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FINANCIAL BOOTSTRAPPING IN IT COMPANIES:  
A STUDY OF MOTIVES FOR BOOTSTRAPPING FINANCE  
IN SOFTWARE DEVELOPMENT FIRMS

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# Financial Bootstrapping in IT companies: a study of motives for bootstrapping finance in software development firms

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## ABSTRACT

Sufficient access to financial resources is important in sustaining a business especially in the early phases. First years in business development are very critical since owners learn by doing mistakes in order to get a proof of concept of the business idea. Being aware of this fact, external financial institutions try to avoid taking part in highly risky endeavours. Although there are financial options like funds from venture capitalists and business angels in early phases, only few companies receive funding. Therefore, majority of companies have to bootstrap to deal with lack of financial resources. Bootstrapping can be referred to as a creative means of overcoming financial constraints in order to acquire resources without borrowing money or raising equity from traditional sources (Freear, Sohl and Wetzel, 1995). Bootstrapping techniques may change depending on the industry context and entrepreneur's values and goals. Unlike other industries, software industry has its own specific characteristics such as spread of technology, fast paced developments and high dependency on human intelligence. This research attempts to explore the motivation and influencing factors behind bootstrapping choices, the way bootstrapping techniques are used based on those motives and change of bootstrapping methods over time in software companies. A case study of four entrepreneurs in software development industry in Sweden was undertaken for that purpose. The study reveals that motivation for using bootstrapping is influenced by different company characteristics and context of software industry, which are high dependency on human intelligence, fewer capital requirements for starting a company, spread of free open-source tools and entrepreneur's personal goals and perception of the risk. These bootstrapping motives encourage use of certain bootstrapping techniques that are found to be more important and common among entrepreneurs. This study also suggests two factors that change motivation over time such as entrepreneurial expertise and change of external conditions.

*keywords* : *entrepreneurial finance; software industry; financial bootstrapping; motives.*

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## 1. INTRODUCTION

Availability of financial resources is considered to be one of the most important success factors in small business development (Hughes, 1996). A firm's survival depends largely on sufficient funding to support its activities. Traditional funding from financial institutions, venture capitalists and informal investors plays an important role in supporting business development. Nevertheless, many start-ups often find it difficult to obtain such external funds for running their businesses (Bolton, 1971; Stanworth and Gray, 1991; Storey, 1994). The major reasons for this problem are normally attributed to insufficient historical operating data, information asymmetry and lack of assets to be used as collateral for newly established companies (Storey, 1994; Williamson, 1981). There are also internal factors that make entrepreneurs less motivated to use external finance due to associated high costs, loss of control and time-consuming process.

According to Winborg and Landström (2001), bootstrapping can be defined as “the use of methods to meet the need for resources, without relying on long-term external finance”. It is an alternative way of acquiring resources which is widely used among start-ups and companies at later stages of development. Thus, financial bootstrapping helps to fulfil the financial gap caused by information asymmetry between small firms and traditional external financial institutions. Evidence from previous studies suggests that most business owners and managers apply at least some of the bootstrapping methods (Winborg, 2009; Harrison, Mason, and Girling, 2004).

Financial bootstrapping as a term was first mentioned in 1992 and has gained some attention from researchers since then (Bhide, 1992). However, compared to other research areas in entrepreneurial finance, bootstrapping has been an untapped arena for research. Even less attention has been given to bootstrapping in the IT industry despite its increasing popularity. The number of IT start-ups is accelerating at higher rates compared to companies in other industries since technology is getting cheaper, more attainable and being applied to every part of our lives (Prive, 2014; Poston and Williams, 2013).

Being part of the IT industry, software development firms deserve more attention from researchers with regard to financial bootstrapping for many reasons. First, compared to other high-technology start-ups, software development start-ups seem to require less capital for

starting business (Prive, 2014). This is partly due to the fact that software development start-ups are highly dependent on human intelligence. This fact create the early-stage financial gap (Sohl, J. E., 2003) which means the investment scales do not match with what external financial institutions expect. Combining this with the fact that the software industry is associated with new technology which leads to high risk, thus limiting access to external funding, we can imply that bootstrapping is highly important for these firms. Second, from very few studies about bootstrapping in the IT industry, we found only two researches from Freear et al. (1995) and Harrison et al. (2004) that have been conducted focusing on the software industry. However, motivation for using bootstrapping in the software industry was not covered in the previous researches. Last, several bootstrapping studies suggest relationship between type of business and type of bootstrapping used (Brush, 2006; Van Auken, 2001; Winborg and Landström, 2001). Therefore, the characteristics and context of software development companies might affect bootstrapping motives and how these firms use financial bootstrapping.

The purpose of this study is to explore how motives of bootstrapping are formed and developed in the context of the software industry. This research follows the suggestion from the study by Winborg (2009, p. 82) that indicates the need for further research into how the motives are formed, developed and changed over time, and study by Harrison et al. (2004, p. 327) who also point out that most of the researches are focused on the resources acquired from bootstrapping rather than the process which those resources are acquired through. Moreover, we plan to explore how motives for bootstrapping affect usage of financial bootstrapping.

### **Research Questions**

To achieve the goal of this research, the following research questions are set:

- 1) How the motives for using financial bootstrapping are influenced in software development companies?
- 2) How financial bootstrapping is used in software development companies based on motives?
- 3) How motives of using financial bootstrapping are developed and changed?

## **2. LITERATURE REVIEW & THEORETICAL FRAMEWORK**

### **Resource acquisition and bootstrapping**

Resource mobilization is considered to be a key element for any product or service development process. There is a variety of resources that a business may need to obtain, such as funds or human capital, in order to develop a product or service. Also, the type of industry a business is in will determine the kind and amount of resources required. Human capital is the cornerstone of the software industry, as success of any IT business highly depends on it (Stylianou and Andreou, 2013). Companies deal with the challenge of acquiring human resources in different ways as some may leverage their network of close friends, while others may formally look for employees on the job market. Certainly, the choice of a particular approach depends on business goals and needs, as well as available finances. This, in turn, determines which bootstrapping methods software companies could apply.

Small businesses normally seek external funding in the form of loans from banks, investments by business angels and venture capitalists (Bhide, 1992). This formalized approach of external financing seems to fit in the ideal case when a company has enough proof of business creditworthiness to satisfy requirements of external financial institutions (Coleman, 1998; Scholtens, 1999). However, this very concept is far from reality when it comes to start-up financing (Freear et al., 1995). At the early stages of development, firms cannot prove their financial trustworthiness to external financial institutions due to lack of historical transactions and valuable collateral to secure a loan (Cassar, 2004). This means that financial institutions deal with high risks associated with new ventures, which consequently makes it difficult for start-ups to secure external funding. Furthermore, at early stages, companies might be concerned about confidentiality and transparency issues (Berger and Udell, 2002). So start-ups might be less willing to disclose all the important information they possess in order to get external funding. This, in turn, leads to information asymmetry, since external actors lack the amount of information that the owners of the firm have, to make informed decisions (Levenson and Willard, 2000). Bhide (2000) also argues that financial institutions expect more tangible information than just hopes and dreams from early start-ups, which is difficult to provide at that early stage. That is the reason why small firms have to rely heavily on private capital and bootstrapping.

However, even at the later stages of development, companies prefer to use bootstrapping due to various reasons. First, resources acquired through bootstrapping are usually more cost-effective (Carpenter and Petersen, 2002). Second, bootstrapping requires less time and has less constraints compared to traditional ways of financing (Winborg and Landstrom, 2001). Third, there can be personal preferences to limit risks associated with external funding and financial goals (Kuratko et al., 1997, Gibson, 1992), because it is better to leverage resources at hand like personal network and knowledge instead.

### **Motivation for using financial bootstrapping**

While financial bootstrapping has gained more interest from researchers in the past 15 years, majority of studies tend to focus on characteristics, usage and outcome of bootstrapping. Even though many studies did refer to the reason and motive behind the usage of bootstrapping, such as lack of capital and cost reduction (Bhide, 1992; Winborg and Landström, 2001; Lam, 2010), few studies have been explicitly conducted in this area.

Besides needs for additional financing, Winborg and Landström (2001) found that there are other motives involved in the use of bootstrapping in small businesses. This view is supported by Neely and Van Auken (2010) who projected that bootstrap finance reduces dependence and complements traditional capital sources because it is convenient and easy to obtain with fewer requirements. While Neely (2010) found that growth in sales and liquidity inversely impacts on use of bootstrap finance among female entrepreneurs, Brush et al. (2006), contrary to their expectation, found that firms that already received an equity investment increase their uses of bootstrapping. Furthermore, in a recent study, Winborg (2009) tested the existence of explicit motives for using financial bootstrapping among small business managers. These motives include reducing costs, lack of capital, reducing risk, managing without external finance, saving time, work satisfaction, freedom of action, aspiration to learn, trust in friends and gaining legitimacy. Their results show that bootstrapping is a deliberate choice and is not only influenced by lack of capital.

In an attempt to find the factors affecting a firm's financial structure, Barton and Mathews (1989) found that a firm's financing decision appears to be affected by managerial values, goals and risk-taking propensity. This finding is supported by Carter and Van Auken (2005) who show that an owner's perceptions, especially perception of risk, drive the use of

bootstrapping. Additionally, Barton and Mathews (1989) argued that this managerial choice of financing is also affected by external variables like a company's characteristics and financial condition. From these studies, it is fair to assume that the surrounding industry context affects financing motivation and decisions made by software company owners. This, in turn, leads to how owners use financial bootstrapping in their firms.

Based on this assumption, we found another support from a study on bootstrapping finance among US entrepreneurs (Neely, 2003). This research indicates some difference on the use of bootstrapping between the US and Sweden. This difference was explained by difference in culture, economic and social conditions. In addition, findings from several studies show that types of bootstrapping activities are related to different types of businesses (Brush, 2006; Van Auken, 2001; Winborg and Landström, 2001). Nevertheless, these studies offer very little explanation on the reason, motivation and factors behind the use of bootstrapping.

### **Software Industry**

The software development industry is a big sector. Software development companies operate in specific business conditions, such as competitive environment, heavy reliance on human resources and specific industry context. All this can affect entrepreneurs' perspective on the different types of financial bootstrapping and motives for using them.

Unfortunately, there are very few studies about financial bootstrapping in the software industry. The first one was carried out by Freear et al. (1995). They studied companies in the software industry based in the US for two categories of bootstrapping techniques - product development and business development. Later, this research was replicated and extended by Harrison et al. (2004) focusing on software development firms based in the UK and Ireland. While these two studies focused on the software industry and analyzed bootstrapping techniques that are more specific to the software industry, there are also other broader studies which were conducted on the high-tech industry and analyzed bootstrapping techniques in general (Van Auken, 2005; Smith, 2009). Nevertheless, the motivation for using financial bootstrapping was largely ignored in these studies.

### 3. METHODOLOGY

This research uses the case study approach based on qualitative analysis. Qualitative methods help to facilitate an insight into the bootstrapping processes, exploring the contexts and relationships behind them. Semi-structured interviews were conducted with owners of software development companies in the start-up and growth phases. IT companies at the growth stage were interviewed in order to collect a retrospective overview of changes in bootstrapping methods used over time. The categorization of the company development phase as start-up and growth phases were based on the subjective opinion of the founders. Four companies were involved in the interview process in total. These companies specialize in different software solutions varying from open-source projects to mobile applications. The nature of business was also different with two companies offering IT consulting services and two other developing their own software development projects. The companies were chosen randomly by leveraging current contacts. All of these companies started their operations in Skane region, Sweden. One of these companies has changed the headquarters recently and moved its main software development team to the US. Another firm was acquired by US based company. The number of employees in IT companies involved in the interview process varied from 10 to 87 people depending on the complexity of software solutions and nature of business.

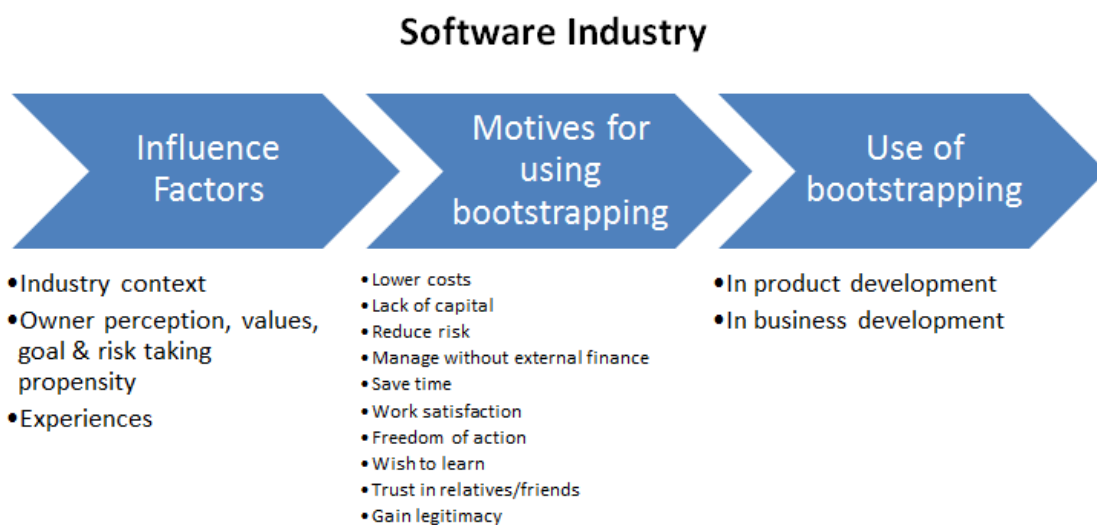
An interview guide included a mix of closed and open-ended questions. Open-ended questions helped to extract information which was relevant to each interviewee based on their personal experiences. All interviews lasted from one to two hours. Answers were recorded in writing and on a mobile device to ensure consistency and backup storage. Later all recordings were transcribed and used in the analysis part. Interviewees were asked general questions regarding company characteristics, age, competitors, business model, financing start-ups, financial bootstrapping and their motivations to use or not to use financial bootstrapping. Entrepreneurs were also asked about their financing experiences, their attitudes to formal and informal financing methods. At last, interviewees were asked about perception on decisions they made on financial bootstrapping in the past.

As for limitations of this research paper, it is important to note that interview may be affected by reflection bias of interviewees. That is the result of biased interpretations of past events and failure to go through a process of sensemaking (Gioia and Chittipeddi, 1991, Zacharakis



et al., 1999). That is in particular relevant to companies interviewed at the growth phase. The research results may also be biased based on researchers' ability to conduct interviews, analyze and interpret data. Moreover, this research is based on a case study of four entrepreneurs and therefore cannot be generalized due to limited number of cases involved. That is well in line with the aim of this research which is to present possible causes for motivation on using financial bootstrapping in software development companies.

The figure 1 below sets up the context for this research paper and illustrates the cause-effect relationship among three different entities. This structure will be used for the analysis of the remaining sections.



*Figure 1*

1) Factors that influence motivation for using financial bootstrapping in software development firms based on previous research could be, for example, characteristics of a software firm or industry context. Other examples could be the owner's vision, perception of risk and personal goals.

2) Motives for using financial bootstrapping. These cover primarily the major reasons of why entrepreneurs opt for using financial bootstrapping. The full list of motives by Winborg (2009) are used as a guideline. For example, these could cover reasons like lowering costs, lack of capital, managing without external finance, saving time, freedom of action etc.

3) Use of bootstrapping in software development firm is about how entrepreneurs bootstrap as a result of their motives. We followed previous bootstrapping studies in software industry conducted by Freear, et. al. (1995) and Harrison et al. (2004) who framed bootstrapping into two groups - product and business development. Bootstrapping related to product development may include for instance development of products at nights and weekends, receiving research grants, turning a consulting project into a commercial product, hiring less expensive programmers (students, freelancers etc.), partnering with other software companies, using open-source software, using owner's skills related to software development etc. Bootstrapping related to business development processes may include use of personal credit cards, sharing office space, purchasing used equipment, working from home, reduced or delayed compensations etc.

During the data analysis phase each transcript was reviewed. Some content from the transcripts was used directly in the analysis part of the research paper. In the result section, the relevant information was categorized into four themes: 1) uses of financial bootstrapping in software development companies; 2) motivation and reason for using bootstrapping; 3) factors affecting motivation for using bootstrapping; 4) change and development of motives. Each theme was then summarized and data that was unique or contradictory was registered accordingly. Then, in the discussion part, the results were analyzed. Patterns and relationship between them were identified and discussed. Possible interpretations and implications of those themes were analysed and communicated back to interviewees and confirmed by them.

### **Entrepreneurs Background**

We interviewed four entrepreneurs working in different software development companies. Two of the interviewees specialize in the IT consulting industry while the other two founders worked on international projects related to graph database development and facial recognition applications. For the sake of privacy, we do not refer to their real names but use a codified reference to them.

Entrepreneur A co-founded six companies in IT. He is an IT consultant specializing in software development for iOS/Android applications. Apart from consulting, his company also develops a decision-making system for farmers including everything from electronics to cloud services.

Entrepreneur B is a specialist in the IT consulting industry as well. He has previously started and sold out several IT consulting companies and now growing a set of his own IT consulting companies successfully.

Entrepreneur C is one of the co-founders of the company that specializes in graph databases. Initially, the founders started the company in Sweden and then moved headquarters to the USA. Entrepreneur C currently works on another project dealing with street maps view with a vision to map every place on Earth with photos. He has an extensive experience in open-source projects.

Entrepreneur D is one of the co-founders of a company that specializes in facial recognition applications. The service allows users to tag people in their photos in social media websites. The company was sold to US based company in 2010.

#### **4. RESULT**

In this section, the results and findings from the interviews are categorized and structured according to the diagram presented in Figure 1. First, usage of bootstrapping techniques in software development companies will be discussed. Second, motives and reasons behind usage of bootstrapping will be explored. And third, the way how those motives are influenced and developed by the surrounding context will be analysed.

##### **Uses of financial bootstrapping in software development companies**

All interviewed entrepreneurs engage in using various bootstrapping techniques in their businesses throughout different stages of company development. We categorized bootstrapping techniques from interviews into two groups following the example of studies in software firms by Freear et al. (1995) and Harrison et al. (2004). These are bootstrapping techniques related to business development and product development prevalent in software development companies.

Regarding business development, Entrepreneur A mentioned that he started the company without external financial support, with one laptop, his own skills and shared office space. Entrepreneur B, who started a company on a bigger scale, tried to reduce dependency on

external finance by using his own money from previous exits and using previously established relationships with banks to obtain credits without collateral. Entrepreneur C, whose company specializes in product development, offered consulting services to third parties as a side project. He also had other jobs during the first three years. Even though consulting was not the main focus of the company that was the source of income to support company operations. When entrepreneur D referred to the time he started the first company, he said *“people took little salary or some, like me, no salary”*. Like entrepreneur A, entrepreneur D did not need a lot of money to start his company as he mentioned *“we all used our own laptops, we did not need inventory, furniture etc”*.

Government funds were also important to three entrepreneurs at the early stage of company development. Although these were *“small grants”*, they helped entrepreneur C when other financial resources were not available and helped entrepreneur D to build a technology before he received funds from a private investor and a venture capitalist.

In addition, both entrepreneurs A and B did not delay payments to their suppliers and did not speed up invoicing from their customers. Instead, they chose to use financial services like factoring and selling invoices to minimize the account receivables and maximize cash inflow.

In terms of product development, Entrepreneur A heavily relied on utilizing his own skills and competences, as he mentioned several times throughout the interview: *“if it is something I could do myself, then I will do it”*. Entrepreneur A also mentioned using his personal network to find experienced programmers for the projects, as well as university students who are usually paid less. Students are usually employed on a temporary basis depending on a number of current projects. This means Entrepreneur A does not have to pay salaries when there are no assignments in the company. With more permanent employees, Entrepreneur B copes with revenue fluctuations by planning ahead, having customers in various areas and avoiding dependency on only few customers. In some cases, Entrepreneur A made agreements with his programmers to pay them after he received money from the customers. All entrepreneurs refuse to reduce development costs by finding cheaper developers from other countries, such as India for various reasons. Entrepreneur A said that for a small and short term project, *“it is cheaper to find someone in Sweden to do the job”*. Taking this issue more seriously, Entrepreneur B was concerned about the quality and reputation of the work performed. In the same way, both entrepreneurs C and D never considered compensating a

reduced cost with experienced staff. As Entrepreneur C mentioned “*one right person can do more than ten average people*” while Entrepreneur D said “*it is not a sustainable solution...I want someone who is great*”. He expects someone who is interested in the product and can be part of the team in the long term. According to Entrepreneur B, making partnerships and subcontracting with other software companies also helped solving the problem of lack of human resources.

In addition, Entrepreneurs A, B and D mentioned that using open-source software is a very important bootstrapping technique in the software development process since it eliminates software licensing costs. According to Entrepreneur A, today, open-source is easy, flexible and “*it has very low entrance barrier*”. Entrepreneur D only uses open-source tools and never bought any software license. He puts it this way: “*the only thing we pay is server infrastructure because we cannot build it ourselves*”.

Entrepreneur C mentioned another bootstrapping technique which is unique to his software development company. Since his company is dealing with an open-source project, anybody can use their product for free as long as they contribute their code to public. Entrepreneur C received revenue streams from selling commercial licenses to software companies which needed support from his company without an obligation to disclose their source code. According to Entrepreneur C, giving away free licenses helped him to build the community around his product and gained virality. This bootstrapping technique was very important since the product was a novelty. The concept of graph database did not exist at that time, nor did the market.

### **Motivation and reason for using bootstrapping**

For Entrepreneurs A, B and C, “*lack of capital*” was a common reason behind their uses of bootstrapping. This motive urged entrepreneurs to manage the companies’ cash flows better. Even though Entrepreneur A did not need any capital when he started his company, he said that he usually had to pay wages to his programmers before he could collect the money from customers. This was the reason why he sold his invoices to a financial service company in order to “*receive the money quicker*”. With the payment period of 60-90 days from large customers, Entrepreneur B also pointed out that it was crucial to have money to pay permanent employees from the first day they start their job. This problem becomes even

worse when there are no projects to be assigned to employees. During the first three years of operations, Entrepreneur C was also motivated by a need of capital. This was reflected in offering consulting services as a side project, although developing a product was his main goal. He said that *“we did not see consulting as a main thing....but product is a long-term thing and quite risky. When we got investment we closed down consulting. You do whatever you can to earn money”*. However, both Entrepreneurs A and B agreed that they have to be careful in use of some of the bootstrapping techniques. Not all bootstrapping methods should be applied. For example, Entrepreneur B refuses to speed up invoices from customers since *“it’s not usual to get money from the customer fast because customer is the number one priority”*. He also rejects the idea of delaying payments to suppliers otherwise *“you will get a bad reputation”*.

All entrepreneurs showed little intention of using bootstrapping in order to *“lower costs”*. Entrepreneur A said that he did not hire IT students because it was cheaper. Students take much longer time doing their job since they have to be in school most of the time, but they are self-motivated and know how to develop really new technology. In addition, hiring overseas human resources also comes with a huge overhead cost and lead time. This does not work when the project is not big enough. From Entrepreneur B’s point of view, quality of employees needs to be considered more than the costs as he said *“we would rather pay more for top ten percent than the cheaper ones. The customers also want the same thing”*. According to Entrepreneur C, costs reduced from hiring cheaper human resources do not *“nearly compensate cost you have from hiring the wrong competence”*. Entrepreneur D thinks that he cannot reduce much cost when the major cost is the salary, as he said *“you cannot reduce salaries below a point. You should be able to provide to your families”*. Moreover, Entrepreneur A and Entrepreneur B agreed that a tight deadline from customers is another reason that significantly reduces motivation to lower costs. In Entrepreneur A’s point of view, experienced employees can meet the tight deadlines while not compromising much on quality.

In addition to *“lack of capital”* and *“lowering costs”*, the interviewees mentioned other motives behind some uses of bootstrapping as well. For example, according to Entrepreneur A, using open-source or license-free software can also reduce *“resource dependency”* since there is lots of support in the community with plenty of examples for open-source software. His experience of working with commercial software shows that *“if you run into a problem*

*you stuck, but with an open-source, you can always fix it*". Entrepreneur A also mentioned that *"saving time"* is another motivation for using bootstrapping. From his past experience, raising external finance takes a lot of time, as he said *"I am a technician. I know my job. I usually start by writing a code or doing something. It takes a lot of time to get an investor into your company"*. In the same way, Entrepreneur B mentioned that he uses bootstrapping because it can be applied fast.

All entrepreneurs referred to *"freedom of action"* as a motivation for using bootstrapping. Entrepreneur A thinks that, without an external investor, he can turn back and change his business direction at any time he realizes the project will not work. However with an external investor, he has to deliver on his promises. On the other hand, the investor can kill the project he has spent a lot of time on. From his past experience, when other people get involved, *"you lose control"*. Additionally, Entrepreneur A is afraid that an investor could *"send you in a wrong direction"* and might not be competent enough for this type of business. Entrepreneur B said that *"it is better if you can manage it yourself"*. Therefore, he mentioned the importance of taking external funds from individuals who can trust you without necessarily knowing the business and willing to interfere. Entrepreneur D also emphasized *"the freedom of action"* as the most important motivation for using bootstrapping. He said that, with external finance, it is difficult to change the direction after it was decided. In the early phase of the business, he prefers to manage without external investors.

In order to *"reduce risk"*, Entrepreneur A avoids raising resources from banks or raising equity as he said that starting business is always risky and *"I do not want to put my house at risk in case if we cannot make it"*. He would rather prefer *"free"* money from the Swedish government or funds from the EU. With usage of different bootstrapping methods, Entrepreneur B finds external customer projects for consultants to work on rather than working on the company's own projects. In the later case with the company's own projects, the company has to be responsible for everything if something goes wrong or if the company fails to deliver products that will be in demand. Entrepreneur B also reduced risk associated with external finance by using his network to raise a 6 million SEK loan from private investors. With this loan, he did not lose any shares and did not have to use collateral to secure a loan.

## **Factors affecting motivation for using bootstrapping**

Based on all interviews, human resources was the obvious factor that affected motivation and use of bootstrapping in software development firms. Entrepreneur B said that “*we are really dependent on the human resources in the company. Our employees are the company*”. Entrepreneur B said that 90% of the total company costs consisted of salary expenses. As mentioned earlier, this cost structure can affect the financial situation in the company. For example, when there are no projects, the company still has to pay the payrolls. As a consequence, reliance on human resources affects the firm’s motivation to bootstrap in order to cope with the need for capital. The dependence on human resources also affects bootstrapping motivation for Entrepreneur A. This can be seen from his strategy and intention of hiring temporarily programmers, as well as using his personal network to find programmers. Additionally, the importance of human resources encourages Entrepreneur B to be very careful with the use of bootstrapping. For instance, he said that he uses bootstrapping to reduce the other 10% of the cost. However, he does not bootstrap the 90% of the cost that relates to employees’ salaries, because “*if we are sneaky with them [employees], they will go somewhere else*”. During the interview, Entrepreneur B also mentioned that when the company had a hard time, “*we did not reduce the salaries for our employees, absolutely not, but we did that with management team*”. Entrepreneur D shared the same view by saying there are not many bootstrapping methods he could use in order to reduce costs when 95% of the costs comprise the salaries of his team members.

The type of software company and target customer segments are the other factors that affect the bootstrapping motives in software development companies. Both Entrepreneurs A and B work in IT consulting business. These companies do not develop and sell their own products, but rather develop projects for/with customers. This means revenues normally come as a deposit or a couple of payments from customers after a certain period of time. This fact affects how entrepreneurs manage their cash and payment to their employees. As a consequence, some specific bootstrapping techniques, such as selling invoices or factoring, are used by Entrepreneurs A and B. In contrast, Entrepreneurs C and D, whose companies develop and sell their own products, did not mention the importance and usage of these techniques during the interview. They rather mentioned the problem of trust from investors and customers in their products in the early phases. Therefore, bootstrapping by getting money from government institutions was more important to them. Furthermore, being in IT



consulting business, Entrepreneur B said that he could not use some bootstrapping techniques in the software development process as *“we are not a product company”*. Even within his different subsidiaries which focus on different customer segments, motivation and usage of open-source software are different. As he mentioned, in some of his companies, he can reduce a lot of costs by using open-source software, but in some companies, *“customers pay for those licenses”*. This means that he does not need to be concerned about it.

Software projects usually have a tight deadline. The deadlines have an effect on bootstrapping motives and how bootstrapping was used. As mentioned earlier, tight deadlines directly affect motivation of using bootstrapping to reduce the costs. Entrepreneur A said that if a project has a tight deadline he has to *“focus more on finding the right people to complete the tasks rather than considering a price”*. Moreover, when customers request tight deadlines, he usually contacts more professional programmers who do not need supervision. *“If the deadline is 6 months away, I could do it myself. But usually it is much shorter; you need to get the right people together to complete the task”*.

According to Entrepreneur B, a long-term vision and a personal goal limit his motivation of using bootstrapping. He said that his motivation to bootstrap depends on *“a combination of goal and vision”*. His goal is to grow fast and reach 500 employees by 2016. He knew from the beginning that this goal cannot be achieved through financial bootstrapping since *“we need to have more resources in”*. He compared this with the time he worked in his previous company when the goal was different. At that time, his motto was to *“try to finance yourself for as long as you can”* in most of the cases.

Previous experience of entrepreneurs can influence their bootstrapping motives. Entrepreneur B's experience from running and selling three companies helped him to make a good plan for his current business. As he said, *“I think we had quite a good plan”*: financial needs were planned in advance and this fact reduced the risk and urgent need for capital. Entrepreneur A also worked in a technology company in past. Some projects that he worked for were cancelled by others and that was a painful experience. He realized the importance of freedom of action which he can utilize by financial bootstrapping. Entrepreneur D said that he learnt how to raise capital from investors based on his experience from running a previous company. Moreover, he learnt from his experience when it is the right time to receive

investors' money and when it is the time to do bootstrapping that comes along with importance of freedom of action.

Even though the interviews were conducted with entrepreneurs in Skane region only, Entrepreneur B said that business location might affect motives for using financial bootstrapping. When Entrepreneur B compared his clients in Skane region and clients in Stockholm, he said that *“it is very different between the regions”*. Customers in Stockholm are willing to pay almost 40% more. This means, with these customers, he would have less financial constraints. As a result, this affects motivation and usage of financial bootstrapping in the company.

### **Change and development of motives**

In order to see changes and development of motives in bootstrapping among the interviewed entrepreneurs, we asked them to identify anything that they would change regarding financing and resource management in the past. All four entrepreneurs shared several lessons they learnt the hard way but none of them were significantly relevant to bootstrapping and the motives for using bootstrapping.

Nevertheless, other findings from the interviews helped us to spot some insights of change and development in the motives of using bootstrapping as the businesses develop and entrepreneurs gain more experience. This development could be observed in how entrepreneurs bootstrapped in the past and how they bootstrap today.

Entrepreneur A has been using his own software development skills as a way of bootstrapping. When he referred back to the time when he started the company, he said *“if it is something I could do myself, I will do it. Originally, it was me who programmed the stuff”*. Now, he has more projects to work with. This means he cannot be involved too much in software development as he did before. As he said *“I cannot focus on programming and project management. Now, we have some students helping us from time to time”*.

According to Entrepreneur B, the way he used bootstrapping in his previous companies and the current company are somehow different. This variation can be described by different goals and ambitions in his previous companies. Entrepreneur B mentioned that *“in my first*

*company, it was only bootstrapping*”, and many bootstrapping techniques were used. He also mentioned that *“we did not have a goal, we just kept the business going”*. In contrast, he has been running the current company with a clear goal to be one of the biggest consultancy companies in Skane region with rapid growth rates. Therefore, external finances have to be used, and the importance of bootstrapping is reduced.

Entrepreneur D also has a different situation with his current company compared with his former company in terms of financing choices. He started his first company with different subsidy-bootstrapping finance, such as a regional grant and fund from the government, as well as equity shares from a private investor and venture capital investment at later stages. In contrast, his current company was started with only private funds and financial support from a Swedish governmental agency called Vinnova. He said *“it is very different when I started this company, I have experience and money. When I started the first company, I had no experience and no money.”* This case also demonstrates that Entrepreneur D had different financial situation and different motives to use financial bootstrapping at different times.

## **5. DISCUSSION**

In this section, the findings from previous sections will be discussed according to research questions. Results are framed and analyzed with theories from other studies.

### **Influencing factors and motives for using financial bootstrapping**

Findings from Winborg (2009) indicated that there are other motives of financial bootstrapping apart from lack of capital and cost reduction in small businesses. The result from our study emphasizes the same phenomena in software development companies. Interviews with four entrepreneurs show that their uses of bootstrapping are motivated by various reasons. The motives found in this study were lack of capital, freedom of action, reduction of resource dependency, saving time, risk reduction and managing without external finance. However, one difference was found in this research. Although “cost reduction” was referred to as one of the most important motives for bootstrapping in most of previous researches, we found that it has less importance in the current research. All entrepreneurs did not mention that their use of bootstrapping was mainly motivated by “cost reduction”. Regarding Entrepreneurs A, B and D, this contradiction can be explained by their concern in

quality of product/service they develop, tight deadlines and heavy reliance on human resources which are all related to the software industry.

Characteristics of the company affect managerial choice of financing (Barton and Mathews, 1989). In this study, we found that some characteristics of software development companies significantly affect the motives for using financial bootstrapping. All entrepreneurs mentioned that their businesses are highly dependent on human resources. Results from interviews show a strong relationship between dependency on human resources and bootstrapping motives in two major ways. First, this motivates entrepreneurs to carefully manage their finances and utilize their internal resources to deal with the “need of capital”. Salaries and wages are the major costs in software development companies. If the company has permanent employees, these costs are fixed and become regular expenses that the company has to pay every month and cannot delay. Entrepreneur A avoided these “fixed costs” by employing temporary programmers on a project basis and both Entrepreneurs A and B bootstrapped by selling invoices. Second, the importance of human resources lowers motivation for Entrepreneurs B, C and D to “reduce the costs” related to their employees. Entrepreneurs B, C and D clearly stated that the quality of the employees highly impact the quality of the products and services they develop. Therefore, they do not want to do anything that would harm the relationship with their current employees or create obstacles in hiring new ones. As a consequence, not many bootstrapping techniques could be applied in order to decrease the costs since salary expenses account for more than 90% of the total costs.

Lack of historical transactions in the early stages of company development reduces financial trustworthiness to external financial institutions (Cassar, 2004). In our study, this problem seems to be consistent with Entrepreneurs C and D as they had problems with finding customers and investors in the early phases of their former start-ups, while Entrepreneurs A and B did not mention this problem. This may be due to the fact that Entrepreneurs C and D were dealing with the software products that were new to the market, unlike those of Entrepreneurs A and B which provided software consulting services. As a result, the investors perceived their businesses as highly risky. Therefore, we came up with a proposition that software firms which develop and sell software products are less likely to receive funds from external investors in the early stages compared to software consulting firms, as a consequence, their “need of capital” cannot be resolved by traditional financing solutions and likely to remain as a motive for bootstrapping.

Entrepreneurs A, C and D did not need a lot of money when they started their businesses. As their businesses relate to software development, what they normally need is their laptops, good teams and their own skills. The nature of the business gave them more flexibility to develop their projects without relying on external finance. As a result, they could manage the product development process and lead their businesses independently. In other words, entrepreneurs who start software companies might find it easier to “manage without external finance” and have “freedom of action” as a motive for using bootstrapping in their start-ups.

Free resources such as open-source software and free software development tools are becoming more widely used, easy to access and provide more capabilities. As the online communities are growing, users easily find lots of support from the Internet when they run into problems. According to Entrepreneurs A, B and C, support from paid software solutions might be slower, users have less flexibility and certainly it comes with higher costs. From this fact, it is reasonable to say that plenty of free resources and knowledge available in the software industry motivate entrepreneurs to “reduce resource dependency”, gain “freedom of action” and “reduce cost” by using open source tools as a means of financial bootstrapping.

According to Barton and Mathews (1989), firm’s financial decisions could be affected by management’s risk-taking propensity, values and goals. Our study shows some supporting evidence in the software industry related to these findings. Entrepreneur B’s goals and vision on company growth reduces his motivation of using financial bootstrapping. Another evidence can be found in Entrepreneur A’s vision. He prefers to stay away from banks, business angels and venture capitalists because he perceives them risky for his private assets and they also limit his freedom of action. As a result, he chooses “free” support funds from government institutions. Although Barton and Mathews (1989) only referred to the effect on a firm’s financial decisions in general, our cases from these two entrepreneurs show that it could be applied to bootstrapping as well. Moreover, the case of Entrepreneur A supports Carter and Van Auken (2005) findings about the fact that the owner’s perception of risk drives the use of bootstrapping. Nevertheless, the managerial goals and risk-taking propensity of entrepreneurs in the software industry might be found in other industries as well. That implies that the results from this research do not show a unique relationship between these factors and the characteristic of software industry.

## **Uses of financial bootstrapping based on motives**

In the previous studies by Brush (2006), Van Auken (2001) and Winborg and Landström (2001), different types of bootstrapping techniques used in firms are found to be based on different types of businesses. The current study's results are consistent with previous research findings. Results from this study show that some bootstrapping techniques might be more important to entrepreneurs than other techniques. Some of these findings can explain the motivation of entrepreneurs, which is affected by software industry context as mentioned in the previous sections.

As discussed in the previous sections, high reliance on human resources creates a “need of capital” and decreases “cost reduction” motives for using bootstrapping in software companies. The “need of capital” motivates entrepreneurs to use bootstrapping techniques that can maximize their cash, either by speeding up cash inflows (e.g. by selling invoices to receive money quicker, signing agreements with programmers to make payments after customers pay) or decreasing cash outflows (e.g. hiring temporary programmers, subcontracting). Entrepreneurs avoid some bootstrapping techniques related to employee salaries since this might harm the relationship among staff, and therefore affect the quality of the products/services developed. For example, Entrepreneurs B, C and D do not believe that they can compensate the quality of their staff with lower costs. Although Entrepreneur A had some students working in his projects, he clearly said that he had to be careful in balancing it with experienced programmers. During hard times, Entrepreneur B never cut salaries or postponed payments to his employees, but he did that with the management team based on mutual agreement.

Entrepreneurs C and D who develop and sell their own software products struggled with finding the investors to support their companies in the early stages of their start-ups. This means that both entrepreneurs had a clear motive to solve their “need for capital”. Fortunately, they managed to obtain some investments from the Swedish government. These funds helped them to survive long enough until other financial sources were available. The cases from these two entrepreneurs demonstrate the importance of bootstrapping by receiving subsidies and funds from government institutions in the early stages, especially for those entrepreneurs who are working on new technology and products.

As it can be seen from Entrepreneurs A, C and D who involve themselves in the software development process, bootstrapping by using personal software development skills tend to be commonly used among entrepreneurs. Several reasons could be used to explain this phenomenon. First, it is quicker, i.e. an entrepreneur does not need to explain a task to other people and can start the programming straight away. Second, it gives entrepreneurs freedom of action as they do not need to rely on anybody. And most importantly, the third reason is that these skills almost cover all the resources needed for entrepreneurs to start their businesses. As discussed in the previous section, software start-ups only need a small amount of capital, team and particular skills to start software companies, at least this is true for Entrepreneurs A, C and D.

As discussed in the literature review section, most research in financial bootstrapping conducted their research focusing on general bootstrapping techniques. Only two studies from Freear et. al. (1995) and Harrison et al. (2004) were focused on the software industry and referred to specific bootstrapping techniques used in the software industry. However, using open-source software and free online resources were not referred in these studies as one of the bootstrapping techniques. This is contrary to the results from our research. We found that all entrepreneurs mostly used open-source tools and perceived them as a very important bootstrapping method in product development. This difference might be explained by the fact that these studies were conducted decades ago and therefore they do not reflect more recent changes and trends in technology.

### **Development and change of bootstrapping motives**

According to our study, some motives of using bootstrapping by entrepreneurs have changed over time. During the analysis phase, we found two major reasons explaining these changes. These are changes in entrepreneurs' experiences and surrounding conditions.

First, entrepreneurs with an experience of running start-ups learnt how to plan and handle financial issues better. A good plan could prevent entrepreneurs from facing financial problems, while experience in dealing with problems encouraged entrepreneurs to come up with better solutions. Therefore, more experience results in less financial constraints, thus reduces motivation for using bootstrapping due to lack of capital. One of the examples was mentioned by Entrepreneur B who planned well his current business and faced fewer

problems because of his experience from running previous companies. Another example was given by Entrepreneur D who said if there is a need he can now receive an investment for his current company because of his previous start-up experience.

Second, all entrepreneurs in our study have started and run more than one company. Many conditions of entrepreneurs and the surrounding context, including financial conditions, were different when they started different companies. As entrepreneur A said, he used to develop the software himself, but now he has to find somebody to help him because he is responsible for more tasks as his companies grow. Entrepreneur D also mentioned a big difference in his financial conditions between the time he started the first company with no money and the time he started his current company which is mostly self-funded. These different conditions affected the way entrepreneurs bootstrap and changed their motives of bootstrapping over time.

## **6. CONCLUSION AND IMPLICATION**

This study investigates some unique features of bootstrapping motives and bootstrapping methods relevant to software development companies. The results of the analysis of four cases are consistent with previous studies of bootstrapping motives (Winborg, 2009). Our findings confirm the existence of variety of motives for using financial bootstrapping in software development companies. However, the motive for “cost reduction” that considered to be as one of the most important bootstrapping motives in previous researches was not mentioned by any interviewees as their main motive for using bootstrapping. Degree of importance of different motives are affected by various company characteristics and context of software industry, which are high dependency on human intelligence, fewer capital requirements to start a business, abundance of free intellectual resources and entrepreneur’s personal goals and perception of the risk. This study also reveals that software development companies working on development of own software products face more challenges in receiving initial funding due to higher risk perceived by investors. Therefore, they are more motivated to bootstrap because of the “need for capital”. On the contrary, consulting software companies have fewer concerns in availability of initial financing sources.

Based on the above mentioned bootstrapping motives, some bootstrapping techniques are found to be more important and common among interviewees. These bootstrapping



techniques include maximization of cash inflow, receiving subsidies from government in early stage of company development and using own skills in software development process. However, entrepreneurs avoided using bootstrapping techniques that could have negative effects on relationship with their employees. This research paper also reveals a unique bootstrapping method of using open-source software that was not mentioned in previous studies. Moreover motives behind usage of open source tools are discovered. These tools are becoming widely used and considered to be as one of the main methods of bootstrapping in software companies.

This study also provides some insights into changes of motives in using bootstrapping in software companies over time. Two notable influencing factors found during this research were gained entrepreneurial expertise and change of external conditions over time. These changes reflect the difference in usage of bootstrapping methods at different times.

The results of this research can be used as a suggestion in government practices that encourage spread of subsidies for innovative projects initiated by entrepreneurs. Government officials should be aware that some innovative projects face difficulties in receiving traditional finance and therefore they should set up proper policies to support those entrepreneurs. This will insure development of innovative ideas in early phases and lead to economic prosperity. Moreover, the findings of this research suggest some common bootstrapping techniques in software industry which can be used by other entrepreneurs in order to make decisions. For example, these findings can be used as a guide on how to balance between the internal financing and external financing over time. They may also learn the reasons for choosing specific bootstrapping methods over others based on context of software industry. And finally novice entrepreneurs could learn about bootstrapping techniques that should be avoided.

This study has a number of possible limitations. First, all interviewed entrepreneurs are located in Skane region which might have its own specific characteristics. For example, we found it common to use government subsidies and research grants among interviewed entrepreneurs in this region. This factor might affect entrepreneurs' motives for using particular bootstrapping techniques. Second, we have only interviewed four entrepreneurs which might not cover the diversity of software industry since there are many different

software companies with unique characteristics like size, business model, customer segment etc.

Since this research has a qualitative nature, future quantitative studies with statistical analyses would be of interest to test if the patterns found in this research are consistent over a larger sample of software development companies. Moreover, our finding show that more bootstrapping researches in software industry need to be conducted in order to keep up with technological and business trends.

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## **Appendix A - Interview Guide**

### 1. Company characteristics (20-30 minutes)

Entrepreneur's background and experience

Age, size, products and business model

What are the characteristics of the business (capital intensive/human intensive)?

- Industry characteristics?
- Competitors?
- Who are your customers? Where does the revenue come from?
- Key success factors
- Organizational structure and culture
- Product development

### 2. Financing, Bootstrapping & Motivation (30-60 minutes)

(Let the interviewee read examples of bootstrapping techniques)

How did you start the business (budget & funding sources)? Can you give examples of bootstrapping you used?

Where does the revenue come from today? Any use of bootstrapping to increase revenues or maximize cash inflow?

What are the major costs for the business? Any use of bootstrapping to minimize them?

Do you use any bootstrapping techniques in the software development process? Why? How?

Which bootstrapping (business development) techniques are the most important for you? Why?

Which bootstrapping (product development) techniques are the most important for you? Why?

What do you think about external finance? How much is it important? What types of external finances are the best for a start-up?

When both external finance and bootstrapping are available what will you choose? Why?

Which motivations (the list is provided during interview) are the most important for you to use bootstrapping?

What did you learn from your past experience regarding financial (and bootstrapping) decisions? If you could go back to past and change your financial/bootstrapping decisions, what would you like to change?

Are there any bootstrapping techniques that you thought would be good for your business, but at the end it turned out that they are not? And vice versa?