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New venture financing order and founder preference: A multi-case study of Austrian Tech startups

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Abstract

This study investigates the source of financing in Austrian tech startups and aims to identify the main factors that affect the decision making of these firms. In doing so, we aim to contribute to the relatively limited field of research conducted in Europe.

In order to achieve the purpose of this study, we implemented a multiple case study method as the research design. For the purpose of this study, a literature review was used that generated a theoretical framework. This framework focuses on capital structure with the main emphasis being on the pecking order theory. Additionally, government financial support is included as a secondary priority. Together with the theoretical framework, our empirical findings i.e. data from the interviews with six companies, one email response, and two additional secondary data from an Austrian startup publication comprised the basis for our analysis.

Our findings from the sample companies used in this study show that Austrian tech startups use internal funding as an initial source of financing their new venture. When it comes to the order of funding, our findings show that most of the startups used in this study utilized equity as a second source of financing after internal funding and before debt. However, when it comes to the preference of the founders, half preferred a financing order that is inline with the pecking order theory while the remaining half preferred otherwise choosing equity to debt.

From this, three conclusions can be drawn. First, the limited funding options available affect the decision making and preference of the tech startups. Second, founders value the non-financial added value they can get from investors both when implementing and preferring a financing option. Third, the future growth potential and the long term strategy of the startups and their founders play a crucial role in the funding option they prefer to finance their venture.

Additionally, when it comes to capital structure, we see that most Austrian tech startups used in this study do not have a set policy. When it comes to Government financial support (GFS), we see that financial support from the government plays a significant role in Austrian tech startup financing.

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መዝ 23: እግዚአብሔር እረኛዬ ነው። የሚያሳጣኝም የለም።

Ps. 23 The Lord is my shepherd; I shall not want.

Psaltaren 23. Herren är min herde, ingenting ska fattas mig.

Yonas Hadgu Tewelu
Jönköping, Sweden

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List of Abbreviations

WKO: Austrian Chamber of Commerce

NTBF: New Technology-Based Firm

R&D: Research and Development

M&M: Miller and Modigliani

WACC: Weighted Average Cost of Capital

GFS: Government Financial Support

FFG: Austrian Research Promotion Agency

AWS: Austria Wirtschaftsservice Gesellschaft mbH

CAQDAS: Computer-Assisted Qualitative Data Analysis Software

1 Introduction

This first section is intended to show the importance of this study and create interest and curiosity in the reader. In this section, with two subsections, we present the background, purpose, and scope of the study. Furthermore, the research problem and research questions are discussed in this section.

1.1 Background

Young and innovative firms operating in tech industries are known to play a crucial role in an economy by developing breakthrough technology, creating jobs, and enhancing growth and competitiveness (Colombo et al., 2010). Understanding their importance, governments of industrialized countries have been paying particular attention to these types of technology firms since the mid-'80s (Berry, 1998). Generally speaking, according to the Austrian chamber of commerce (hereafter, “WKO”) (WKO startup, 2020), a startup is an innovative firm that is at most then years old. Regarding the classification of a tech startup, also known as New Technology-Based Firm (hereafter, “NTBF”), it is a startup that focuses on new technology and the products or services mainly depend on scientific or technological knowledge to solve customers’ problems (Mundbjerg and Sipari, 2017). Therefore, tech firms are technology-centered firms that have a strong innovative approach and undertake a high level of Research and Development (hereafter, R&D) and end up producing products or services that are considered as tech solutions (Zakrzewska-Bielawska, 2010). According to Haji, Younes, and Seringer (2019), these firms, right at the beginning of their journey, are categorized as startups and what they accomplish during this time interval is highly determinant of their success or failure.

Starting from the early stages, for these tech startups to innovate and come up with novel solutions that can solve societal problems, there needs to be a high level of R&D, feasibility testing, and verification of the new technology, and this is capital intensive (Mundbjerg and Sipari, 2017). In most cases, it is evident that in sectors where it takes longer to go from R&D to commercialization and where the unrecoverable (sunk) costs are high, new firms require a strong financial backing (Geroski, 1995). In addition to this, although there are successful tech startups among which Apple, Samsung, Microsoft, and

Tesla are examples, more than 90% of tech startups fail (Marmer et al., 2011). Haji, Younes, and Serninger (2019) consider the complexity in the nature of these firms, which makes financing possibilities limited and challenging to access the ones available, to be one crucial obstacle causing such a high failure rate. This makes the financing of NTBFs an important topic to study for both theoretical and practical purposes.

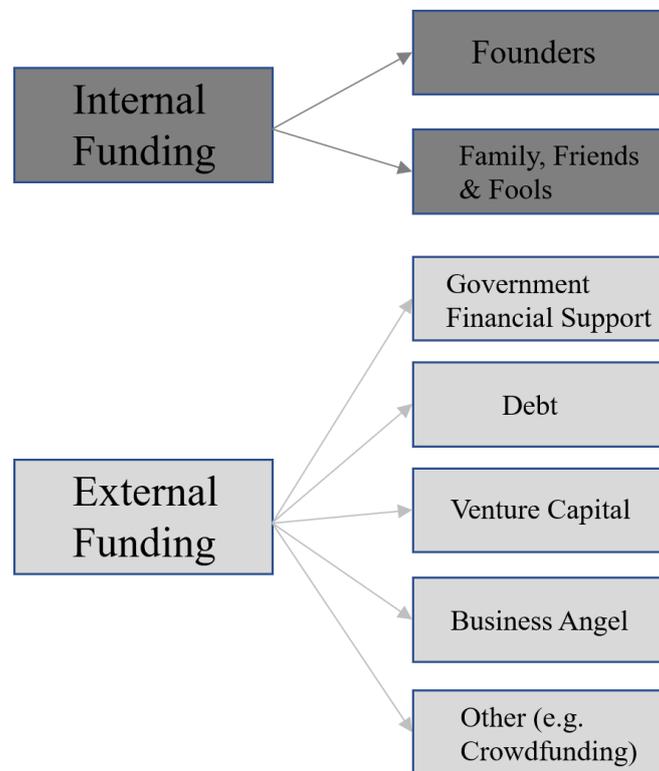


Figure 1- Financing Options for Tech Startups

When it comes to financing a tech startup (Figure 1) in its early stages, using one's own savings and resources from the 3Fs, i.e., Family, friends, and fools, is commonly used (Coleman and Robb, 2012). It is also quite common for the founders to secure debt using personal assets to finance their tech startups (Coleman and Robb, 2012). However, as a tech startup progresses, it becomes difficult to continue the process using the founder capital (Spann & Adams, 1997). This is due to the high level of R&D and prototype development costs that are associated with these types of firms (Mundbjerg and Sipari, 2017). Then it becomes natural for firms to look elsewhere for funding, which, according to Coleman & Robb (2012), is quite difficult and complicated for various reasons.

One such reason is, although tech startups enjoy rich endowments of intangible assets, they lack what is traditionally considered as collateralizable assets (Colombo and Grilli, 2007). Another reason is that they are unable to show a track record to potential financiers due to them being in business for a short period (Allen, 1992; Revest and Sapio, 2010). Additionally, these tech startups are often associated with a higher risk when compared to other firms (Sjögren and Zackrisson, 2005), and this hampers their ability to lend from banks (Guidici and Paleari, 2000). Moreover, although the founders could be the best in their fields, i.e., science and technology, they, in most cases, tend to not possess equally strong marketing and financial expertise (Revest and Sapio, 2010). These reasons, according to Örtvist et al. (2006), make the possibility for these startups to raise external funds extremely difficult.

The capital-intensiveness, newness, and riskiness coupled with their complexity in nature might imply a discrepancy between how they are financed and how they would like to be financed. Understanding these discrepancies can help create a deeper understanding of the patterns in tech startup funding decisions and the outcomes pertaining to these decisions.

In this particular study that focuses on Austrian tech startups, it is our aim to contribute to a deeper theoretical understanding of the patterns in regard to the effect of the unique nature of these firms on how they are financed relative to how they would like to be financed. We would also like to contribute in a practical manner where future Austrian tech startups can use this study to better understand what types of financing are available and learn from the prior tech startups in regard to their financing-related decision making. Additionally, we will investigate if Austrian tech startup founders are content with the current financial state support when it comes to NTBFs and if they have any suggestions for policymakers in that regard. In order to do this, we find it relevant to review what options a firm uses to finance its operation, and for this purpose, it is vital to study the firm's capital structure.

1.2 Problem Statement

The capital structure of new ventures has attracted scholarly attention for some time leading to the proliferation of the different theories to understand the phenomenon.

Coleman and Robb (2012) define capital structure as a mix of long-term debt¹ and equity² that, as is the case with other inputs to the firm, contain cost. In the broad field of finance, the work of Miller and Modigliani (1958) on capital structure is considered as the foundation of the theory. This theory, referred to as M&M theory, stipulates that a firm will choose a combination of equity (and debt that maximizes the value of the firm and minimizes its Weighted Average Cost of Capital (hereafter, “WACC”³) both of which occur simultaneously in their theory.

Even though this theory has served as the foundation for capital structure theory in the past half a century, some assumptions it makes prevent it from holding true for new, privately held firms. Such assumptions include the existence of no transaction costs, that the firms have access to the full range of equity and debt, and that managers and investors have similar information regarding the firm and its financial standings. According to Coleman and Robb, (2012) due to the so-called information asymmetry in new firms especially technology-based firms and the incapability of smaller firms to issue bonds and stocks, unlike their larger counterparts due to the high cost of doing makes these firms heavily reliant on personal sources, private investors, venture capital, bank loans and in some instances, government funding to fund their ventures. Information asymmetry occurs in a transaction where one party has more information than the other. A practical example would be car buyers, who cannot adequately tell good cars apart from bad ones. Therefore, car sellers of good cars are not able to get a better average market price than someone who sells terrible vehicles (Akerlof, 1978).

However, after the groundbreaking work of Miller and Modigliani (1958), new theories that are more applicable and in tune with the realities of newly founded small firms have come to light. One such theory is the “pecking order” theory by Myers (1984) and Myers and Majluf (1984). This theory recognizes that firm insiders have information about the firm that outsiders might not necessarily have. Due to this information asymmetry, the firm’s shares tend to be underpriced by outside share purchasers. This proves to be a determining factor when founders make financing decisions leading them to prefer the

¹ Money that does not have to be paid for at least a year after it is borrowed (Cambridge dictionary, 2011).

² The collection of all the outstanding shares of a corporation (Berk and DeMarzo, 2007).

³ The average of a firm’s equity and after-tax cost of capital, weighted by the fraction of the firm’s enterprise value that corresponds to equity and debt, respectively. Discounting free cash flows using the WACC computes their value including the interest tax shield (Berk and DeMarzo, 2007).

use of internal equity, be it retained earnings⁴ or debt before the issuance of external equity.

When it comes to tech startups in particular, Barclay and Smith (2005) argue that although firms, according to the pecking order theory are expected to have a high debt ratio (Financial ratio which shows the percentage of a company's assets which are financed by debt (Hillier et al., 2013).) as their free cash flow (Measure that shows the available cash of a company after deducting cash outflows that keep the firm running and maintaining its capital assets (Hillier et al., 2013)) is in the negative, their findings suggest that tech firms are nearly exclusively financed by equity. This finding tends to oppose the assumption made in the Pecking order theory that firms prefer to borrow rather than issuing equity. After their research on Irish software companies, Hogan and Hutson (2005) concluded that not only did new technology-based companies use more external equity compared with debt, they actually preferred external equity to debt. This raises a question on the applicability of the pecking order theory on tech startups and raises a question on the determinants of financial decision making in these firms.

1.3 Research Purpose and Question

Overall, there is limited research done on understanding the financing choices of a firm (Coleman and Robb, 2012), and most research done on firms' capital structure has focused on well-established public companies. It should also be noted that research has mainly focused on countries with larger economies like the U.S. and the U.K. with access to international capital markets and a variety of financing choices (Mayers, 2001). In the U.S. for instance, startups tend to rely heavily on external debt financing (Robb and Robinson, 2014), while tech startups tend to focus on equity investments rather than debt (Tech, 2018, p. 17). However, Austria is classified in the bank-oriented financial system category (Ergungor, 2003), where banks, i.e., debt, play a significant role in the financing of firms.

This leads us to question whether the funding preference of Austrian tech startups is in tune with the pecking order theory provided that Austria has a bank-oriented financial system, and tech startups in European countries tend to prefer external equity to debt. By

⁴ The difference between a firm's net income and the amount it spends on dividends (Berk and DeMarzo, 2007).

doing this study, we intend to understand the preferred way of financing for these startups, the drivers that lead to the specific preference, and later compare our findings with similar findings done in other geographical contexts. By conducting six semi-structured interviews with Austrian tech startups and using data gathered from an email response and two other interview transcripts from a startup publication, we attempt to contribute to the limited research done regarding the financing decisions of tech firms in Austria. In order to pursue our objective, we have come up with the following three related research questions to be answered in relation to the pecking order theory: “How are Austrian tech startups financed initially and why?”; “What order of financing do Austrian tech startups implement and why?”; and “What order of financing do Austrian tech startup founders prefer and why?”.

Additionally, as a secondary purpose, we seek to answer, “the role that the Austrian government plays in financing tech startups.” The emphasis on the government financial support (hereafter, “GFS”) in Austria is included as according to Haji, Younes and Serninger (2019, p. 12) governmental policies and regulations play a crucial role in how startup companies prioritize their source of funding in addition to taxes, incentives and the entrepreneurial culture of the economies.

After this introduction, Theoretical Background focuses on discussing the theoretical framework of the paper presenting the relevant theories and a literature review, and Startup Environment in Austria presents the Austrian Startup environment. Afterwards, Methodology details the Methodology aspect of this paper discussing the research method and design employed as well as how data was collected and analyzed. Thereafter, the Empirical Findings section is dedicated to the findings of this study which is followed by Analysis and Conclusion sections, respectively.

2 Theoretical Background

This section details the literature used in this study. In subsections 2.1 to 2.2, the theoretical background, especially terms such as capital structure and the theories surrounding it will be explained in detail and compared according to the current level of understanding. Then, after clarifying the theoretical concepts that are vital for this study, subsection 2.3 is a short overview of different types of equity, as well as debt financing for startups, discussed in order to ensure a proper understanding of the analysis in section 5. Finally, in subsection 2.4, the results of existing research on the funding decision process of NTBFs will be presented and shortly discussed. This review will be used in Section 6 in order to compare it to the findings of this thesis from Section 5.

2.1 Capital Structure

In general, capital structure can be described as the mix of debt and equity of a company (Brigham and Ehrhardt, 2008). As mentioned in the introduction, one of the most famous and important concepts of capital structure stems from Miller and Modigliani, in which they analyzed the capital structure of companies in the electric utility industry (Coleman and Robb, 2012). Eckbo (2008) describes the work from Miller and Modigliani (hereafter, "M&M") as crucial in laying down the doctrine of modern financial theory. Through their study "The cost of capital, corporation finance and the theory of investment," from 1958, they explain the effect of a company's capital structure to its value (Ahmeti and Prenaj, 2015). As the M&M theorem still serves as one of the most fundamental theories in capital structure and as it is the foundation of the other capital structure theories and research, it is important to take a closer look at it (Horvatinović and Orsag, 2018).

Modigliani and Miller (1958) theorized that a company will select a mix of debt and equity which maximizes the value of the business and minimizes the WACC (Weighted Average Cost of Capital). To be precise, their main finding, the so-called "M&M Theorem" states that in perfect capital markets, no impact of leverage can be seen on firm value, meaning the value of a company is not affected by its debt-equity ratio (M&M

proposition 1⁵) (Ahmadimousaabad et al., 2013). Hence it does not matter if a company finances itself through a loan, venture capital, or other types of debt and equity, the WACC will always stay the same. In order to understand why the WACC remains constant, no matter the financing choice, it is important to first understand the market reward and risk philosophy. As debt has a prior claim to equity when it comes to a company's earnings and assets, its cost is always less than the cost of equity (Modigliani and Miller, 1958).

However, if the company has a growing debt level or is in financial distress, the equity holders will demand compensation for the increased risk. This expected compensation or rate of return is based on the spread between the cost of debt and the overall cost of capital. Hence if the company attempts to substitute debt for equity in order to increase its cost of capital, it will have no impact on the WACC. The reason for that is that an increase in debt to equity ratio will lead to an increase in the cost of equity, resulting in a constant WACC (M&M proposition 2⁶) (Modigliani and Miller, 1958).

A related fitting analogy to the M&M Theory was put out by Miller (1991) in his book "Financial Innovations and Market Volatility": "... *Think of the firm as a gigantic tub of whole milk. The farmer can sell the whole milk as is. Or he can separate out the cream and sell it at a considerably higher price than the whole milk would bring. (That's the analog of a firm selling low-yield and hence high-priced debt securities.) But, of course, what the farmer would have left would be skim milk with low butterfat content, and that would sell for much less than whole milk. That corresponds to the levered equity. The M and M proposition states that if there were no costs of separation (and, of course, no government dairy-support programs), the cream plus the skim milk would bring the same price as the whole milk.*"

⁵ $V_U = V_L$ The unlevered price of a firm, which means the price of the firm only consists of equity (VU) is the same as the price of a levered firm, which means the price of the firm consists of a mix of debt and equity (VL) (Modigliani and Miller, 1958).

⁶ r_E (cost of levered equity) = V_L (cost of unlevered equity) + $\frac{D}{E}$ (debt to equity ratio)

Return of cost (rE) increases with more leverage (Modigliani and Miller, 1958).

However, the capital market in our present world is not perfect due to costs related to agency, taxes, and information asymmetry. Most finance literature agrees that such market imperfections are the cause of a considerable difference between the cost of equity and debt financing (Colombo and Grilli, 2007; Carpenter and Petersen, 2002; Berger and Udell, 1998). Hence companies try to find the perfect capital structure according to those factors (Myers, 2001). Miller and Modigliani even addressed one of those market factors, tax, in their paper from 1963 "Corporate income taxes and the cost of capital: a correction", in which they formulated the M&M Theorem 2, which utilizes a capital market with no zero tax assumption contrary to the first one (Ahmeti and Prenaj, 2015). Now that the capital market does have tax, companies are able to increase their value through debt financing. The reason for this is that by utilizing debt, the companies pay less in taxes (Modigliani and Miller, 1963). Still, although the M&M theories were groundbreaking at the time, one of the biggest criticisms and lacking point of their findings remains their concept of a controlled environment with the lack of the earlier mentioned factors like information asymmetry (Gifford, 1998).

Due to the above mentioned and other factors that influence the realistic capital market, multiple studies tried to find a "perfect capital structure" by specializing in one or more of them. However, it has to be mentioned that it is more or less agreed upon by scholars that something like a perfect capital structure applicable to every company does not exist in the real world. Besides the multiple influencing factors of a real-world capital market, characteristics of the specific company like owner personality or access to financial and human capital influence the capital structure (Robb and Robinson, 2014).

Consequently, all capital structure theories are based on the studies of Modigliani and Miller but differ in their interpretation and understanding of a real capital market and the factors that influence it (Meyers, 2001). Most of the studies conducted concerning those theories focus on publicly traded companies with access to the US or other international capital markets. This is due to such companies usually having a broad range of financing options to choose from and the ability to adjust their capital structure when compared to smaller companies with relatively low costs (Meyers, 2001).

2.2 Theories of Capital Structure

In the study of capital structure, next to the M&M Theories, there are three major classical capital structure theories, which are the tradeoff theory, the agency theory, and the pecking order theory. Recently though, new capital structure theories such as the market timing theory and life cycle theory have come to the limelight (Weigl, 2011). Since the focus of this paper is the pecking order theory, we have focused on presenting the theoretical framework of the three classical theories, followed by a brief introduction to two of the relatively new theories.

2.2.1 Trade-Off Theory

In the study of capital structure theories, the trade-off theory is considered one of the most researched and well-known theories (Harris and Raviv, 1991). As mentioned in subsection 1.1, most theories of capital structure focus on a specific factor of the capital market, and in this case, it is tax and bankruptcy costs. This theory builds on Modigliani and Miller's findings from their study in 1963 regarding using tax as a debt shield. According to the trade-off theory, the perfect capital structure by companies can be acquired by a trade-off of the cost of debt and equity against their benefits (Ahmadimousaabad et al., 2013). The benefit of debt is as already proven by M&M, a tax shield, and tax deductibility on interest payments. However, debt can lead to financial distress costs, i.e., bankruptcy and non-bankruptcy costs such as agency cost and costs related to staff leaving. Hence according to this theory, a company tries to balance out or in other words, trade-off the benefit of debt in terms of tax savings against the cost of debt in terms of bankruptcy costs in order to maximize its value (Kraus and Litzenger, 1973). By inference, a firm with high profitability will have a higher debt level in order to maximize tax benefits and increase the availability of capital.

However, contrary to that assumption, many studies found that companies with high profitability tend to utilize debt less and not more (Fama and French, 2002; Rajan and Zingales, 1995; Titman and Wessels, 1988). Examples of such firms that contradict the trade-off theory are Microsoft, Walgreen, Cisco Systems, and William Wrigley. The reasons behind such a zero-debt policy of the mentioned firms are a favorable equity market as well as valuation and borrowing constraints and a reduction of agency costs (Byoun and Xu, 2013). When it comes to startups in specific, we observe that the trade-

off theory is not applicable due to two main reasons: First, young and new businesses are less likely to benefit from tax interest deductibility or generally from tax savings because they often generate little to no revenues in their first year of existence (Coleman, Cotei and Farhat, 2016). Second, startups are at higher risk of financial distress than compared to bigger companies. This high risk of failure makes it quite difficult for startups to raise debt (Coleman, Cotei, and Farhat, 2013).

2.2.2 Agency Theory

The second classical theory of capital structure, the agency theory, focuses on the role of the self-interest of managers when choosing the capital structure (Weigl, 2011). In a perfect capital market, the managers, or so-called “agents” would determine a capital structure that benefits the shareholders, so-called “principals.” In a real capital market, however, managers tend to make decisions that are not in alignment with the interests of the shareholders (e.g., pursuing the goal of personal success instead of organizational growth) and therefore conflict arises (Ang et al., 2000). This conflict and asymmetric information between principal and agent results in so-called “agency costs.” According to Jensen and Meckling (1976), there are two types of such costs, agency costs that stem from conflicts between equity holders and managers and agency costs, which derive from conflicts between equity holders and debt holders. Agency costs caused by the conflict between equity holders and managers consist of the cost due to the suboptimal decisions taken by the managers (self-interest) as well as the cost of monitoring management in order to prevent them from making such decisions (Weigl, 2011) whereas agency costs stemming from the conflict between equity holders and debt holders are caused by the assumption that management acts in favor of shareholders rather than debt holders and therefore transfer the wealth to shareholders while passing over debt holders. Hence debt holders will implement preventive measures (e.g., higher interest rates) in order to make up for the potential losses (Jensen and Meckling, 1976).

There are mixed research results when it comes to the influence of such agency conflicts and costs to a firm's capital structure. Leland (1998) and Parrino and Weisbach (1999) showed that agency costs deriving from shareholder debtholder conflict only seem to have a minimal impact on the corporate leverage decision. Those results got further support from Childs and Mauer (2008), who found that shareholder/debtholder agency costs have

a negligible effect when it comes to the capital structure decision. Contrary to that, Ericsson (2000) and Childs et al. (2005) found that the shareholder/debtholder agency costs do have an impact on a firm's decision of leverage as well as debt maturity structure.

Concerning the effect of shareholder/manager agency costs, Childs and Mauer (2008), in line with the findings of Parrino et al. (2005), found that they do indeed have an impact on capital structure and, moreover, a bigger one than shareholder/debtholder agency costs. Additionally, according to Margaritis and Psillaki (2010), high shareholder/manager agency costs are in a positive correlation with higher leverage, which constitutes an increase in firm efficiency, performance, and, therefore, corporate value.

2.2.3 Pecking Order Theory

The pecking order theory focuses, similar to the agency theory, on the factor of asymmetric information. This information asymmetry stems from the fact that managers possess more information about the actual value of the company and the involved risks compared to outside investors. Consequently, the equity of the firm gets misvalued by the market, and therefore, the company prefers to finance itself through internal funds or debt before issuing equity (Myers and Majluf, 1984). Hence according to the pecking order theory, the financing choice of a business depends on the information costs aligned with the particular type of financing (Myers, 2001). It also suggests that, contrary to the trade-off theory, companies do not have a target debt ratio because the order of financing determines their preference regarding the issuance of new capital (Myers and Majluf, 1984). Internal financing, e.g., through retained earnings, profits, personal sources, share capital and dividends, does not have information costs, and therefore will be used first by firms. The second choice, according to this theory, is debt as it comes with lesser information costs with it compared to issuing equity. One of the reasons for this is that in the case of a liquidation process of the company, debt has the prior claim to equity. Hence debt investors have to bear a smaller risk compared to equity investors. Therefore, equity finance is usually the most expensive option when it comes to information costs and should only be preferred to debt financing if it is cheaper. This is, for example, the case if the firm is in financial distress or already has a high debt ratio (Myers, 2001). Thus, according to the pecking order theory, a company should firstly finance itself through

internal financing sources, secondly through debt sources, and lastly, through equity financing. Additionally, Myers (1984) argues that when external finance is required, a company will utilize hybrid securities such as convertible bonds after debt but before equity.

When it comes to conducted research, the pecking order theory is second to the trade-off theory in terms of citation and acceptance in capital structure theory (Weigl, 2011). For example, Shyam-Sunder and Myers (1999) provide empirical evidence for the pecking order theory by analyzing US companies between 1971 and 1989. Another example would be Bharat et al. (2009), who found further evidence that asymmetric information between investors and managers is a critical determinant of the capital structure decision. Support for the pecking order theory in non-US countries was provided by Chen and Chen (2011), who analyzed the capital structure of Taiwanese companies. The study shows that Taiwanese companies primarily use internal capital to finance new projects. When such funds are insufficient, the company issues debt and only as a last resort, equity.

However, like the vast majority of research on capital structure and its theories, most studies concerning the pecking order focused on mostly large companies that are publicly traded (Meyers, 2001). Hence what does the existing research say about the applicability of the pecking order theories in startups? Coleman et al. (2000) found that the pecking order is particularly applicable to small and privately held companies because the informational asymmetry in such firms is high. Mainly that is the case because such companies usually do not publish annual reports, and their financial statements are often not publicly available, and therefore outsiders have no way to evaluate the financial condition. Berger and Udell (1998) come to the same conclusion and find that small businesses are primarily reliant on internal finance, such as personal savings, as they have a difficult time obtaining external funding due to information asymmetry. Additionally, when these firms have to turn to external finance, they prefer debt rather than equity, because debt does not require them to give up ownership. Furthermore, Frid (2009) found evidence that US startups utilize their own savings as the sole funding source during the initial startup process, which aligns with the pecking order theory. As those companies develop, they tend to switch to external debt and equity.

Especially in tech startups, information asymmetry seems to play a vital role considering that the involved technology is relatively inscrutable to non-tech investors and especially for banks, which therefore leads to wrong and undervalued assessments and evaluations (Deakins and Hussain, 1993). A more detailed analysis of the previous research on the pecking order theory in relation to tech startups will be presented in section 2.3.

2.2.4 Market Timing Theory

The Market Timing theory is a relatively new theory of capital structure and originates from Baker and Wurgler and their study "Market timing and capital structure" from 2002. In general, this theory is taking the overvaluation or undervaluation of the stock price as a determining factor in order to identify the perfect capital structure of a company (Setyawan, 2015). Baker and Wurgler (2002) found that if stock prices are overvalued, companies will finance their investments through debt; otherwise, they will be undervalued and have to rely on equity financing. Therefore, firms choose to finance through equity or debt according to which one of them is more valued by financial markets at the moment.

This premise seems to hold true when looking at the study by Graham and Harvey (2001). According to them, two-third of the surveyed business executives said that the quantity through which their stock was overvalued or undervalued was a big concern when deciding upon issuing equity (Graham and Harvey, 2001). In fact, most studies on the market timing theory, for example, Setyawan (2015), seem to support it. At least when it comes to managers waiting for the market conditions to get better before issuing new stocks. However, as the market timing theory usually applies to more prominent, publicly traded companies, it is not as relevant to startups, which most of the time are not publicly traded.

2.2.5 Time Cycle Theory

Another example of a rather new capital structure theory is the time cycle theory, which focuses on the change of the capital structure of a firm over time. This change in capital structure comes down to the fact that companies have different capital requirements over their life cycle according to their current stage of growth (DeHan, 2014; Berger and Udell, 1998). This development of capital structure holds especially true to small businesses. In the beginning, such companies usually rely on equity (especially personal savings) and

private equity rather than public equity. After this initial phase, according to Fluck (2000), companies use their retained earnings, outside equity as well as long term debt. As already mentioned in 2.2.1, startups, notably during their first year, are often not able to raise adequate debt because of the general risk nature of their undertaking and small revenues. According to DeHan (2014), highly innovative firms⁷ that are at the beginning of the life cycle are more likely to raise capital through equity issuance than compared to less innovative companies. Moreover, there seems to be a positive correlation between a company that holds patents and its decision to finance through the stock or bond market (DeHan, 2014). Even though debt is harder to come by for startups, La Rocca (2014) concluded that when it comes to Italian startups, debt is still essential to the early stages of their life cycle as internal resources are often not sufficient. Additionally, as the owners of such a business usually are also the majority shareholders of the business, agency costs can be ignored when choosing a capital structure (Berger and Udell, 1998).

Evidence for such a change when it comes to financing and capital structure of startups was also provided by Bozkaya et al. (2008). In their study concerning the funding of small Belgian tech companies, they found a change in financing choice during their development. In the initial phase, the startup's primary funding source utilized was equity in the form of personal funds, which subsequently got replaced by bank financing, and finally, angel and capital funding became the primary source of finance (Bozkaya et al., 2008). In conclusion, the time cycle theory constitutes that firms, especially startups, often do not stick to one particular capital structure during their life cycle.

2.3 Previous Research on Tech Startups

Considering the fact that tech startups are highly capital intensive (Geroski, 1995) and the increased likelihood of failure in insufficiently funded startups, (Basu and Parker, 2001) finding a financing source and making sure it is suitable for that specific firm becomes a crucial step in starting an entrepreneurial venture (Čalopa, Hovart, and Lalić, 2014, p. 25). In this case, founders have the option, although constrained due to their inability to generate retained earnings (Mayers, 1984) to utilize internal and/or external sources to

⁷ Firms are considered innovative if they incorporate some intentional and deliberate innovative behaviour. Furthermore the company's innovation should be new and exceed some basic measure of novelty and it must have an objective improvement which can be measured and communicated (Hauknes, 1998).

finance their startup (Paul, Whittam, and Wyper, 2007) based on various factors (Atherton, 2012).

Although there are various sources to finance a startup (Tariq, 2013) considering the focus of this paper on pecking order theory, we argue that it is essential to concentrate on Internal funding, debt, and Equity. Additionally, government financial support, as it can fill the gap in cases where it is challenging to acquire external funding, will be discussed in section 3. As mentioned in section 2.2.3 of this paper, Mayer and Majluf (1984) argue that the pecking order theory stipulates that firms prefer to first utilize internal funding to finance their startup before turning to debt and finally equity as the last option.

Hereafter, we have analyzed the literature by dividing it into the three parts of startup funding sources, i.e., internal funding, debt, and equity. This analysis mainly focuses on summarizing the findings in the pattern of financing choices in the previous research in line with the pecking order theory. The summary will be followed by Table 1, where we summarize previous research findings in relation to the preferred financing order of the startups in five countries.

2.3.1 Internal Funding

Considered the first option of venture financing in regards to tech startups in various countries including Italy (Giudici and Paleari, 2000; Colombo and Grilli, 2007), Belgium (Manigart and Struyf, 1997) Sweden (Haji, Younes, and Serninger, 2019) and Ireland, (Hogan and Hutson, 2005) internal funding is, in accordance with the pecking order theory, the preferred source of funding for tech startups (Paul, Whittam, and Wyper, 2007). Generally speaking, founder's equity, personal loans, and credit cards are considered a part of internal funding (Tariq, 2003, p. 4) in addition to financing secured from family members, friends, and affiliates of the firm (Robb and Robinson, 2012). Berger and Udell (1998) argue that one of the key reasons why startups choose internal sources of financing is because they do not have any retained earnings from the startup that can be used to finance their venture.

Additionally, as mentioned in section 1 of this paper, since startups: lack a track record resulting in increased information asymmetry; lack collateralizable assets to access debt; are associated with a greater than "normal" risk; and are considered speculative

undertakings with lower prospects, outside investors are adamant about providing funding without the successful demonstration that the firm is potentially profitable (Scholtens, 1998; Bhide, 2003; Harrison et al., 2004). Due to these reasons that make it difficult to access external funding, the founders are forced to focus on internal financing.

Apart from the constraints they face, owner-managers are unwilling to relinquish control of their venture through issuing equity to investors (Binks, 1991; Cosh and Hughes, 1994). Additionally, most tech startups are known to prefer to stay independent and continue to have control of their firms as most founders are in the pursuit of innovation, unlike investors focused on the ability to maximize the future selling value of their share (Hogan and Hutson, 2005).

However, despite the fact that an internal source of funding can be of high significance, tech startups, highly capital intensive in nature, run a higher risk of faster depletion of funds proving internal funding a less relevant topic in the study of tech startups (Wing Tam, 2011). This reason tends to push them to look elsewhere for more funding.

2.3.2 Debt Financing

Following internal funding, debt financing is the second preferred way of funding for startups ahead of issuing equity (Hisrich, 1986 and Caird, 1991) and especially during the first years of operation, firms rely heavily on external debt such as bank loans (Rob and Robinson, 2014). However, research on financing choice of tech startups in Ireland (Hogan and Hutson, 2005) Belgium (Manigart and Struyf, 1997) and Sweden (Haji, Younes, and Serninger, 2019) show that tech startups are more inclined to issue equity than debt.

One reason for this is, although in most startup cases, there is a very high and positive correlation between debt/bank loan and sustainability of the venture, (Åstebro and Bernhardt, 2003) tech startups seem to have difficulties in getting a loan compared to their counterparts in more traditional sectors (Brown et al., 2012). Additionally, Tariq (2013) argues that even in the cases where the founders are able to obtain loans, in most cases the terms that come with the financing are unaffordable for the startups and the need for liquidity funds from banks tend to pressure the founders into additional loans, loan commitments, and increased demand for repayment. Furthermore, the governmental

policies and regulations, in addition to taxes, incentives, and the entrepreneurial culture of the different economies, play roles in how startup companies prioritize their source of funding (Haji, Younes, and Serninger, 2019, p.12).

2.3.3 Equity Financing

Startup companies lack a track record (Allen, 1992; Revest and Sapio, 2010) and their complex nature and the information asymmetry created by founders having more knowledge and detailed information about their firm compared with potential investors (Gompers, 1995; Coleman and Robb, 2012) hinder them from being able to issue equity to finance their ventures. Additionally, the refusal of most tech startup founders to cede control of their startups is a major component in them preferring other alternatives of financing (Hogan and Hutson, 2005).

However, as the ventures progress and the initial source of funding dries up, founders are, in most cases, forced to choose between losing some control and continuing to innovate and grow or go out of business (Hogan and Hutson, 2005). In these cases, firms can turn to Angel Investors, i.e., private, wealthy individuals operating informally and investing in startups in the early stages for various reasons, including personal interest and financial return (Leach and Melicher, 2012). Angel investors, in addition to providing funding, provide support by sharing skills, knowledge, experience, expertise, network, and managerial support, helping them to stand out in the minds of founders when compared to the other options (Calopa, Horvat and Lalic, 2014).

Furthermore, funding can stem from Venture capital firms, considered as the main source of external financing for tech startups (Tariq, 2013, p. 6), which are firms that formally or informally bring investors together and invest in the early stage of new and rapidly growing ventures (Leach and Melicher, 2012). This form of investment involves taking a considerable risk.

Research / Study	Country / Focus	Findings: Order of funding
Manigart & Struyf (1997)	Belgium	(1) Internal Funds (2) Debt (3) Equity
Giudici & Paleari (2000)	Italy	(1) Internal Funds (2) Debt (3) Equity
Hogan & Hutson (2005)	Ireland	(1) Internal Funds (2) Equity (3) Debt
Minola et al. (2013)	USA	(1) Internal Funds (2) Equity (3) Debt
Serninger et al. (2019)	Sweden	(1) Internal Funds (2) Equity (3) Debt

Table 1- Previous findings regarding the funding order of tech startups

3 Startup Environment in Austria

This section presents the key facts and figures relating to the Austrian startup environment. Additionally, this segment details the major financial support programs offered by the Austrian government.

Next to the mentioned traditional funding methods and theories, another factor that has to be considered when looking at the selection of capital structure by startups is the general startup environment. Governmental support and policies can help startups to overcome the initial financial problems that especially innovative companies usually face in their first years of existence (Okrah and Nepp, 2018). This seems to hold true, especially for tech startups, as it was shown by Zhao and Ziedonis (2012), who looked into the relationship between state R&D funding and the recipient firms' performance. According to their findings, state R&D funding enhanced the survival rate of the receiving companies in their first three years of existence by around 15% to 25% compared to similar companies that failed to get such governmental support. Hence this chapter focuses on the major financial support programs offered by the Austrian State. Before delving into the specific programs, a short overview of the general startup environment will be presented.

3.1 Key Facts and Figures

The source of this subsection will be the Austrian Startup Monitor 2019, which was published in February 2020. This yearly report created by the Austrian Institute of Technology, WU Vienna, and the Startup Platform Austrian startups is the most comprehensive study of the Austrian startup environment, and its data stems from the survey of 710 Austrian founders.

In the last ten years, more than 2.200 startups were founded in Austria, from which the vast majority, 49.3%, was founded in Vienna. When it comes to the industry of Austrian startups 31.2% are active in IT / Software Development, 10.1% in Hardware Development, 10.1% in consumer goods, 9.2% in Life Sciences, 7.0% in communication, marketing and media, 6.3% in Finance and Fintech, 5.3% in Energy and Mobility, 4.4% in commerce, 3.1% in Tourism, 2.8% in education, 2.6% in real estate and construction

and 7.9% in other sectors. Around 81% of all Austrian founding teams consist of more than one person and, on average, have 2.6 members. Of those, 2.1 are male and 0.5 female. The average age of a founder is 37.2 years, and 72.2% of the founders have an academic background. Furthermore, four out of ten founders are so-called serial entrepreneurs, meaning that they already were engaged in entrepreneurial endeavours before. Around 14% of Austrian startups are academic spin-offs, meaning they originated from an academic institution, and 20% are spin-offs of existing companies (Austrian Startup Monitor, 2020).

When it comes to financing, 26.4% of startups report no revenues and 26.2% relative low revenues ranging between 1 to 50.000€. In terms of funding, the vast majority of Austrian startups, 69%, utilized their savings as a primary source. The second most important funding source is financial state support. Around 48% of the surveyed companies used various government financial support programs. 27% of the startups received an investment from a business Angel, and 14% got financing through venture capitalists. Additionally, 8% of the firms utilized crowdfunding, and 23% financed themselves through their own revenues. Compared to that, 19% funded themselves through debt capital, specifically through bank loans (Austrian Startup Monitor, 2020).

Regarding the general reception of the surveyed founders, only every sixth thinks that the Austrian Government is seriously interested in supporting startups. Concerning most wished improvements from the policymakers, 44% of the firms would like to see a decrease in terms of income related to social security payments, 41% the creation of incentives for venture capital investors and 30% higher flexibility and transparency concerning public grant funding (Austrian Startup Monitor, 2020).

3.2 Government financial support for Startups

As already mentioned, state funding plays a vital role when it comes to the performance of tech startups, and 48% of Austrian startups utilize it. It is, therefore, important to give a short overview of the most important governmental funding institutions and programs in Austria as they play a role in the funding decision process, and most of the interviewed companies in section 5 utilized some of them.

There are three major state institutions in Austria when it comes to Startup financing and other support: WKO, FFG, and AWS. The WKO is the Austrian Economic Chamber and therefore represents the interests of Austrian Companies and provides comprehensive services and offers firms expert knowledge (WKO, 2020). In terms of startups it offers various non-financial programs like for example the WKW Startup academy, which provides potential founders with various workshops relating to business management, the Innovation2company with the aim of bringing together startups with established firms and the GoSiliconValley initiative which offers innovative startups an accelerator program in Silicon Valley, USA (WKW Startup Academy, 2020; Innovation2company, 2020, GoSiliconValley, 2020). When it comes solely to funding, the Austrian Research Promotion Agency (FFG) is the second biggest funding provider after the AWS. It supports innovative young firms in developing, implementing, and launching their ideas onto the market and does so by investing around 70 million euros yearly into them as well as providing consulting and networking. The FFG provides startups with grants and loans which cover up to 70% of innovative service and product development (R&D costs). Additionally, Tech startups receive an even higher potential financial coverage of 5% (FFG, 2020).

The biggest state provider of startup funding is the promotional bank of the Austrian federal government, called Austria Wirtschaftsservice Gesellschaft mbH (hereafter, “AWS”). Essentially it supports young firms that implement innovative ideas by offering loans, grants, and guarantees (AWS, 2020). An example of such an offering is AWS Double Equity, which essentially is a loan guarantee provided by the AWS for sums of up to 2.5 million euros (AWS Double Equity, 2020). The total yearly budget of the AWS is around 1 billion euros (AWS, 2020).

Besides these federal state institutions, every region of Austria offers various mostly smaller funding support programs for startups in their region. An example of such a regional institution would be the Vienna Business Agency, which offers grants like the creative initiative project, which supports small firms with sustainable products and services in the creative industry with up to 150.000 euros (Vienna Business Agency, 2020). However, most of the mentioned programs require the applicant startup to go

through a thorough selection process, which in recent years came under criticism for its lacking transparency and company selection (DerStandard.at, 2018).

4 Methodology

In this section, we present a description of the methodology used in this study. In addition to describing and motivating the choice of companies, this section presents the research strategy, research design, and research method used in this study. Furthermore, the quality and trustworthiness of this study is discussed.

4.1 Research Philosophy

When doing a scientific research, determining the research philosophy i.e., a system of beliefs and assumptions about the development of knowledge, is appropriate as it gives an overview of how the researchers construe the environment and how they use the research methods to contribute to their field of study (Easterby-Smith, Thorpe & Jackson, 2015; Saunders, Lewis & Thornhill, 2009). When undertaking a scientific study, researchers make various assumptions some of which they are not consciously aware of (Burrell and Morgan, 1979). These assumptions, among other areas, could be assumptions on human knowledge (Epistemological assumptions) and assumptions on the realities that researchers encounter in their research (ontological assumptions). A credible research philosophy which underpins the methodological choice of a study, research strategy, data collection mechanisms, and analysis procedures is a result of a consistent and well-thought-out assumptions (Saunders, Lewis & Thornhill, 2009).

Considering that the purpose of this study is to understand what source of funding founders use to finance their startups and why, a relativist ontology, whereby “truth” and “facts” are context and subject dependent (Easterby-Smith, Thorpe & Jackson, 2015), is employed. When it comes to epistemology, consider the ontological assumption employed and the use of interviews to undertake a qualitative study where interviewees are central in achieving the purpose of this study and contributing to knowledge creation, social constructionism is used (Easterby-Smith, Thorpe & Jackson, 2015).

4.2 Research Strategy – Qualitative Approach

According to Patton (1990), the relative value of Qualitative and Quantitative research paradigms has long been discussed. These two approaches are used to achieve different goals by using different techniques. The qualitative approach seeks to understand phenomena in a context-specific setting by using a naturalistic approach, while the quantitative approach tests theoretical generalizations using quantitative measures and experiential methods (Hoepfl, 1997). Bryman (2005) claims that the research problem of a scientific study should be used to determine the appropriate research design. It is our understanding that by using a qualitative approach, we are able to dig deep into the behavior and related factors affecting the founders of our chosen case companies.

Bryman (2005, p. 19) further notes that qualitative research emphasizes on the perspective of the subject that is being studied and unlike quantitative research, the main aim of the study is to understand what is important to the individual being studied and how they interpret their working environment using thorough and in-depth investigations. A qualitative research method that can be undertaken by collecting thoughts, feelings, impressions, etc. (Saunders, Lewis, and Thornhill, 2007) appears fitting considering the aim of this paper. We, therefore, argue that, in order to understand the choice in the source of financing of our case companies and the underlying factors affecting these decisions, we will choose a qualitative research approach.

The fact that we chose qualitative research does not in any way mean that there will be no quantification. Bryman (2015) states that contrary to popular assumption, qualitative researchers cannot escape quantification as they need to undertake some sort of counting procedure at some point. It, however, has to be noted that, considering the purpose of this study, there will be no systematic use of quantities in the final analysis for this study.

4.3 Research Design – Multiple Case Study

As the rational progression that links the empirical data to a study's research question, and, eventually, to the conclusions, an implicit, if not explicit research design is essential (Yin, 2018). As such, a research design is a logical plan to get from the initial questions to be addressed to the conclusions that will be made. Philliber, Schwab, Samsloss (1980) refer to research design as the "blueprint" of the research that deals with the type of

questions to study, relevant data needed, how to collect the data, and in the end how to analyze the results. It is pertinent to note that the primary purpose of the research design is making sure that the evidence gathered is relevant for answering the research question or set of questions (Yin, 2018).

Yin (2018) states that when a study is aimed at understanding “how” or “why,” a social phenomenon works, undertaking a case study research becomes naturally relevant. Additionally, Yin (2018) argues that when the researchers have no or little control over behavioral events, and the study is mainly focused on a contemporary phenomenon instead of a historical one. Case study becomes more relevant. In its essence, the case study helps in the understanding of a decision or set of decisions, i.e., the reasoning, implementation, and outcome of the decisions (Schramm, 1971). According to Yin (2018), other major factors such as “programs,” “processes,” “organizations,” “individuals,” etc.. can be included.

Yin and Davis (2007) state that a case study is a practical method that is particularly helpful when the phenomenon being studied can be context-sensitive. Therefore, considering that our aim is to identify if the Pecking Order Theory is applicable in the financing related decision making in the Austrian tech startup context, we argue that case study is an appropriate choice for our paper.

A case study can include both single- or multiple-case studies (stake, 2006). According to Gerring (2017), a multiple case study consists of analyzing resemblances, differences, and interconnections between two or more cases sharing a similar objective. We, therefore, argue a holistic multiple case study is ideal in our research as we aim to understand the financing related decision making of Austrian tech startups operating across a wide range of sectors. Additionally, we are persuaded by Yin (2018) that although all designs can lead to a successful case study, whenever possible, it is preferred to undertake a case study with more than one case as the odds of doing better research persists and the analytic benefits of more than one case are considered to be extensive.

Although the advantages of the case study can be distinctively observed (Yin, 2018, p. 50), there are various critics of its use. These critics are vocal on the use of case study research due to various reasons ranging from its lack of generalizability (Bryman, 2012) to the lack of skill in researchers and whether researchers undertaking case studies are

rigorous enough in following systematic procedures and their willingness to let ambiguous evidence impact the direction of the finding and the conclusions (Yin, 2018).

Even though the above-mentioned criticisms can be valid in some contexts and the fact that we undertake a multiple case study design improves the generalizability of our findings, it is important to note the purpose of this study. We maintain that the main aim of our research is not to generalize but rather to achieve a comprehensive review of our chosen case companies and later use the pecking order theory to make a theory-based analysis.

Furthermore, we would like to point out that although the skills for doing a proper case study research is yet to be delineated (Yin, 2018) we are, to the best of our ability and resources available, committed to undertake a study that can be useful for both theoretical and practical purposes. We would also like to add that we have put into consideration the basic desired attributes of researchers undertaking a case study research formulated by Yin (2018). These include asking the right questions, being good listeners, having a holistic understanding of the issue being studied, and being ethically responsible for the duration of the whole study.

4.4 Case Selection

Considering the primary purpose of this research, we interviewed six Austrian tech startups operating in various sectors and received an email response from one Austrian Tech startup. We additionally, in order to have a broader understanding, we used two interviews from an Austrian Startup website and focused on the parts that fit the goal of this study. The initial stage in the selection process was finding out which companies are well suited to answer our research question. Such an approach, where researchers self-select the cases to be studied in accordance with the purpose of their paper and the research question, is called purposive sampling (Bryman, 2012, p. 428; Teddlie and Yu, 2007, p. 77).

Therefore, we have selected the nine Austrian tech startups that we believe are relevant in answering our initial research question. During the selection process, we have tried to include startups from various sectors and regions of Austria in order to make sure we can

get a broader perspective. This approach is supported by Bryman (2012, p. 417) argues that having companies operating in a broad range of industries with different characteristics as the focus of attention is of high importance.

In the initial stage of our journey of finding companies for our study, we contacted the founder of the tech startup where one of the researchers of this paperwork is employed. We received a positive response and were also given contact details of other Austrian tech startups, which we could interview as part of this study. We then went on to search various websites that list and work with Austrian tech startups such as the AWS database and WKO publications. After carefully selecting a number of companies, we emailed the ones we believed to fulfill the criteria of being tech startups (Mundbjerg and Sipari, 2017) and were appropriate in the process of answering our research question.

Although this process turned out to be challenging to undertake and more time consuming due to most founders being busy and unable to do 45-minute interviews and the complications COVID-19 created, we were able to interview what we consider a fair number of companies. Additionally, when selecting the case companies, we made sure that our sample is representative of the startup environment in Austria. According to the Austrian startup monitor report, (2020) of all the startups in Austria created since 2008, 1125 were founded in Vienna, 282 in Upper Austria, 267 in Styria, and 171 in Tyrol. Therefore, of the startups we used for this paper, six startups are from Vienna, two from Upper Austria, and one from Tyrol.

Table 2 covers the case companies selected, the year they were founded, the number of founders, and the number of employees at the moment of the interview. It also indicates the sector the startup operates in, its area of focus, and the role of the interviewee in the company.

Case Company	Startup year	Region	Team Size	Respondents Role in the Company	Industry / Area of Focus
1	2017	Upper Austria	13	CEO & Co-Founder	Software Development / Autonomous Vehicles
2	2018	Upper Austria	10	CEO & Co-Founder	Software Development / Automated Quality Assurance
3	2018	Vienna	4	CEO & Co-Founder	Energy and Environmental Technology
4	2014	Vienna	26	CEO & Founder	Software Development / Biotechnology
5	2013	Vienna	9	CEO & Founder	Biotechnology
6	2005 ⁸	Vienna	4	Co-Founder	3D Animation Technology
7	2018	Vienna	3-15	Co-Founders	Software Development / Machine Learning
8	2018	Vienna	4	Co-Founders	Fin Tech
9	2015	Tyrol	30	CMO & Co-Founder	Augmented Reality Technology

Table 2- Summary of Case Companies

4.5 Research Method – Interviews

According to Yin (2018), an interview is commonly used and considered as the most important source of evidence in case study research. This is because interviews “can help by suggesting explanations of key events (i.e., the “how” and “why,” as well as the insights reflecting participant’s relativist perspectives” (Yin, 2018, p. 162). Although having their own pros and cons (Yin, 2018, p. 157), we argue that interviews help researchers to focus on the topics of the case study and provide explanations while at the same time being insightful enough to use them.

⁸ As company 6 is older than 10 years and therefore not considered a startup according to the WKO anymore, only the financing choices of the first 10 years were considered in this study.

To develop a deeper understanding of the interviewee's point of view (Bryman, 2012, p. 470) and remove various factors that might limit their unhindered expression, we decided to conduct semi-structured interviews with open-ended questions. Asking open-ended questions has allowed us to avoid yes or no answers and let our interviewees elaborate their answers without borders.

Yin (2018, p. 161) notes that researchers conducting interviews for a case study research need to follow their own line of inquiry according to their set protocol and try to unbiasedly verbalize the questions in a manner that serves the line of inquiry. This is what we have done during the interview process, and by minimizing "why" questions and asking more "how" questions, we were able to avoid the defensiveness that could occur in doing otherwise.

In order to later help us transcribe the interviews and as it can be a great addition to taking notes (Yin, 2018, p. 161), we got permission and recorded all interviews with the selected case companies. Later on, right before compiling the findings, we used Otter.ai, an interview transcribing platform to save time, and we only needed to edit a few errors. Table 3 gives an insight into the recorded interviews. It includes the gender of the person interviewed, in what setting the interview was conducted, and the duration of the interview.

However, it has to be noted that due to various reasons that are mentioned in the limitations section of this study, we could not reach our target of conducting at least eight interviews. Therefore, we used one email response and two other findings from interviews done by a startup website that we deemed were within the scope of our study and beneficial in creating a broader understanding to better achieve the aim of this research.

Case Company	Interviewee gender	Job position	Audio recorded	Duration of Interview	Type of Interview
1	Male	CEO & Co-Founder	Yes	35:00	Phone
2	Female	CEO & Co-Founder	Yes	25:00	Skype
3	Female	CEO & Co-Founder	Yes	50:00	Zoom
4	Male	CEO & Founder	Yes	60:00	In-Person + Skype
5	Male	CEO & Founder	Yes	30:00	GoToMeeting
6	Male	Co-Founder	Yes	40:00	Skype
7 ⁹	Male	Co-Founders	Yes	35:00	In-Person
8 ⁸	Male	Co-Founders	Yes	15:00	In-Person
9 ¹⁰	Male	CMO & Co-Founder	No	-	Mail Response

Table 3 – Interviews

4.6 Research Findings and Data Analysis

When it comes to organizing the research findings, we used Atlas.ti, a computer-assisted qualitative data analysis software (hereafter, “CAQDAS”). The various CAQDAS applications have become more diverse and functional, covering text, audio, and video-based data and are helpful in analyzing open-ended interviews and other documents such as news articles (Yin, 2018).

After we finished our data collection, we created an analytical strategy. Yin (2018) suggests that researchers, whether they use computer-assisted software or not, should “play” with their data in search of patterns, insights, or concepts that seem promising. Miles and Huberman (1994) list organizing data in different arrays, reflecting different themes and subthemes. Considering this, we used thematic coding, based upon the theoretical proposition that is central in our study to compile our findings. However, since we cannot use the software’s output as an end result of our analysis (Yin, 2018), we had to study the outputs and determine the meaningful patterns that emerged in the analysis section based on the theoretical perspective used in this study.

⁹ Interviews were not conducted by the researchers but extracted from an online source.

¹⁰ No interview was conducted.

The analysis of case study data is one of the least developed aspects involved in doing case studies, and unlike quantitative research, there is no “cookbook” for analyzing the evidence from case studies (Yin, 2018, p. 213). Thus, analyzing case study evidence gathered from interviews and observations can be ambiguous (Bryman, 2012, p. 565). In this case, what we have done is understand that having a general analytic strategy is crucial as it can line our case study data to the concepts we consider important and help us make sense of the direction in analyzing the data (Yin, 2018, p.223).

Therefore, we have relied on a theoretical proposition (Yin, 2018, p. 216): the pecking order theory to analyze our data. This approach, known as the deductive approach, grounds its analysis on pre-existing theory (Gale et al., 2013, p. 3). Here, initial codes are drawn from the pre-existing literature on the topic of focus or what is known about the phenomenon being studied guided by the aim of the research, the research question, and the interview questions (Azungah, 2018). In this study, the theoretical proposition we used has been central since the beginning of our data collection and has yielded analytical priorities.

Moreover, after having chosen an appropriate theoretical proposition that can help answer our research question, and considering we are novice researchers, we find it important to use a guideline during the course of documenting our findings and making the final analysis. We, therefore, used the five-step guideline by O’Connor and Gibson (2003) to guide us in the analysis part of this study. This guideline entails: (1) organizing the evidence collected (2) finding and organizing ideas and concepts (3) building central themes in the data (4) ensuring trustworthiness and legitimacy in the data analysis and in the findings (5) finding possible and plausible explanations for findings. Below is Table 4, a demonstration of how the collected data was coded and readied for analysis.

Question	Responses	Code	Sub Theme	Theme
How was the startup financed first?	<p>"We bootstrapped it." (Company 3)</p> <p>"The first years were bootstrapped." (Company 1)</p> <p>"When we started the company, we had some personal money set aside." (Company 2)</p> <p>"In the very first months, everybody invested his own money." (Company 6)</p> <p>"Until now, we are more or less bootstrapped." (Company 8)</p>	Internal Funds	Initial Funding	Financing

Table 4 - Coding Scheme

As can be seen above, the responses to each question were first coded. These codes were then categorized into different sub-themes such as initial funding, GFS criticism, funding preference, etc. Finally, those sub-themes were put into the three major themes of this study: Financing, Capital Structure, and Government Financial Support.

4.7 Research Quality and Trustworthiness

According to Saunders, Lewis, and Thornhill (2007), the quality of a study can be measured by its reliability. When a study is reliable, it means that the findings of the study are not random, and the results can be reproduced if the same procedure and techniques are followed. We argue, provided that any similar research is done on the case companies with a similar goal of understanding their financing decision, the outcome will be similar.

Additionally, we made sure to get our draft reviewed by our supervisor and by the participants of the case study and included comments that we believed were exceptionally helpful as it can boost the overall quality of our study (Yin, 2018, p. 298). Schatzman and Strauss (1973, p134) argue that getting the draft reviewed is more than “professional courtesy” and is an integral part of verifying the discoveries and data presented in a case study. This process commonly referred to as triangulation of data, ensures the credibility

of our research, which is one of the components of trustworthy research, according to Guba and Lincoln (1994).

The other three components of a trustworthy study, according to Guba and Lincoln (1994), are the dependability, confirmability, and transferability of the study. In order to ensure the reliability of this study, which is “the stability of the findings across time” (Bitsch, 2005, p. 86), we, as mentioned in section 4.4, recorded all the interviews and then transcribed them. We argue that this process enhances the trustworthiness of the research by creating transparency. Confirmability is the degree to which the results of the study can be confirmed or validated by other researchers (Baxter and Eyles, 1997) and can be achieved by the impartiality of the researcher and the ability thereof to curtail bias and personal judgments in the study (Guba and Lincoln, 1994). To ensure the confirmability of this study, we have refrained from any kind of interference, meddling, or manipulation of the collected data before analysis.

Last but not least, the purposive sampling used in this paper and the thorough description of the responses of the respondents ensure the transferability of the data collected, which is the degree to which the outcomes of the study can be transferred to other contexts with other respondents (Bitsch, 2005).

5 Empirical Findings

In this section, the findings related to each of the main themes, Financing, Capital Structure, and Government Financial Support, will be presented. At the beginning of each subsection, an overview table will be provided, followed by a more in-depth presentation of the collected data.

5.1 Financing

FINANCING	Initial Funding	Quotes	Funding Preference	Quotes	Funding during Life Cycle	Quotes
Company 1	Bootstrapping	"The first years were bootstrapped."	Debt over Equity	"I would of course prefer to keep my equity."	AWS pre seed an seed, AWS Double Equity, Investment Round	"Then we got AWS pre seed, afterwards seed and now we are about to close an investment round" - We are going for AWS Double Equity.
Company 2	Bootstrapping	"When we started the company, we had some personal money set aside."	Equity over Debt	"I never wanted to take like a personal risk and be in debt after the startup if it fails"	FFG, AWS, tech2b, Business Angel	"We've got three different funding programs from Austria. And we've got a business angel on board."
Company 3	Bootstrapping	"We bootstrapped it. "	Debt over Equity	I think we'd go for a bank, when choosing between an investor or debt.	Business Angel, AWS Double Equity, Horizon 2020	We have a Business Angel since last year. - "We'll do the double equity for 600,000" - We just applied to Horizon 2020.
Company 4	AWS Pre Seed	"We got the pre-seed funding."	Equity over Debt	So, when it comes to issuing equity, it was never a problem as I understand that I am not developing a family business and as R&D in tech startups can be expensive, I see issuing equity as a good way to finance the startup.	Revenues, bank loan, Venture Capital, AWS Double Equity	"We could show about 350,000 Euros in revenues." - We managed to get a small convertible loan. - Finally we got our current investor.
Company 5	AWS Pre Seed	"We've we founded the company in 2013 with a pre seed funding from the AWS"	Debt over Equity	Remaining in control of the startup was a decisive factor for us when we decided to finance our startup.	AWS seed, FFG projects, Horizon 2020, revenues	After the first year we continued with the seed funding. - Then we had a horizon 2020 funding and smaller FFG projects. - We generated a revenue stream, which is now around 50%.
Company 6	Bootstrapping	"In the very first months everybody invested his own money."	Equity over Debt	We would have chosen an investor over debt if that would have been possible.	revenue, bank loans, FFG projects	"Everyone invested his own talents to finance the company more or less." - "Every one of us did take loans." - "We were able to acquire some FFG projects."
Company 7	Business Angel	We built the company with investors.	-	-	VC	-
Company 8	Bootstrapping	"Until now we are more or less bootstrapped."	-	-	Vienna Business Agency subsidy, FFG, VC	"We have received a subsidy from the Vienna Business Agency." - "We will get the FFG funding" - We are currently looking for a strategic investor, in order to get the FFG funding.
Company 9	Business Angel	"We started with a Business Angel investment."	-	-	VC	"In December we did our Series A with a Venture Capitalist."

Table 5 - Overview: Financing Finding

5.1.1 The initial source of financing used & preferred order of financing

From the data gathered, we were able to observe that seven of the nine interviewed case companies initially used either internal capital or governmental support to initially finance their ventures. The remaining two startups were backed by Angel Investors when starting their venture.

Among the startups, case company 2 utilized the founders' own savings. Additionally, the company received financial support from the AMS in the form of unemployment benefits.

When we started the company, we had personal savings set aside, and the support from AMS in the form of unemployment benefits was very helpful (Case 2).

The founders of case company 3 solely focused on bootstrapping to initially run their startup in the first year of operation while Case company 4 and 5 were financed through pre-seed funding from the AWS.

Initially, we bootstrapped our company. Then, a year later, an Angel Investor invested in our company (Case 3).

Our company was founded with pre-seed funding from AWS (Cases 4 and 5).

Similarly, the founders of case companies 6 and 8 used internal funding to kick-start their venture. In this case, the founders used their own savings to finance their startup.

In the first six months, we invested our own money, which was around 2000 Euros per person (Case 6).

Until now, we have more or less used bootstrapping to finance our startup (Case 8).

These findings show that most of the cases selected for this study, either by choice or due to limited options available, financed their tech startups through internal financing and/or government grants. Regarding the founders that chose internal funds, not losing control of their venture by issuing equity was one of the main reasons.

Remaining in control of the startup was a decisive factor for us when we decided to finance our startup using internal capital (Case 5).

For the founder of case company 3, the future growth prospect of the venture and the founders' willingness to maintain control so as to continue to dictate how the venture is run played a significant role in their decision to self-finance their startup.

We understood that if a Venture Capitalist joined us, we would adhere to their business model. Additionally, our startup is considered a "Zebra" and not a "Unicorn" that they look after (Case 3).

However, some founders have considered using bank loans to finance their startups. They tend to see it as a favorable alternative to issuing equity as it lets them keep control of their company.

When possible, I would definitely take a loan as this can help maintain control of the company (Case 1).

"... (If possible) I think I think we'd go for a bank. Okay. I think we'd go for a bank because of the decision making you know... So, we prefer to go for a bank loan, which is a high risk but less control so we cannot give control..." (Case 3).

Although, as can be noted above, tech startup founders might be eager to use debt as a way of financing their startups, our findings show that dealing with banks to secure this type of financing is quite tricky.

I went to the bank in Vienna and was told I could not get even 1000 Euros since they give loans based on private equity (Case 4).

Since, as a tech startup, we are considered to be of higher risk, and banks ask for private security, it is not possible to get loans (Case 5).

For a tech startup just with an IP only, it was not possible to get a loan of even 10,000 Euros (Case 6).

When it comes to issuing equity, in addition to case companies 7 and 9 that were financed by investors, we learned that some of the remaining founders were fond of the idea provided that their expectations are met. Generally, for the companies that issued equity or considered issuing equity in the initial stages, the comfort that a strong financial backer gives them, (case 4, and 7) and the knowledge and network the investors bring to the business, (Case 2, 7, and 9) were seen as the key factors when making their decision. Below are some illustrations.

So, when it comes to issuing equity, it was never a problem as I understand that I am not developing a family business, and as R&D in tech startups can be expensive, I see issuing equity as a good way to finance the startup (Case 4).

For us, when we decided to take in our venture capital, the main reason was the really good mentoring behind it (Case 2)

To help with Building up financial processes, grow better, and create more connections, in addition to the financial strength and positive negotiation skills, we used financing from an Angel investor (Case 9).

In addition to case companies 2 and 4, case company 6 would have also considered issuing equity even if it meant that they would lose control. The reason behind them not doing it had to do with the difficulty of convincing Austrian investors to invest in tech startups, which are synonymous with high risk.

If we could have convinced an investor, we would have done it. We know this might mean we give up control, but we would still have done it (Case 6).

Finally, when it comes to the founders that were reluctant to issue equity in the initial stages to finance their startups, Case company 1 saw losing control as the primary constraint while case company 5, although interested in the idea, was not interested in any random investor with money, but instead in what is known as “smart money,” i.e., funding from investors with knowledge in the sector they are in. For case company 5, maintaining control was also an important factor in their initial financing source decision making.

Considering the decision power, we lose late by issuing equity, I would prefer to self-finance the startup (Case 1).

Although being backed by an investor could ramp up our R&D, since it will make us control, we decided against it. However, if it were possible, we would have gone for “smart money”. This would be an ideal scenario (Case 5).

5.1.2 The Changes of Source of Financing during company lifecycle

All case companies except 7 and 9 changed their source of funding during their lifecycle. Both of the case firms continued to utilize Venture Capital as their source of financing.

“We started with a Business Angel investment, did a Seed Round with a corporate but financial VC. In December we did our Series A” (Case 9).

Especially for company 7, this decision can be attributed to their financing preference and will grow as quickly as possible.

The other seven case companies changed their source of financing at least once during their development. From the companies that initially financed themselves through internal funds, i.e., case companies 1, 2, 3, 6, and 8, four of them, i.e., companies 1, 2, 3, and 8, switched to external financing. For companies 1, 2, and 8 that external funding consisted of government financial support.

“The first years were bootstrapped, ... Then we got AWS pre seed, afterwards seed ...” (Case 1).

After bootstrapping, the next step was applying for different funding programs like the FFG, the AWS. Tech2b (Case 2).

“We have received a subsidy from the Vienna Business Agency ...” (Case 8).

Company 3, and later on firm 2, moved to issue equity by bringing in a business angel as a financing source.

We bootstrapped mainly the first part, but now we have a business angel since last year (Case 3).

“And we’ve got a business angel on board. So, we have a pretty good mixture.” (Case 2).

However, the main motivating factor that influenced the decision of both firms to work with a business angel had to do with the potential mentoring and the professional network the business angels are known to bring. Therefore, money was not the major motivation behind the change of source of funding.

So, with our business angel, money was not the main reason we decided to work together. We have his network and his power; he is really supporting us (Case 3).

The main reason to take an angel investor was for us to get really, really good mentoring from them (Case 2).

The founders of case company 6, who continued to finance their firm through internal funds, decided to use their skills to find side-jobs and use the money they generate to finance their startup.

We ran into problems with financing. And then everyone invested his own talents to finance the company more or less. So, we did everything from carpentry to software development. (Case 6).

However, the founders of company 6 had to eventually, due to dire financial situations, look for external funding. Therefore, they switched to using personal loans as a way to continue financing their startup.

Every one of us did take loans, but very tiny ones, so maybe 5000 euros (Case 6).

Eventually, they also received external funding in the form of government financial support from the FFG.

We had several state-funded projects. Through our research background, we were able to acquire some FFG projects (Case 6).

The two companies which did not start financing themselves through their own funds, but through government financial support, companies 4 and 5, also changed their source of financing during their lifecycle. Company 5 continued to finance itself through government financial support such as the FFG projects and Horizon 2020 but eventually managed to fund itself up to 50% from revenues.

“... and then in 2014 and 2015, we had smaller funds, we had a horizon 2020 non-dilutive funding, we had smaller FFT projects for some R&D... (Case 5).”

And then, around 2015, 2016, we started with our contract Research Services, and with it, we generated a revenue stream, which is now around 50% (Case 5).

Whereas company 4 managed, with the help of AWS pre-seed money, to come up with a prototype and create a revenue stream.

With the seed money, we developed a prototype to get funding, and this way, we could show about 350,000 Euros in revenues (Case 4).

Due to an unexpected failed negotiation with an investor, company 4 had to take a loan later on. The founder also had to put in more money, and the firm was close to bankruptcy. Eventually, they got a VC on board.

“And finally, after almost one year of complete struggling, we actually got in contact with the current investor (Case 4).”

After that VC investment, they recently got debt capital in the form of the AWS double equity program.

When it comes to future funding, most of the companies are planning to use non-dilutive financing.

In terms of future funding, we will continue with the funding programs in Austria. ... And the other thing is, to get stable with the cash flow from our customers (Case 2).

We just applied for horizon 2020. ... We'll do the double equity for 600.000 (Case 3).

We are still considering crowdfunding, so we might be using it at some point if we think it fits a project (Case 5).

Only companies 1, 4, and 8 stated that they are planning on getting funding through issuing equity.

We are about to close an investment round (Case 1).

We are currently actively looking for investors (Case 8).

However, it has to be mentioned that company 8 is looking for an investor in order to co-finance the FFG financial support that they managed to get recently.

We will get the FFG funding this or next month, but we are actively raising funds for it because we are required to co-finance. (Case 8).

5.2 Capital Structure

CAPITAL STRUCTURE	Dedicated Capital Structure	Quotes
Company 1	No	We do not currently have a set capital structure policy, as we believe we probably have to do that when we reach the investment round.
Company 2	No	-
Company 3	No	-
Company 4	Yes	Initially, we wanted to give away around 10% - 20% of the company in different rounds, which seemed right in theory but not practice. So, we decided to issue equity based on what amount of financing we need before the next round.
Company 5	No	We do not have a written down and strictly phrased capital structure policy, but we are considering it.
Company 6	No	-
Company 7 ¹¹	-	-
Company 8 ¹¹	-	-
Company 9 ¹¹	-	-

Table 6 - Overview: Capital Structure Findings

¹¹ As the researchers did not conduct an interview with those companies and specific questions about their capital structure or opinion about GFS were asked, no data regarding those themes exists.

5.2.1 Implementation of a Capital Structure Policy

From the data we gathered, we found out that only one company, i.e., case company 4, had a pre-set capital structure policy at the beginning.

Initially, we wanted to give away around 10% - 20% of the company in different rounds, which seemed right in theory but not practice. So, we decided to issue equity based on what amount of financing we need before the next round (Case 4).

From the other founders we interviewed, we learned that some were in the process of implementing, and some were willing to implement a set capital structure in their startup.

Here are some illustrations:

We do not currently have a set capital structure policy, as we believe we probably have to do that when we reach the investment round (Case 1).

We do not have a written down and strictly phrased capital structure policy, but we are considering it (Case 5).

5.3 Government financial support for Tech Startups in Austria

GFS	General Positive Feedback	Quotes	Critic	Quotes	Suggestions for Improvement	Quotes
Company 1	Yes	"I think the start in Austria is fabulous. AWS seed is great".	Not enough programs like AWS Double Equity to scale things up. Not enough private equity in Austria.	"If you do technology you need money and I think there could be more initiatives like double equity, where you can really scale things up." - "In the end of the day you are stuck with the valuation that you have in Austria"	More GFS programs like AWS Double Equity, in order to scale things up.	"I think there could be more initiatives like double equity, where you can really scale things up."
Company 2	Yes	I'm very happy with the offered financial state support and we would not be where we are today without those funding programs	Required Co-financing for most of the programs.	The only downside I see is that for any of the major programs you have to bring 30% of your own capital. So, you either have to have lots of personal savings or you have to get an investor.	Evaluators of GFS programs with knowledge of the applicants industry and more time for them to evaluate the applications.	There are no experts in your field and then they give a decision, yes, we want to fund this or not. And so it seems to me, that it would be better if they had more time for considering the individual projects
Company 3	Yes	"People say that there is a lot of money around for digital and tech companies. There are a lot of programs running at the same time."	Lack of focus on social innovation in the evaluation process of GFS programs.	"The first question from the evaluators is do you have IP, is your code new and they don't focus so much on the business model or the social innovation because the valuation raster is very, very narrow."	-	-
Company 4	Yes	I think the Austrian system is quite good, if you have a cool idea and a scalable business you get funding.	Lack of state and private equity funding in Austria.	"There is clearly not enough money out there."	Bringing more private equity into the market by introducing a wealth tax, which can be avoided by investing a specific percentage into Austrian Startups.	One possibility could be to set up a system with a virtual tax. So, you would have to pay "Vermögenssteuer" (wealth tax). But you could avoid this tax, if you invest, let's say 10% of your money in startups or growing companies.
Company 5	Yes	I think Austria has a quite good ecosystem at least for the things we needed in the past.	Research funding is too formal. Austrian state funding environment tends to focus more on traditional industries.	There's an industry in Austria in a sense of manufacturing something, so maybe there is a bit more awareness of that, having resulted in funding schemes that enable this type of cost. - "Sometimes funding things are really formal."	-	-
Company 6	No	-	Austrian state funding focuses too much on traditional industries and low risk ideas. No way of financing ideas or IP.	"In Austria, nobody wants to take risks." - "They just invest in traditional stuff." - "There's no way to finance IP and there's no way to finance ideas in Austria."	Allowing outlandish non traditional ideas to get financing by implementing a funding lottery.	"One could implement some kind of lottery. So that even the craziest ideas could get funding, just by luck. So that we at least have a little chance of implementing something crazy. Because at the moment, there's no chance of implementing it."
Company 7	-	-	-	-	-	-
Company 8	-	-	-	-	-	-
Company 9	-	-	-	-	-	-

Table 7- Overview: Government Financial support

5.3.1 Positive Feedback

From our findings, we observed that most of the founders tend to have a positive perception towards the financial incentives provided by the Austrian State.

“I think the start in Austria is fabulous. AWS seed is great” (Case 1).

I am very happy with the offered financial state support and we would not be where we are today without those funding programs (Case 2).

I think the Austrian system is quite good, if you have a cool idea and a scalable business you get funding (Case 4).

I think Austria has a quite good ecosystem at least for the things we needed in the past (Case 5).

5.3.2 Criticism

Even though most of the feedback was positive, some companies expressed criticism towards some aspects of the government's financial support and the general availability of private funding in Austria. For example, Case company 2 criticizes the necessity for firms to co-finance major state funding programs that they receive with their own funds.

The only downside I see is that for any of the major programs you have to bring 30% of your own capital. So, you either have to have lots of personal savings or you have to get an investor. (Case 2).

Furthermore, company 3 criticizes the evaluation process of companies applying to major financial state support programs, especially in regard to the lack of focus on firms with social innovation.

The first question from the evaluators is do you have IP, is your code new and they do not focus so much on the business model or the social innovation because the valuation raster is very, very narrow (Case 3).

Companies 1 and 4 stated that the lack of money in Austria, especially when it comes to private equity, is a problem. In that regard, they highlighted the difference in the availability of funding in the US compared to Austria.

If you do technology, you need money. When I see what our competition in the most famous valley in the world raises, it is a two-digit million. ... And Money ultimately gives speed and I think this is something that after you start in Austria you have to think how you get to the next step to really scale up. (Case 1).

There is clearly not enough money out there. ... And the main difference I experienced between Europe and the US is that in Europe, investors invest in running businesses with already established revenues, but they do not invest that much in ideas. (Case 4).

Additionally, company 6 also criticizes the rather conservative and risk-averse investment environment in Austria compared to the USA.

The problem is, in Austria, nobody wants to take risks. And nobody wants to invest in something new. They just invest in the traditional stuff. There is no way to finance IP and ideas in Austria. (Case 6).

If you compare it to the US, there they try to distribute the money for ten companies because they expect that nine companies will fail, and just one makes them all the money. And in Austria, it is the complete opposite. (Case 6).

Another point stated by company 6 and also company 5 is the general focus of Austrian government funding on traditional companies. According to them, many financial support programs are tailored to non-tech businesses.

They just invest in traditional companies. It would have been easy for us to get money for a production line or for a production facility. So, we could have built a giant building to put something in there for two or three million euros. (Case 6).

There is also an industry in Austria in the sense of manufacturing something and having a product and having the need to prototype and do experiments and development. So maybe there is a bit more awareness of that, which has resulted in funding schemes that enable this type of cost (Case 5).

5.3.3 Suggestions for Improvement

When asked for possible improvements, company 1 suggested the implementation of more programs like AWS Double Equity, in order to tackle the mentioned criticism of a lack of funding when scaling up.

I think there could be more initiatives like double equity, where you can really scale things (Case 1).

Another suggestion in order to get more private investors was made by the founder of company 4, who suggested implementing a system that motivates wealthy individuals to invest their money into startups. One way to achieve this would be to let wealthy individuals circumvent the wealth tax by investing around 10% of their savings into Austrian startups.

One possibility could be to set up a system with a virtual tax. So, you would have to pay "Vermögenssteuer" (wealth tax). But you could avoid this tax, if you invest, let us say 10% of your money in startups or growing companies. So, wealthy people would choose the companies themselves. So, in that way, you would create competition between investors where to invest and not the other way around. Because I think it does not make sense everyone invests in real estate because this does not bring the country forward. The people should invest and bring money where innovation is made (Case 4).

Addressing the evaluation process, when applying for funding, company 2 recommends the utilization of experts, who have knowledge in the applicant's field, as examiners and to give them more time to evaluate the projects.

I believe the fact that there are not enough experts that cater to every industry and the time limit they have to evaluate more than 100 applications affects the outcome. I believe it would be beneficial to include more experts from different fields and give the evaluators more time (Case 2).

When it comes to the conservative and risk-averse funding decision of Austrian state support programs, the co-founder of company 6 suggested the implementation of some kind of lottery so that companies with "outlandish" ideas would be able to get funding.

"One could implement some kind of lottery so that even the craziest ideas could get funding, just by luck. So that we at least have a little chance of implementing something crazy. Because at the moment, there is no chance of implementing it. (Case 6).

6 Analysis

In this section, by using the findings and theoretical framework, the analysis will be presented. Here, the theoretical framework will be used as the foundation to create a deeper understanding of the use of the empirical findings in addressing the research questions. The analysis follows similar formatting as the empirical findings by dividing the section into three themes, i.e., financing, capital structure, and government financial support. The analysis in this section will then be used to draw conclusions in the following section.

6.1 Financing

6.1.1 Case Companies initial Financing Method

Case Company	Initial Funding
1	Internal Funds
2	Internal Funds
3	Internal Funds
4	GFS
5	GFS
6	Internal Funds
7	Equity
8	Internal Funds
9	Equity

Table 8 - Initial Funding Source

From table 8, a summary of the initial financing mode used by the case companies in this study, we see that five out of nine utilized internal funding to finance their new venture. This discovery is in line with the findings of Coleman and Robb (2012) were using internal funds was the most common way of financing used by startup founders. This decision of using internal funds in the early stages of venture creation, as opposed to

external funds, according to the companies used in this study, is caused by the unavailability of ample funding options, the lack of awareness of the available options, and/or the difficulty to acquire the funds available.

However, from our findings, we can see that four of the nine companies used either equity or government financial support to initially finance their startups. In the case of company 4, they used GFS as they were a spin-off from an Austrian research institute and therefore had the connections and awareness about the government support available to fund the high level of R&D necessary. Another startup, case company 5, used GFS because it would not be possible to undertake the level of R&D needed to be operational with internal funds as the tech sector is dynamic and fast-paced. Here, they could have issued equity as an option, but as with issuing equity comes losing some sort of control; they chose to apply for a government grant which they received. This is in line with the findings by Hogan and Hutson (2005) that tech startup founders, to remain independent and avoid pressure and high demands from investors, tend to avoid issuing equity.

The remaining two companies, Cases 7 and 9, were financed through equity. In the case of company 7, the main reason was that they, from previous ventures they created, were able to create and nurture contacts with what they felt were the “right” investors. Considering that having investors with (and not limited to) more in-depth knowledge, financial prowess, and a broader professional network is beneficial for any new venture, they opted to issue equity as a means of initially financing the venture of focus in this study. For case company 9, in addition to the financial strength, it brings, building a financial process, widening their network, and getting support for growth were the main reasons behind their decision to issue equity.

To summarize, we can, based on our findings, argue that internal funds are the most commonly used source of financing the initial stages of new tech ventures in Austria. The main reasons we found to be steering Austrian tech startups towards using internal equity range from the fact that internal capital is readily available and easily accessible. In comparison, due to issues such as information asymmetry, lack of an established track record, and difficulty in providing collateral, the possibility of accessing debt and/or equity is minimal. Additionally, the level of awareness of the founders about the financing options can be named as another reason why Austrian tech startups tend to finance their

startups through internal funding. This is because considering the multiple government financial support available from the Austrian government, and the financial relief and boost it can provide, tech startup founders would be more likely to use them to finance their ventures.

6.1.2 The Changes of Source of Financing during company lifecycle

Case Company	Order of funding
1	(1) Internal Funds (2) GFS (3) Debt ¹² (4) Equity ¹¹
2	(1) Internal Funds (2) GFS (3) Equity
3	(1) Internal Funds (2) Equity (3) Debt ¹¹
4	(1) GFS (2) Internal Funds (3) Debt (3) Equity (4) Debt
5	(1) GFS (2) Internal Funds
6	(1) Internal Funds (2) debt (3) GFS
7	(1) Equity (2) Equity
8	(1) Internal Funds (2) GFS (3) Equity ¹¹
9	(1) Equity (2) Equity

Table 9 - Chosen Financing Order

After the initial type of funding, we see that seven of the nine startups changed to other types of financing (Table 9). This is in line with findings by DeHan (2014) and Udell (1998), which say that companies adapt their capital structure over time according to their current stage of growth. The time cycle theory, therefore, matches with our findings and with Fluck (2000), who postulates that after the initial phase, smaller companies switch their financing choice to retained earnings, outside equity, as well as long term debt. However, besides those forms of financing for the case companies, GFS played an important role after their initial financing phase. For the two companies, 7 and 9, that did not change their type of financing during their life cycle, the high-level, cost-intensive R&D which includes feasibility, testing, and verification which according to Mundbjerg

¹² Planned future funding source

and Sipari (2017) tech companies go through, cannot be the only explanation as all the case firms had to deal with those issues. Especially for company 7, the real motivation behind taking on venture capital was not necessarily related to raising capital. For the founders, VC was the only option to grow as fast as possible and to gain a network, as well as to get an experienced external “motivator.” Against the notion of Myers and Majluf (1984), information asymmetry was not the primary motivator behind their financing decisions.

Concerning the other seven companies, the pecking order theory seems to apply to some of them. As already mentioned, all of the case companies started out with internal funding or GFS, which brings with it a low amount of information costs (Meyers, 2001). This initial funding decision also aligns with the previous studies on tech startups done in Belgium by Manigart and Struyf (1997), Italy by Giudici and Paleari (2000), Ireland by Hogan and Hutson (2005), the USA by Minola et al. (2013), and in Sweden by Serninger et al. (2019). In all those studies, tech startups chose to finance themselves first through internal funds, and our results show the same pattern. Later on, we see that none of the case companies that initially bootstrapped their company continued to use internal funding, which can be explained with the high amount of R&D and sunk costs associated with tech startups and hence a high amount of required financial backing (Geroski, 1995).

However, as can be seen in table 9, the consecutive funding of companies 1, 2, 3, 4, 5, 6, and 8 differed from each other. Companies 2, 3, and 8 utilized equity, therefore a financing form with high information costs, after funding themselves through internal funds and GFS. The founder’s decision to utilize equity before debt, therefore, contradicts the pecking order theory. However, similar to companies 7 and 9, the decision of companies 2 and 3 to go for equity was not made according to the information costs of alternative financing like debt but rather to get mentoring and a network from the Business Angel. For case company 8, the major reason for issuing equity was to be able to co-finance and consequently receive FFG research funding. Contrary to that is the chosen order of financing of companies 1, 4, 5, and 6 in accordance with Myers and Majluf (1984). Company 5 continued to finance itself with the funding option, with a low amount of information costs in the form of further GFS and revenues. One of the reasons for that is the steady growth strategy of the company, which focuses on staying in control and having a rather small team. Companies 4 and 6 firstly continued to use financing

with low information costs like revenue but eventually switched to debt, which aligns with Berger and Udell's (1998) findings that small companies prefer debt to equity when they turn to external financing. After debt financing, company 4 eventually switched to equity, which is in line with Meyers (2001).

To summarize, when it comes to the chosen funding order of the case companies, two companies, i.e., case 7 and 9, contradict the pecking order theory entirely by utilizing equity financing, which has the highest information costs, over their entire life cycle. While the other seven case companies all started out in accordance with the pecking order theory, only firms 1, 2, 5, and 6 continued to be financed in accordance with the theory, as their financing order correlates with stagnant or sinking information costs. Consequently, most of the case companies' chosen financing order does not add up to the theory by Myer and Majluf (1984). Tech startups in Austria seem to prefer equity before debt after utilizing their own funds in the initial phase. Compared to the previous studies, the majority of the case companies in this study follow the same order of funding as the companies involved in studies undertaken in Ireland, Sweden, and the USA and differ from the results in Italy and Belgium, where debt was chosen over equity by most companies.

However, our findings show that the chosen financing does not always correlate with the founder's preference for funding. An example of that would be companies 4 and 6, which utilized debt before equity but would actually have preferred equity if they would have had an investor. Hence, implying that they were more or less forced to take loans due to their financial situation and the options available at the time.

6.1.3 Preferred Choice of financing for the case Companies

Case Company ¹³	Order of funding	Consistent with Pecking Order Theory
1	(1) Internal Funds (2) Debt (3) Equity	Yes
2	(2) Internal Funds (2) Equity (3) Debt	No
3	(1) Internal Funds (2) Debt (3) Equity	Yes
4	(2) Internal Funds (2) Equity (3) Debt	No
5	(1) Internal Funds (2) Debt (3) Equity	Yes
6	(2) Internal Funds (2) Equity (3) Debt	No

Table 10 - Preferred Funding Order

From table 10, a summary of the preferred order of financing, four of the six startups prefer a financing order that is inconsistent with the pecking order theory, while the remaining two prefer an order that is in line with the pecking order theory. In the initial stage of founding their tech startup, we can see that all the case companies used in this study would prefer to use internal funding. This is due to the reluctance to give away control, the need to be independent and avoid pressure and high demand from investors, and the difficulty of getting a loan.

However, since these tech firms are highly R&D intensive, a need for more financing arises through time (Geroski, 1995). Therefore, the firms need to look elsewhere for financing. According to the Pecking order theory (Myers, 1984 and Myers and Majluf, 1984), debt is the second most preferred way of financing firms. Debt, being the second most preferred financing option (Hisrich, 1986 and Caird, 1991), is heavily relied upon for financing by startups (Rob and Robinson, 2014). Contrary to this, we found out that equity is the second most preferred option in the funding order when it comes to tech startups in Austria. Four out of the six case companies would rather prefer to issue equity than finance their venture through debt. The remaining two prefer to use debt financing, which is in line with the pecking order theory. According to the case companies, issuing equity is favorable only next to internal funding as it can, in addition to providing

¹³ As companies 7, 8, 9 were not interviewed by the researchers, and no questions regarding their funding preference were asked, no such data exists.

financial support, bring in investors with industry-specific knowledge and vital business contacts.

When it comes to external financing, our findings show that three startup founders would choose debt after equity, while the remaining three prefer equity. In relation to the use of debt as a secondary option of financing, the reluctance to cede control (Hogan and Hutson, 2005) and the pressure from investors are crucial factors. However, the difficulties tech startups face when pursuing the debt (Brown, Degryse, Hoewer, Penas, 2012), the unaffordability of debt due to more stringent terms for tech startups, was a deciding factor that made the prospect of debt financing less favorable for the companies used in this study. When it comes to equity, in addition to the financial backing, the non-financial support they receive in the form of skill-sharing, network development, added expertise (Calopa, Horvat and Lalic, 2014) positively affects the choice of equity according to the founders.

6.2 Capital Structure

In this study, we set out to find if the Austrian tech startups had specific capital structure policies, as is the case with well-established firms. Our findings show that all but one of the six do not have a clear set capital structure policy in their firms. From the interview we had with the founders, we learned that having a clearly written capital structure policy is not seen as impactful to their business in the early stages.

However, we have learned that two startups are considering the need to have a set and clearly phrased capital structure policy to guide their financial decision making. Additionally, for one founder, what is important is to keep at least 50% of the shares among the founders.

Furthermore, considering the MM theorem by Modigliani and Miller (1958) that states a capital structures' irrelevance to a firms' cost of capital, and henceforth its valuation, one can argue that the decision by the Austrian tech startups to not clearly set a phrased capital structure policy is justifiable. Although Atherton (2009) indicates that startup companies do not always necessarily follow an established capital structure pattern, the pecking order theory (Meyers and Majluf, 1984) states that these firms need to consider the transactions costs, especially those associated with information asymmetry that might arise when

choosing a financing order. Hence, the need for firms to select an optimal capital structure policy that can minimize transaction costs becomes beneficial.

6.3 Government Financial Support

Our findings show that seven out of the nine case companies utilized government financial support or are planning to do so, which correlates to 77% of the startups used in this study. Compared to the average of all Austrian startups that utilize government funding, this number is therefore 29% higher (Austrian Startup Monitor, 2020). This shows that, in alignment with Okrah and Nepp (2018), tech startups in Austria, use government financial support in order to fund their R&D during their first years of existence. Especially the AWS seed and pre-seed program played an important role for three of the case companies in order to get their business going and build a team. Additionally, as the only way for some companies to raise a sufficient amount of debt capital, AWS double equity was or will be used by four of the case companies. This tendency and the feedback received from some founders show, although according to Ergungor (2003) Austria is classified in the bank oriented financial system category, that tech startups in Austria face difficulties raising debt on their own. This difficulty of raising debt can be explained with Colombo and Grilli's (2005) findings that information asymmetry exists between financial institutions and startups and that young firms lack inside collateral.

Next to the AWS, research financing plays a vital role in serving as a source of funding for tech startups in Austria. Notably, project financing from the FFG is an essential source of financing for Austrian tech startups as five of the case companies used it or are planning to in the near future. Additionally, two of the case companies are academic spin-offs, which correlates to around 22% of the case companies used in this study. Compared to all Austrian startups, this figure is 8% higher and shows that Academic Spin-offs indeed make up a relatively bigger portion of Austrian Startups (Austrian Startup Monitor, 2020). The third most popular GFS choice was Horizon 2020, which was utilized by two companies, whereas financial federal-state programs seem to play a minor role.

All in all, compared to the previous studies regarding the funding of tech startups, mentioned in section 2.3, our results suggest that in Austria, GFS plays a significantly

higher role in the financing of tech startups. However, as some of the studies are over twenty years old, like Manigart and Struyf (1997) and Giudici and Paleari (2000), the situation regarding GFS in those countries could have changed by now.

When it comes to the voiced criticism and suggestions for improvement concerning GFS and the Austrian Startup environment in general, the collected data partly correlates with the results from the Austrian Startup Monitor (2020). The most raised criticism, the lack of risk capital in Austria, among the case companies were also mentioned by 41% of the startups in the Report. This more or less supports the findings of Gassler and Sellner (2015), who found that Austria has a significant gap in terms of venture capital compared to other countries. Another criticism raised by some of the case companies, flexibility, and transparency during the application process to governmental financial institutions, was mentioned by 38,8% of Austrian Startups in this study.

6.4 Applicability of other capital structure theories

From our data, besides the time cycle and pecking order theory, we found no evidence that the postulations of the trade-off theory or market timing theory had an impact on the financing decision of the founders. None of the founders mentioned tax benefits at all when talking about the reasons behind their specific funding choice. This absence of thought regarding the tax benefit of the particular funding choice of the founders is in line with the findings of Coleman, Cotei, and Farhat (2016). According to them, the trade-off theory is not applicable in startups as young firms are less likely to benefit from tax interest deductibility due to them having little to no revenues in their first years. When it comes to the market timing theory, as none of the case companies at the time of the interview were publicly traded, its premise did not play a role in the funding decision of the firms.

Concerning the applicability of the agency theory, as in all of the interviewed startups, the founders are the primary owners and do not have managers running their businesses for them, owner-manager agency costs did not play a role in the funding decision. Only the startups which have external investors onboard could suffer from agency costs between them and the founders. However, as our study focuses on the pecking order theory and our questionnaire was created around it, our collected data is not suitable to

postulate if the agency theory in relation to the external investor-founder conflict applies to Austrian Tech Startups.

7 Conclusion

In this final section, the purpose of this study is addressed through conclusion. Additionally, the practical implication and limitations of this study will be presented. Finally, future research suggestions of the researchers are presented.

This paper aims to examine ways Austrian tech startup founders finance their startups and what the determining factors are when making the decision to finance their startups in a specific order. Additionally, understanding the preference of the startup founders in terms of the order of ways of financing and the underlying reasons for this preference was a primary goal for this study. To better understand these two orders and serve as a guideline, we used the pecking order theory as a starting point. Furthermore, as a secondary research aim, we aimed to understand the role of government financial support in the Austrian tech startup financing process. Based on our study, we ended up with several observations.

First, we see that the majority, i.e., five of the nine startups, were financed through internal funds, which is in line with all previous major studies regarding initial financing sources of new ventures. This finding can mainly be attributed to the lack of other financing options and the difficulty to tap into the limited ones already available due to factors such as information asymmetry, relatively short to no track record, and the lack of collateral. Furthermore, control was seen to play an important role in financing related decision making since founders are wary of losing decision making power in their new venture. The findings of this study imply that there is a discrepancy between how firms are financed and how they would prefer to be funded.

From the findings of this study, it can be noted that the implemented order of financing options is in accordance with the pecking order theory in four cases, while five of them stray from the order presented in the Pecking Order Theory. However, since the pecking order theory focuses on founder preference, from the six interviews with adequate data needed to analyze preference, we see that three out of six prefer to finance their startups with an order that is inconsistent with the Pecking Order Theory by preferring equity to debt while the remaining three prefer an order that is in line with the pecking order theory. From this, we can make three conclusions.

First, Austrian tech startups face greater difficulty in accessing external funding. Especially when compared to more “traditional” startups, they face a higher level of difficulty in accessing debt and are affected by market imperfections. Second, a segment of Austrian tech startups considers the non-financial added value that equity investors can bring to the company. This makes the prospect of issuing equity more preferable than debt for some, while others prefer debt in order to avoid the resulting loss of control when issuing equity to investors. Third, the future potential for growth of the startups and the long-term strategy of the founders play a role in the choice of ways to finance their startups. Therefore, it can be implied from this study that although the pecking order theory is suitable in explaining the capital structure of big and mature firms, it appears that it is less suitable in illustrating the implemented and preferred capital structure of Austrian tech startups as a whole due to their nature and the limited funding options they have.

When it comes to the implementation of a set capital structure policy, this study shows that all except one of the tech startups felt the need to have one in the initial stages of venture creation. The difficulty and limitations in tech startup financing in Austria are, according to this study, the main reasons that contribute to the tech startups not having a set capital structure policy. Not having various options and the difficulty to access the ones available, limit their flexibility in terms of ways to finance their companies and hence adds to the notion that having a set capital structure in the early stages is irrelevant. However, this study finds out that a growing number of tech startups are already working on creating a set and strictly phrased capital structure policy as they move forward in their startup time cycle.

Finally, we found that GFS plays a significant role in financing tech startups in Austria, which can be attributed to the lack of private equity and accessibility to debt capital. Especially in the early stages is state funding, the only viable financing option besides bootstrapping.

7.1 Practical Implications

Based on our study, we have come up with recommendations both for the tech startups and the policymakers in Austria. First, we recommend that tech startup founders exhaustively look into the funding options available in Austria. By doing so, in addition to having various options to fund their startups, they will have the possibility to see what the ideal way of financing for their startup is based on their goals and long-term strategy. Second, we recommend that Austrian tech startups give more consideration to having a set capital structure policy as it can give them a clear sense of how and why they should make financing decisions.

When it comes to the policymakers, more programs, similar to AWS double equity, should be implemented in order to allow tech startups to scale up their operations and to stay competitive. Additionally, should the GFS evaluators have more time to go through the specific applications, and the evaluation raster should take the social impact of the business idea into consideration. Moreover, in order to enable more outlandish, innovative, and non-traditional ideas to thrive, should the policymakers implement some way to finance them. One example mentioned by one of the founders on how to do that was to implement a funding lottery, where the company gets chosen randomly.

Finally, we recommend that the Austrian government starts initiatives in order to bring more private equity into the Austrian funding environment. One possibly useful way to do so, as mentioned by one of the founders, is the introduction of a wealth tax for private individuals, which can be avoided by investing in Austrian startups.

7.2 Limitations

As is the case with similar studies, this paper is not without limitations. First, although researchers need to decide on a sample size that is considered enough to reach a theoretical saturation (Bryman, 2012, pp. 425-426), we used nine tech startups due to various reasons, and this can be considered a limitation. The use of nine tech startups limits the generalizability of the findings and the conclusion in relation to the general Austrian tech startup sector.

Second, the choice of using a qualitative research method means that we, as researchers, relying on our unsystematic opinion decide what is important. This characteristic of using a qualitative approach can be seen as a limitation as it can be viewed as being too subjective and create differences in outcome when other researchers with a different opinion try to replicate this study.

Third, the complications Covid-19 created in the business sector affected this study. Because of Covid-19, potential interview partners became busier than ever to keep running their startups meaning we had a lower number of tech startups willing to do an interview and the inability to have face-to-face interviews with the participants that agreed to be a part of this study. For this reason, we had to rely on other publications in addition to interviews that were not helpful in answering all our research questions but just a part of them.

7.3 Future Research

The main aim of this study has been to examine the order of financing of Austrian tech startups and the founder's preference relating to how they would finance their startups. In regard to further research, we believe it would be beneficial to expand the research. One way of doing it could be including more case companies, as this can help in strengthening the generalizability of the study.

Additionally, since this study is based on the perspectives and observations of the tech startup founders in Austria, it would be of significance to do similar research focusing on the perspectives of the external financiers. Doing so would help the various stakeholders have a broader understanding of the multiple reasons for the funding related decision making. This, in turn, can help create a better understanding between the tech startups and external financiers, which can help increase the financing options for the tech startups. Furthermore, we believe that research on the effects related to having a set capital structure policy could enable founders to have a better understanding of whether or not to adopt a specific policy for their firm.

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9 Appendix

Appendix 1 – Questionnaire

Introduction

1. Please tell us a bit about yourself and when the company was started?
2. How many people founded the company, and what kind of educational / work background do they have?
3. What was the reason and motivation behind starting the company?
4. How many employees does the company currently have?

Financing

5. How was the start-up financed first? And please elaborate on why the firm was financed the way it was? Was there any employee or a founder with a financial background? What did you consider when making the decision?
6. What other financing options were considered, and why did you decide against them? What were the main reasons or important pros and cons?
7. How has the start-up chosen to be financed until now in further financing rounds?
8. If there was a change in financing choice, why did you choose to change your way of financing?
9. What is your preferred way of financing at the moment? And why? (What is important for you and your business when seeking funding?)
10. Has there been financing choices that you regretted afterward or ones that you were particularly proud of when looking back?
11. Which role does control or independence in relation to other stakeholders (e.g., investors) play when making financing choices?
12. When it comes to financing a tech start-up, what do you wish you would have known when you started out? What advice would you give to someone starting a tech start-up now?
13. Did the company receive any kind of financial government support? (If yes, which kind?)
14. Do you think Austria provides enough financial incentives and support to start-ups, especially to highly resource-demanding tech start-ups?
15. Which kind of financial state incentives or support do you think would have changed your initial funding decision, or would you like to see implemented by Austria?

Capital Structure

16. Do you have a certain capital structure policy in your firm? If yes, why was this specific capital structure chosen against others? If not, is there a reason, or are there plans to introduce a capital structure?

Conclusion

17. Do you have any last remarks or questions?