, allocating meaningful resources to managerial positions can reduce tasks informality, which leads to clarify short-term goals of each partners and/or employees. In such configuration, product is better developed.

The entrepreneur tends to overvalue functions related to his profile. This bias needs to be clarified, since his profile is often correlated with the startup's sector. However, management-oriented entrepreneurs will allocate more resources to commercialization while technical-oriented entrepreneurs will do the same for R&D. Rebalancing these resources might be necessary in order to protect the startup development.

Entrepreneurs need to be flexible, moving from one function to another depending on opportunities and circumstances. Partners often cover two functions. Teamwork is key (Ruef and al., 2003, Davidson and Honig, 2003). The optimum is around two or three partners. High-tech startups require more resources than low-tech startups and also more operational partners. In addition, number of partners generally increases as the startup growths and becomes mature, in order to acquire new resources. The company is always looking to raise equity (although one operational partner brings less equity than a financial partner) and new skills in relation to product development.

6.1.2. Linking functions distribution and equity

The importance of functions covered by a partner in the startup is one of the factors explaining equity distribution. Initial equity negotiation takes into account several parameters: contribution in cash and in kind, and also complementary resources brought by each partner. Moreover, there is often a time gap time between startup existence and startup legal establishment: everyone's effort can be rewarded by additional equity. Equity distribution is also a governance issue: enabling everyone's interest alignment (avoiding some partner to consider their equity share too small in relation to work done or work to be done), maintaining equity control by the founding entrepreneur etc. In the end, equity distribution negotiation is about company's future value and how each partner will exit when the company will be sold. Indeed, several legal and contractual tricks are possible to overcome minority equity blockages. The founding entrepreneur can secure his equity output value. Equity distribution schemes will mainly depends on relationships between partners and their objectives in terms of involvement and governance. From there, the link with tasks distribution is not so obvious. If it is possible to show possible links, it is harder to give a direct causal sense to these links.

This thesis' results also partially question literature conclusions. Unlike Kotha and George (2012), it was not possible to strongly demonstrate the existence of a relationship between the tendency to distribute equity unequally with entrepreneurship experience from focal entrepreneur.

Similarly, strong links between partners does not lead to promote equal distribution between them. However, other factors have been highlighted. Partners from mature startups believe equal equity distribution is a good practice. This practice is to put in perspective with governance issues. Managerial issues occur lately in the startup life.

Equity distribution is an insidious frustration that can pop up during a deeper managerial crisis. It is in partners' interest to quickly solve governance and equity issues in order to avoid potential ego conflicts.

Low-tech startups tend to promote equal equity distribution compared to high-tech startups. This can be explained by the risk difference between both sectors. High-tech startups consume more liquidity and are riskier than low-tech startups. A shareholder that will not reduce the technological risk will have little equity. In low-tech startups, cash contributions are smaller and focal entrepreneurs are looking at liquidity as much as they are looking at

diverse knowledge that can promote, develop and market their products. The risk in low-tech startups is less concentrated around one single aspect of the company.

6.2. Limits

6.2.1. Non-operational partners

If this research helps to understand equity distribution between partners, it neglects an important parameter: non-operational partners. These partners may join the startup for very different reasons.

At the startup creation, the founding entrepreneur may ask relatives to put money in their project. These funds providers - which are often family members or first-network connections - will have no active role in the company. Nevertheless, other early investors may have a declared goal such as business angles or venture capital funds. Neglecting these partners is also missing the "financial equity" which necessarily coexists with "sweat equity" at all development stages of the startup.

Another type of partners has been neglected. It corresponds to partially operational partners, but considering their involvement in the startup schedule as secondary compared to their day-to-day activities. Thus, we need to question their integration among equity holders. Several factors can explain it: the network they provide to the startup, their reputation, and the perspective of rising funds in the future (expected to be easier with them in the inner-circle of the startup).

The importance of entrepreneurs' network has been quite widely proven on many levels. Birley (1986) highlighted the importance of informal relationships (family, friends, colleagues, etc.) in the entrepreneur's ability to launch his company and find the different resources necessary for this purpose. Uzzi (1996) has shown that companies that had links with banks were getting preferential loans. Shane (2006) showed that the existence of links between venture capital funds and startups looking to raise money is a concrete bias in investments' selection from this fund. Moller and Halinen (1996) emphasized that a company was able to gather additional resources with a well-used network and then and create from it a competitive advantage. With its network, a startup can confirm that its product / service corresponds to a market need, and refine his offer, price, etc. The social network in which the startup operates (and how it uses it) is a clear success factor. The founding entrepreneur can

accept to transfer equity to non-operational partners if the startup benefits from levers driven by these new partners.

Startup's reputation is another element that can justify equity transfer. Fombrun and Shaley (1990) showed the importance of the startup's reputation in relation to stakeholders' behaviors (especially for investors: Stuart and al., 1998; Certo, 2004; Higgins and Gulati, 2007). However, fundraising can be complicated for a startup with no reputation. Entrepreneur's reputation and employees' reputation (through past entrepreneurship experiences or industry-specific experience) can balance this bias. Again, focal entrepreneur might give equity to a non-operational partner, who will then be a member of the steering committee and for example, make the startup benefit from this prestige.

Thus, potential partners types is wider than those described in this paper. One should not generalize these results to all types of stakeholders involved in the startup's success.

6.2.2. Partners' functions in equity distribution model

One of the limits of the reasoning is the assumed linearity of equity distribution based on functions' respective weight. Indeed, some functions will have a weight over total equity that is justified by their symbolic importance (and not their real importance in the startup's strategy). The most obvious case is the role of CEO, which is considered marginal when it comes to allocate resources. However, this role if often entrusted to majority shareholder (if any). Thus, other types of link than linear links need to be studied. In his absence, the future role covered by one partner in the startup is a good base of negotiation. In his presence, the proposed model is becoming less meaningful.

7. Conclusion

Functions distribution in startups is a key issue to understand key success factors for the company in its environment. If human resources management remains informal, entrepreneurs keep in mind resources allocation to secure startup growth and development. First objective is product development, followed by its commercialization. Experience from entrepreneurs allows them to also focus on marketing and fundraising. The most variable function remains the CEO function. If few resources are directly allocated to it, this role appears to be necessary in highly technology-oriented startups, mainly composed of specialists. Management is a recurring weakness for startup a certain development stage. This weakness seems even more important is high-tech startups at early development stage.

Subsidiary researches can be done to refine some parameter. For example, rather than measuring an optimum perceived by entrepreneurs, it could be interesting to determine a preferred functions distribution in relation to a success criterion (survival existence, turnover, etc.). Moreover, it may be useful to monitor resources allocation in a startup sample in order to understand paradigm shifts (cyclical or structural shifts for example).

Partners' responsibilities can explain equity distribution. If this criterion is not unique and sufficient enough, it remains operationally useful in case of low-cash contributions at the startup creation. Above all, any equity distribution is modulated according focal contractor's objectives and its ability to federate the team. If research does not confirm the impact of previous experience or pre-existing relationships between partners, it highlights new criteria explaining the tendency to equally distribute equity: a weak technological intensity, an advanced stage of development or the focal entrepreneur's academic profile.

It would also be useful to conduct the same search on a representative sample of venture capital professionals. This would enable to compare the relative importance of functions (such as CEO and other key business functions) from their perspective.

This research about links between equity and partners' functions could be generalized to partners' initial contributions. It would be interesting to see if one prevails on the other (and in what circumstances) or if both are connected, in order to derive a complete and operating model. Finally, variables explaining the willingness to distribute equity in a more or less equal way can be further clarified (team typology, focal entrepreneur's profile, technological intensity, stage of development).

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FIGURES AND GRAPHICS TABLE

ANNEXES

Annex 1 – Favorable environment for the development of innovative startups, OCDE 2015

Determinants						Entrepreneurial performance	Impact
Regulatory framework	Market conditions	Access to finance	Knowledge creation and diffusion	Entrepreneurial capabilities	Culture	**Firm based**	Job creation
Administrative burdens for entry	Anti-trust laws	Access to debt financing	R&D investment	Training and experience of entrepreneurs	Risk attitude in society	**Employment based**	Economic growth
Administrative burdens for growth	Competition	Business angels	University/industry interface	Business and entrepreneurship education (skills)	Attitudes towards entrepreneurs	**Wealth**	Poverty reduction
Bankruptcy regulations	Access to the domestic market	Access to VC	Technological co-operation between firms	Entrepreneurship infrastructure	Desire for business ownership		Formalising the informal sector
Safety, health and environmental regulations	Access to foreign markets	Access to other types of equity	Technology diffusion	Immigration	Entrepreneurship education (mindset)		
Product regulation	Degree of public involvement	Stock markets	Broadband access				
Labour market regulation	Public procurement						
Court and legal framework							
Social and health security							
Income taxes; wealth/bequest taxes							
Business and capital taxes	Patent system; standards						

Firms	Employment	Wealth
Employer enterprise birth rates	Share of high growth firms (by employment)	Share of high growth firms (by turnover)
Employer enterprise death rates	Share of gazelles (employment)	Share of gazelles (by turnover)
Business churn	Ownership rate start-ups	Value added, young or small firms
Net business population growth	Ownership rates business population	Productivity contribution, young or small firms
Survival rates at 3 and 5 years	Employment in 3 and 5 year old firms	Innovation performance, young or small firms
Proportion of 3 and 5 year old firms	Average firm size after 3 and 5 years	Export performance, young or small firms

Annex 2 – The Business Model Canvas

The Business Model Canvas

Designed for: POSTGEIST
Designed by: KRISTIN GRÄFE

Key Partners

SOCIAL NETWORKS

LOCATION BASED NETWORKS

Key Activities

WEBSITE IS MAIN PLATFORM:

WORKING IN WEB STANDARTS

PLATFORM MANAGMENT
SERVICE PROVISIONING
PLATFROM PROMOTION

Key Resources

ONLINE STORAGE (SERVER)

SECURITY SYSTEM

Value Propositions

CONTROL – ABOUT WHAT DATA THE COLLECTOR PASSES ON

DATA STORAGE – A SPACE WHERE ALL PERSONAL DIGITA DATA CAN LIVE

ACCESSIBILTY – EVEN OVER A LONG PERIOD OF TIME THE DATA IS ACCESIBLBLE ON AS MANY DEVICES AS POSSIBLE

Customer Relationships

TRUST

TRANSPARENCY

SAFETY

CREATING MEANING

Channels

WEB SALES – DIRECT CHANEL

REACHED THROUGH CHANNEL PHASES

Customer Segments

COLLECTOR:

THE PERSON WHO IS BUILDING A LEGACY

HEIRS:

THE PEOPLE WHO INHERIT THE LEGACY

Cost Structure

VALUE DRIVEN

Revenue Streams

MONTHLY FEE FOR ONLINE STORAGE

MATERIALIZING LEGACY TO PASS ON LEGACY (E.G. BOOK, LETTER, APP, ETC)

www.businessmodelgeneration.com

Annex 3 – Sweat equity deal structuration (from Ins. SRI)

Sweat equity contracts are useful for entrepreneurs who need cash. However, such contracts are very costly. Indeed, value of distributed equity represents 7 to 10 times value of such contract (in cash).

Contract characteristics

Contract value: 10 000€
10% is paid now (1 000€)
Remaining value is converted into equity

Equity is valued on following criteria:
        Exit in 3 to 5 years
        Return expected @20% per year (PE or VC type)
        Success rate of startup creation: 1/3

Cash-flows

Contract value	10 000€						
Paid in cash	1 000€						
Paid in capital	9 000€						
Exit	5 years						
Return	20%						
Success rate	33%						

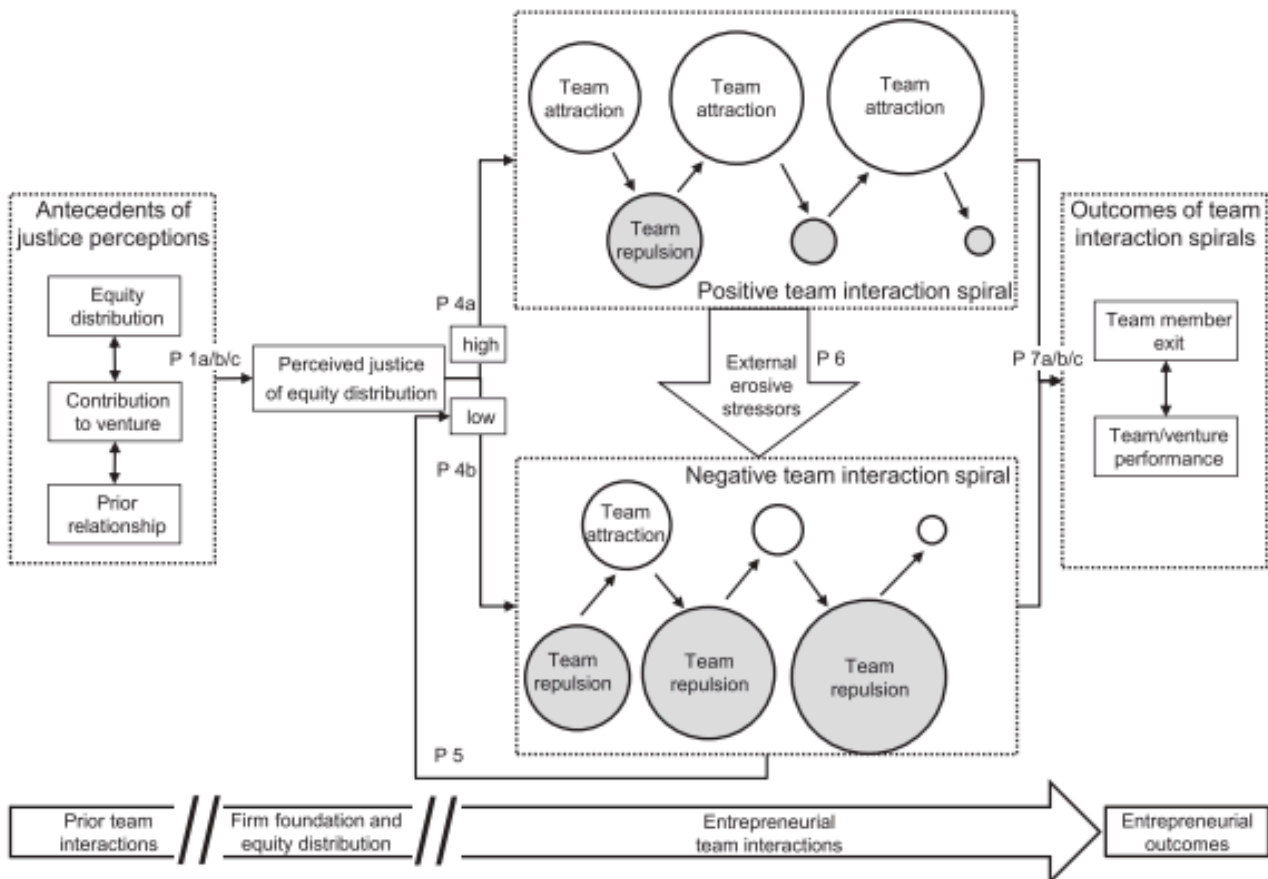|	0	1	2	3	4	5
Years						
Amount ('000€)	9,0	10,8	13,0	15,6	18,7	22,4

Contract value   10 000€
Paid in cash   1 000€
Equity value   22 400/33% = 62 7000€

A 10 000€ contract costs the startup around 70 000€

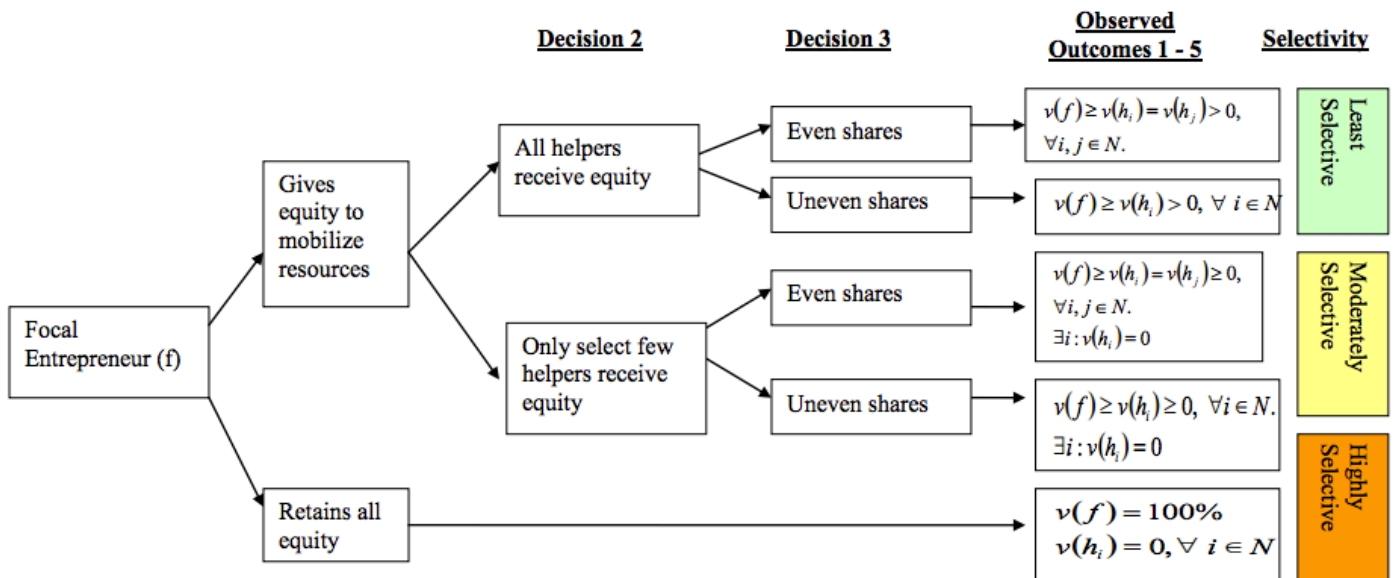**Annex 4 – Common management and behavioral patterns of entrepreneurs across life cycle stages**

	Start-up stage	Growth stage
Churchill and Lewis (1983)	Entrepreneur as a spider in his web	Recruiting professional staff who take on supervisory roles
	Obtaining customers and delivering the product	Marshaling resources to finance rapid growth
Van de Ven et al. (1984)	Entrepreneur works on average 47.7 hours/week	Entrepreneur works on average 63.0 hours/week
	Entrepreneur focus on internal activities (e.g., product development)	Entrepreneur focus on external activities (e.g., strategic alliances and relationships with supplier)
Scott and Bruce (1987)	Obtaining customers	Managing and financing growth
	Economic production	Maintaining control
Kazanjian (1988)	Technology development	Produce, sell and distribute in volume;
Kazanjian and Drazin (1990)	Set up task structure, gearing up for first marketing	overcoming functional crisis; growth related personal problems
Hanks and Chandler (1994)	Broad overlapping roles	Specialized roles
	Specialization limited to research and development, and sales	Additional specialization in manufacturing, marketing, and administrative roles
McCarthy et al. (1990)	Dealing with customers	Dealing with employees, arranging financing, planning future activities
Lichtenstein et al. (2006) for start-up stage	Investing personal capital, developing a prototype, defining an opportunity, organizing a founding	Employee empowerment, strategic management, management of culture and vision, personal
Andersson and Tell (2009) for growth stage	team, purchasing major equipment, asking for funding	networking

Annex 5 – A model of perceived fair equity distribution in startups and its impact on team interaction and outcomes

Annex 6 – Focal entrepreneur distribution of equity to partners when creating a startup

f	Focal entrepreneur (Individual with the highest equity share)
N	Number of helpers in the venture
$h_i, i \in N$	Helper i
$v(\cdot)$	Share (value) of the equity

Annex 7 – Teams typology in startups

Basis of Attachment & Retention	■ Compensation ("money") ■ Qualities of the work ("work") ■ Work group as community ("love")
Criterion for Selection	■ Skills ■ Exceptional talent/potential ■ Fit with the team or organization
Means of Control & Coordination	■ Direct monitoring ■ Peer and/or cultural control ■ Reliance on professional standards ■ Formal processes and procedures

DIMENSIONS			EMPLOYMENT MODEL
Attachment	Selection	Coordination/ Control	
Work	Potential	Professional	STAR
Work	Skills	Peer/cultural	ENGINEERING
Love	Fit	Peer/cultural	COMMITMENT
Work	Skills	Formal	BUREAUCRACY
Money	Skills	Direct	AUTOCRACY OR DIRECT CONTROL

Annex 8 – Survey sent to entrepreneurs (the sample, 180 startups)

Operational Functions For Innovative Startup in France

About your company

1. What is the sector of your startup ?

○ Services

○ Social network / collaborative startup

○ Technology and Telecom

○ Health and Biotech

○ Sustainable Development

○ Other (Please provide some details)

[   ]

2. When did you create your company ?

[   ]

3. How many operational shareholders was there when you have created your startup ?

○ 1

○ 2

○ 3

○ 4

○ 5 or more

4. How would you qualified your team of shareholders ?

○ A team with strong links (family/friend) with a common culture

○ A team composed of specialists profiles with a strong expertise

○ A team composed of generalists profiles with a strong potential

○ Other (Please provide some details)

[   ]

Suiv.

Operational Functions For Innovative Startup in France

About you

5. Do you have any previous entrepreneurship experience ?

○ Yes

○ No

6. What is your profile (several possible answers) ?

○ Engineer/Tech

○ PhD/Doctor/Pharmacist/Physician

○ Management

○ Other (Please provide some details)

[   ]

Operational Functions For Innovative Startup in France

Simulation 1: Introduction

Please imagine you create today a startup in the same sector of your current company. You are one of the operational shareholders of the project.

7. Including you, how many operational shareholders would this newly created startup have ?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 or more

Operational Functions For Innovative Startup in France

Simulation 2: Weight of each function

This newly created startup has 100 points of key resources.

8. How would you allocate these resources ?

CEO	
Head of Sales	
Head of Marketing / Public Relations	
Technical Development (R&D, CTO)	
Production, Logistics and Quality Process	
Fundraising and Financial Management	

Operational Functions For Innovative Startup in France

Simulation 3: Equity Distribution

9. How would you allocate previous key functions between funding shareholders (you are SH1) ?

	SH1 (you)	SH2 (if applicable)	SH3 (if applicable)	SH4 (if applicable)	SH5 (if applicable)
CEO	○	○	○	○	○
Head of Sales	○	○	○	○	○
Head of Marketing / Public Relations	○	○	○	○	○
Technical Development (R&D, CTO)	○	○	○	○	○
Production, Logistics and Quality Process	○	○	○	○	○
Fundraising and Financial Management	○	○	○	○	○

10. How would you allocate equity between previous funding shareholders (out of 100%) ?

SH1 (you)

SH2 (if applicable)

SH3 (if applicable)

SH4 (if applicable)

SH5 (if applicable)