Predictability of asset bubbles: Economic bubbles and the effect they have on economies

A Delphi Study on the predictability of economic bubbles and the possibility to prevent them

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Author
David Kruse
s1294482

Supervisor: University of Twente
Dr. M. L. Ehrenhard

Supervisor 2nd
Bjorn Kijl

Supervisor: Technische Universität Berlin
Natalia Strobel
Abstract
Investment activities in technology related companies increased tremendously due to the combination of missing investments alternatives in the market and exuberance amounts of investors who are looking for an attractive return on their investment. As consequence, the amount of companies with a valuation higher than one billion dollars is no exception even though they miss a revenue generating model. Due to this hazardous combination, a bubble fostering environment is assumed. In order to investigate this assumption, it becomes necessary to execute a profound foresight study which takes the current situation into consideration.
However, existing academic literature with a focus on asset bubbles in the technology sector is missing. Therefor this thesis investigated the future of company valuations in the technology related sector with the help of a literature study, a financial statement analysis and a Delphi method. The Delphi method which was executed in four steps contained a sample of ten experts, equally assigned over two groups. The experts were assigned based on their industry knowledge in the technology sector and their knowledge in the area of venture capitalism.
Subsequently to the data collection it came out that certain indicators, which can be identified as red flags were present during past bubbles and can also be detected in the present situation. Furthermore, due to lacking due diligence and expertise on the investors side, the investment behaviour was identified as unsustainable. In addition, it was found that there is a certain degree of predictability that increases with the degree of transparency. Nevertheless, the results indicate that the global economy is not actively encouraging a change in the status quo. Hence, it can be concluded that the global economy encourages the creation of technology related asset bubbles due their lack of actions to improve the status quo.
This study extended the amount of available academic literature due to the novel combination of a literature study, a financial analysis and a Delphi method. Furthermore, it can be seen as a starting point for further research.

Keywords:
Asset bubble, overvaluation, unicorn, Delphi method, economic crisis, technology related sector
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1. Introduction

1.1 Context of the research

‘Where were you when $Snap ripped off America?’ (iBankcoin, 2017). The technology company Snap Inc. and its application Snapchat, which is publicly traded since March 2017, launched its initial public offering (IPO) with 17 Dollar a share, closing with 24.5 Dollar resulting in a market value of 34 billion dollars shortly after its initial public offering (Streck, 2017). According to the financial markets, the company is more valuable than Credit Suisse, Renault Chrysler and American Airlines (Streck, 2017). The high value of Snapchat is even more surprising regarding its losses of 514.6 million dollars only in 2016 (Business Insider, 2017). Nevertheless, Snap is no anomaly in a completely rational environment but rather one unicorn in an ecosystem, which seems to evolve and disrupt current standards.

Unicorns, which are defined as software companies that started since 2003 and are valued over one billion dollars by public or private market investors (Lee, 2017), are no exception but rather daily routine. The number of companies that can be categorized by this definition rose during the last years rapidly from one unicorn in 2009 to seven in 2013 and 76 in 2015 (Clarence-Smith, 2017). Although these companies bare a high potential to scale up rapidly they often fail to present revenue generating strategies and the resulting returns of the shareholder’s investments.

Taken the business model of these companies into consideration, parallels occur to the technology companies that were founded in the late 1990’s. During this period, a lot of companies were founded with the overall goal to financially benefit from the booming new economy. The most remarkable parallels are the focus on high return of investment in future and the failure to observe that a profit generating business model is missing. As a consequence of this misbehaviour a bubble effect was fostered.

The economic bubble was pumped up by high-risk investments at the stock markets until its burst in 2000 built the fundamental foundation for an economic downturn followed by recession, low interest rates and bankruptcy of young companies on big scale. Even though there are parallels regarding the structure of the economy and the related investment behaviour, also differences can be identified if nowadays technological development opportunities are taken into consideration. This can be explained by the fact that businesses like Snapchat were not realizable 17 years ago due to technological limitations and the resulting adoption rate that would be relatively low compared to present time. Due to this it is assumed that the environment the company is currently operating in mainly defines the company’s value. This indicates that a firm can be valued much higher if its environment fosters this development although a clear defined structure regarding its revenue generation is missing. Technology related companies like Snapchat do not produce any tangible
good that has a value by itself but rather an intangible good which success purely depends on the customer’s value proposition. Kaplan and Norton (2007) state that a value proposition defines the products and services a company offers to its customers to satisfy their needs. The overall goal is to demonstrate what a company does different and better than its competitors (Kaplan & Norton, 2007). The precise targeted customer experience and the related satisfaction of their needs results in gaining popularity of the company. As consequence, important considerations regarding a sustainable strategy, a successful revenue generation model or long time goals of the company lack attention due to customer’s high value propositions. The deviation between the customers and an objective assessment can lead to misinterpretation and too optimistic valuations. This process can be described as under or overvaluation. Due to the rapid growth of technology companies it is assumed that this industry branch is particularly in danger to encourage overvaluations.

Technology and the companies that produce it are omnipresent in today’s society. The way people communicate with each other via different channels like Snapchat or WhatsApp, listen to music using streaming services like Spotify and Napster, share their personal experiences through social platforms like Facebook or twitter and even how they work has completely changed during the last two decades. If the old infrastructure is compared to the new one it becomes obvious that technology became crucial for a firms’ survival in today’s economic world.

The technological change can be partly explained by the process of creative destruction and the interplay between user needs and the companies’ willingness to satisfy these needs. As described in Schumpeter’s theory of creative destruction (1942) industries will innovate from within and only companies with the ability to cope with a new environment will be able to survive. According to Fortune magazine (Gandel, 2016), five out of the ten most valuable companies worldwide operate in diverse industries whereas the other five are related to one industry, namely technology. Those companies have a strong and innovative brand image, a positive revenue stream and the willingness to innovate on a regular basis. Nevertheless, another branch of technology companies arose during the last years. These companies are less focused on the enabler technologies like smartphone, PC or telecommunication infrastructure but rather into the occurring software possibilities. Mentionable in this context are companies like Facebook, Snapchat, Pinterest or WhatsApp. Dominating performance indicators are follower growth, completion rate in the form of the time a user spends to fulfil a task in the app or user engagement which includes using the provided content actively (Skyword, 2017). Even though companies that fall under this definition produce software that is meant to become a game-changing life style application, they often lack to introduce a steady business model to generate money. As consequence those companies miss the chance to generate revenues, break even or become a profitable investment. Keeping the fact in mind that financial
markets are a crucial enabler for the real economy and its related flows of goods in exchange for money, this behaviour occurs irrational and incomprehensible. Two different approaches are presented to give an explanation.

The mentioned investment behaviour goes along with Gompers and Lerners (2000) assumption that investors look for a high exit of the company they invested in to generate the maximum return. Investors who are using this approach often spread their risk by investing money into different companies in the same sector. By doing this it becomes possible for venture capitalists to identify trends, invest in different sectors of those trends and generate high returns of investment if one company in this eco system generates money. Furthermore, this bares the opportunity to back up the losses from unprofitable investments. Nevertheless, this approach stands contrary to Benson and Ziedonis (2009) hypothesis, which assumes that companies prefer to invest in new trends, motivated by the fear of falling behind or miss out new technologies. This investment trend can contain hazardous consequences regarding the worlds’ economy like a bubble, caused by over investments. The creation of an investment bubble, which clearly took place during the Dot-com bubble, is further elaborated in the following section.

1.2 Justification for the research

![Diagram](image_url)

Figure 1. Definition of the Research gap

Definition of the Research gap
The thesis is based on three different aspects, which are asset bubble, enabling assets and foresight methodology. In order to define the research gap, the interplay between the different aspects is examined. Due to the overlap, marked in figure 1, crucial information can be gathered which in turn can describe the research gap. In order to close the gap a unique research design will be proposed.

Foresight methodologies with a focus on asset bubbles were conducted during the last years, often after the burst of a bubble. These studies mainly focused on the psychological factors like expectation management of investors that played a crucial role (Hommes, Sonnemans, Tuinstra & Van de Velden, 2008). Nevertheless, the detected body of literature was not further developed to give adequate guidance for asset bubbles in future. As consequence, foresight studies with a focus on the prediction of an asset bubble rather than the analysis of prevalent indicators during a passed bubble are missing.

Enabling asset in the context of this research means the asset or the industry which can be made responsible for massive over- or undervaluation in the world’s economy. From an historic perspective, it can be demonstrated that tulip bulps (Dash, 2011), shares of a blossoming industry in foreign markets (Carswell, 1961) or the above average valuations or software companies (Griffin et al, 2009) fall under this description. The fact that the consequences of a bubble were often analysed after a crisis, it is difficult to define which asset will be the enabling one for a new crisis. As consequence, literature lacks a valid forecasting methodology to identify enabling assets.

None the less, the correlation between an asset bubble and an asset with the ability to foster the rise of this phenomenon is undeniable. Still, some industry branches are overvalued through the impact of a bubble and other industries do not. Mechanisms and dynamics that are capable to give a statement which industry is potentially in danger and which industry can shrink the bubble before its burst are not available.

Financial markets and the executed speculations at those markets contain high risks for real economy. If a bubble arises and bursts due to different causes, the impact on society is tremendous. This seems obvious if the fact is taken into consideration that the aftermaths of such a burst will have influence on taxes, interest rates, loans and on the employment of masses.

This is especially true for the bubble which is assumed to grow just now because much more private investors with almost no liquidity are involved, start-ups with cash burning growth strategies compared and low revenues as well as a cyclically adjusted price earnings ratio (CAPE) of 27 which was only outbid in 1929 (Mahmood, 2015). Even though the fact that the exact future cannot be predicted, a method with the ability to define different future developments and rank them regarding their probability must be applied. Scenarios analysis which tackles the key challenge to
examine a range of future plausible pathways of combined social and environmental systems under conditions of uncertainty, surprise, human choice and complexity in a sustainable manner (Swart, Raskin & Robinson, 2004) is therefore the most appropriate choice. This scenario analysis will take place in the form of a Delphi method. Even though the forecast of a scenario in such a complex environment is ambitious, it is necessary to build the foundation for methodological frameworks with the ability to prevent economies from creating investment bubbles. Furthermore, the scenario analysis will combine the knowledge of several experts and, by doing this, contributes to the overall amount of available knowledge.

1.3 Research goal and research questions
Asset bubbles seem to occur regularly and have a huge impact on national and international economies. Potential causes for different asset bubbles during the last century were identified and parallels were found between causing factors. Especially after the evolution from a manufacturing to a more service oriented industry, it becomes crucial to identify economic bubbles before they burst, to prevent economic downturns. Current investment activities are alarming indicators regarding the rise of a technology related bubble, which clearly underlines the recency of the problematic as well as the necessity for a valid measurement tool. However, there is no progress regarding the prediction or effective prevention of bubbles. In the past, a tremendous amount of scientific literature was written with the overall goal to explain the past rather than recognize a pattern for current developments or even predict the future. Due to the limited amount of literature with the ability to tackle this problem, it is necessary to lay an empirical fundament, design a theoretical framework and create incentives to conduct further research. In order to accomplish this goal, the following research questions were posed:

In how far will the global economy encourage the creation of a technology related asset bubble?

To answer this question, the following sub questions needed to be answered:

1. In how far will already familiar indicators influence the encouragement of the global economy to create a bubble?

2. To what extent do the current investments in technology driven companies foster an asset bubble?

3. How strong is the predictability of emerging technology bubbles?
4. *In how far will the global economy encourage a change of the status quo?*

**1.4 Research Design**

To answer the research questions, a Delphi method was executed. As starting point an interview structure was set up and handed out to the participants. The Delphi method made it possible to find out several future trends and developments based on the opinions of different experts with industry related knowledge. The goal of this method was to align the opinions and generate a set of expected future relevant trends. In order to prevent the data from getting biased by technology related experts exclusively, two sample groups were created. Both groups contained five technology related financial experts and five non-technology related financial experts. A sample size of 10 was chosen to enhance the validity of the conducted data.

Subsequent to this method a financial analysis was executed in order to check whether the predicted trends can be verified or not. The financial analysis was based on the financial statement of a technology related unicorn.

The research design required a scientific as well as a non-scientific literature study to gain basic knowledge about the topic at hand. Desk research as well as qualitative research has been executed. The data gathered through qualitative interviews was recorded, transcribed and coded to define statements. These statements were ranked by the experts of both groups and the degree of alignment was calculated with the help of Kendall’s W.

**1.5 Contribution**

The research at hand contributes to both, the theoretical and practical knowledge about early signs of economic bubbles.

This study contains multiple academic contributions. First, the combination of a Delphi method, including qualitative and quantitative data with a scientific and non-scientific literature study enlarged the amount of publically available, scientific literature in the context of investment behaviour and asset bubbles. Therefore, it can be considered as an extension to already existing research by under more Chang, Newman, Walters & Wills (2016), Sahlman and Stevenson (1985) or Girdzijauskas, Štreimikiene, Čepinskis, Moskaliova, Jurkonyte and Mackevičius (2009). Second, this thesis established the foundation for future research around trends and future developments in investment behaviour. Third, based on the generated data, a starting point for model with the capability to predict future economic developments is defined.

Furthermore the results can be used in practice. They may enhance the quality of the decision-making process of investors. This includes private investors whose presence rose during the last years in the form of business angels, venture capitalists (VC) in the form of capital pools or
individual VCs as well as corporate investors, since all of them can influence the economic environment they are operating in permanently. This study can present valuable implications for investors in technology related industries and give practical guideline for them.

1.6 Delimitation and scope of the research
As the concept of asset bubbles and the assets that enable such a bubble are a broad topic and can be analysed in different ways, it is important to define the scope of the research to the participants in order to generate useful information and trends based on this. The trends and developments that were generated through the Delphi analysis display assumptions and are not objective facts.

The overall purpose of this study is to shed light to the concept of asset bubbles. Deducible from this, it tried to point out indicators that predict an asset bubble to occur. Since this research only focused on the financial analysis of asset bubbles, psychological effects, social, political, and economic factors were not taken into consideration.

Based on the literature it was assumed that the enabling asset, which prevalence makes it possible to create an asset bubble was present in historic crises. For this purpose, historical circumstances as well as possible enabling assets that become relevant in the future were in the scope of this research.

Even though asset bubbles occurred in different countries all over the world and at different points of time, only the most important ones will be discussed during this research in order to get relevant insights on the topic.

1.7 Outline of the thesis
The thesis is organized in 11 different chapters. The first chapter focuses on relevant information to properly execute the analysis and answer the research question. The second section contains a literature review with the overall goal to gather information about the most important concepts and subjects discussed in this thesis. The third section focuses on the method and how the research was executed. The fourth section describes the data collection method, followed by the results of the interview and the attempt to answer the research questions. During the subsequent section the results are further elaborated in form of conclusion and discussion section. The seventh section focuses on possible implications exclusively followed by the limitations as well as the concluding sections, containing the further research, the appendix and the references.
2. Literature Review
The second chapter focuses on the theoretical foundation of the study. During the literature review the concept of asset bubbles, psychological mechanisms, the concepts of unicorns as well as a historical review are discussed. The chapter is closed by a precise analysis of different theoretical frameworks followed by a justification for the choice of the Delphi method.

2.1 Asset bubble
2.1.1 Definition of the term Asset bubble
To understand the phenomenon of an investment - or asset bubble a precise description is crucial. According to Scherbina (2013) a bubble can be described as the deviation between the fundamental value of a market good and its market price. This is supported by Siegel (2003) who states that a bubble can be described as a period wherein speculative investments lead to an overvaluation of securities in a particular sector. This process of mispricing can either be positive or negative, depending on the development of current shares in relation to its past price movement and the resulting buying or selling reaction (Scherbina, 2013). Mispricing can lead to a trading price below or above the discounted expected future cash flow. Since an overvaluation will be corrected with more delay due to higher profits for the investors, the probability of a positive bubble is higher. As stated by Xiong (2013) the economic consequence of such an asset bubble can be over investment, frenzied trading of shares during a boom period as well as a financial crisis including depressed real economies subsequently to the bust of the bubble. These consequences most likely occur after the burst of a bubble, when investors realise that the industry they invested in is not as profitable or sustainable as they thought (Chang et al., 2016). As soon as this is realized, the companies’ valuations descend below to the pre- bubble levels (Chang et al., 2016)

2.1.2 Indicators of a bubble-fostering environment
Even though the definition of an economic bubble exists, the reasons for such a bubble to arise are only partially defined. Eichengreen and Arteta’s (2000) state in this context that heterogeneous beliefs investors have regarding the price of an asset and the idea of high sales in the future are mainly responsible. Additionally, Borio and Lowe (2002) acknowledge that an increase of the rate of growth of domestic credit increases the probability of a banking crisis by 0.056 percent. Consequently, it must be acknowledged that a credit boom increases the chance to trigger a financial crisis. Subsequently to the credit boom and the overvalued assets the money is spend for, another factor has to be considered, namely the government which is responsible for the interest rates a country can provide. Viewable from different historical bubbles, a misinterpretation of a crisis by governmental instances and the resulted decrease of interest rates can foster the rise of a bubble. This was under more identified by Taylor (2009) who criticized that the real estate crisis was prolonged through the government of the US and its focus on liquidity rather than risk
reduction. Concluding, Hott and Jokipii (2012) identified the massive fluctuations of an assets market price as cause of an asset bubble. Due to these factors, the overvaluation in relation to massive market price fluctuations of an asset as well as a credit boom in relation to facilitating credit structure - low interest rate and easy access to credits- can facilitate an environment which encourages the rise of an asset bubble.

2.1.3 Supporting psychological mechanisms
Overvaluations, which can be identified as the major cause for the development of an asset bubble, occur due to wrong estimations about the internal value of a good. The divergence between the actual value and the selling price of a good is mainly influenced by humans on the selling and the buying side. In this context, the mechanisms that manipulate people are of enormous interest since they occur completely irrational. Two mechanisms that have a major influence on people’s behaviour are heterogeneous beliefs about the value and people’s expectations.

According to Xiong (2013) heterogeneous beliefs are an investor’s willingness to pay more than the actual value of a good because he beliefs to sell the asset in future for a higher price to another optimistic investor. It is comprehensible, that this price increase is only possible until a certain point and saturation is reached. The consequence is that at one point an investor cannot sell the overvalued good and is left behind with it.

The second mechanism is called expectation management and can be described as the expectation a trader has regarding the development of an assets price. Haruvy, Lahav and Noussair (2007) found out that the lower the amount of experiences a trader has, the higher the deviation between the actual value and the paid price of an asset. Furthermore, the study indicates that more experience in the field of expertise reduces the divergence. This can be explained by the fact that expectations are assumed to be adaptive. As consequence, the trader will base an evaluation on experience, past prices of an asset and a current price. However, as technology companies that can be categorized as unicorn became popular only during the last years, the applied methods to estimate the value of these companies are rather new to investors. Even if experience could have been gained in other fields of expertise, the correct valuation of a technology related company and its practices to generate money is a new territory for traders.

Nevertheless, both mechanisms can have major influence on the valuation of a company. Furthermore, they can be responsible for price volatility and irrational economic decisions. Although it is rather improbable that these mechanisms are responsible for the creation of an asset bubble they can be described as supportive.

Due to this it is of enormous interest to keep them in mind during the execution of this research.
2.1.4 Definition of the term Unicorn
Unicorns and super-unicorns, companies with a value higher than one billion dollars or 100 billion dollars respectively like Facebook Inc., are common in the tech ecosystem. However, it seems unclear how these companies managed to justify such high valuations. If the current revenue structure of Snap Inc. that is a purely lifestyle related application and Amazon Inc. which is an electronic commerce and cloud computing company are compared, several differences occur. Regarding the costs of goods sold (COGS), it is noticeable that Snap Inc. consumes almost 111% of its revenue in 2016 (MarketWatch, 2017) compared to Amazon with 65% (Yahoo Finance, 2017). Additionally, occurred costs for selling, general and administrative costs (SG&A) that under more include research and development expenditures consumed 117% of Snap Inc.’s revenue. Compared to this, Amazon Inc. consumed 29%. Deducible from these figures it becomes obvious that Snapchat is not generating enough revenues. This can be seen as a characteristic for other unicorns as well. Uber which was the only filed unicorn in 2009 faces the same problem with recorded 987,2 million dollars of losses in the first half of 2015 (Forbes, 2016) due to high cost for goods sold and SG&A. Both companies lack an efficient revenue strategy since Snap Inc. only generates money through advertisement and Uber through a revenue share for every successful ride.

However, since a rapid growing customer base is using both products on a regular basis the overall value of the companies is growing. This can be under more explained by the fact that the companies provide a service that goes beyond the product and fits to the customers’ value propositions. The consequence for capital providing companies is to invest early in those companies and hope for high return on their initial investment as soon as such companies are profitable. The overall effect for the economy can be an economic boom accompanied by fast money circulation due to heterogeneous beliefs of investors.

2.1.5 Historical overview
As already mentioned in the prior sections, the phenomenon of a bubble is not observed for the first time. Through the history of economy several economic up- and downturns occurred partly caused by economic bubbles. Mentionable in this context are the Dutch tulip crisis, the south sea bubble, the dot-com bubble and the US housing bubble.

The Dutch tulip crisis, also called ‘Tulip Mania’ took place during the 16th century and can be described as the first documented crisis (Dash, 2011). During that time, tulips were just introduced to middle Europe (Garbner, 1989) and were a status symbol for successful merchants. Since the transport of the grown plant was too risky for speculation, the speculative contracts were closed for the tulip bulbs before the end of the growing season. At the beginning of this business branch, only professional growers planted and grew the tulip bulbs. After 1634, broad groups of semi-
professional growers entered the business and started to breed new variations of tulips which became highly popular and led to an increase in popularity and demand (Garbner, 1989). Since the tulip business was a seasonal one, the traders had to exchange future contracts on tulip bulbs. To formalize this process of buying and selling bulbs that were not even grown, a formal market was established in 1636. The growing fame among wealthy Dutch families as well as an expected high sales volume to rich foreign individuals who would buy the bulbs for any amount led to a massive price increase. In February 1637, traders realized that nobody would pay the unrealistic prices they asked for, which led to massive descending prices until the pre-bubble state and sold future contracts without the promised value (Garbner, 1989). The Dutch tulip crisis was characterized by a massive overpricing of tulip bulbs due to a high promised demand for rare and special bulbs. The shortage in demand combined with greed, inexperience in trade and short sightedness of traders caused the prices to explode, a bubble to arise and the Dutch economy to collapse after its burst (Dash, 2011). As consequence, the financial markets were forced to reduce the deviation to the real economy what was demonstrated by price reductions up to 95 percent.

The South See company was founded to provide funding for the English government after the war of the Spanish succession (Garbner, 1990). This funding method was introduced by a company ran by John Law who introduced an economic theory in 1705 which led to the establishment of national banks and a paper currency as alternative to gold and silver (Garbner, 1990). Additionally to the introduction of a paper currency, Law also explained that it is possible for a venture to raise capital by selling shares of the company. The price of the shares increases depending on the claims the venture has regarding the nature of the undertaking. The South Sea company was such a venture and generated money through share exchanges for short term governmental bonds after the broad mass was successfully convinced of the stability of the price. By doing this, the governmental debt was reduced effectively (Garbner, 1990). In exchange for this a 6% annual revenue share as well as the monopoly for trade in the south sea was granted to the company. In order to fund more government debt acquisition as well as the promotion of the monopoly the company had in the south American trade region led to constant share issuing which in turn led to an inflation of the share price from 130 pounds (per hundred shares) in January to 950 pounds (per hundred shares) in July 1720 (Temin & Voth, 2004). The company sold a lot of shares as subscription shares. This means that investors provided payments in instalments and received fractions of real shares per instalments in exchange. If the share price rises during the time of the subscription the investor receives more shares that are worth more than he paid originally (Chang et al., 2016). This scheme led to fast funding for the companies enterprises as well as reliable and regular income for its employees in the mid-term. The company expanded its offering by granting cash loans with company shares as collateral, which was extremely dangerous due to the volatile nature of shares
(Shea, 2007). During the third quarter of 1720 the share price of the company rapidly decreased because the instalments for subscription share were due and the investors were not capable to pay for them without selling their shares (Chang et al., 2016). As consequence, many investors defaulted and the cash flow of the company reduced. The same phenomenon took place on an international level (Smant 2012) what reduced the demand, forced the price down below subscription share purchase price.

It can be concluded that the source of the France south sea bubble were mainly new markets and the related products in the south sea. Massive increases in innovation focused on the south sea, the perception that stocks are just as good as owning land as well as major publicly traded companies indicated a clear discrepancy between the product related real economy and financial markets. Eventually, the fear of missing an opportunity as well as the early exit behaviour of investors who decided to exit after the bubble began to grow can be identified as enabler for the crisis (Carswell, 1961).

Compared to its predecessors, the dot-com bubble, which began to arise in the late 90’s and burst in 2000 was focused not only on tangible assets but also on intangible assets. This evolutionary process from a manufacturing industry to a more service oriented one can be described as servitization (Reiskin, White, Johnson & Votta, 1999) and was caused by a change regarding the perception a customer had about a product. Reiskin et al. (1999) state that the function of the product became more important for the customer than the product itself. According to Pohjola (2002) the concept of servitization gained tremendous importance during the 1990s’ and established the basis for the new economy, which can be defined as primary web based service-oriented industries. After the boom of technological achievements like ICT and the publicly traded companies that provided this technology, most of the companies were not able to generate the promised revenues, which forced investors to exit and the bubble to burst eventually. Since there were no tangible equivalent values to back up the financial markets all investments were gone (Griffin, Harris, Shu & Topaloglu, 2009).

The US housing bubble was the result of an overvalued real estate market as consequence of speculation and can be described as the largest financial crisis after the Second World War (Chang et al., 2016). The ‘credit crunch’, which was the large number of housing bubbles that burst parallel and triggered the US housing market to collapse, was one major reason for this crisis. As the term implies, no serious background checks were executed on the credit applicants, which made it extremely easy for them to access money (Mian & Sufi, 2008). The result of this imprudent behaviour was that a lot of lenders were not able to repay the loans they took and the credits defaulted. This in turn decreased the amount of available money reserves of the banks what forced
them to borrow from other banks to stay in the market. Eventually other banks experienced the same problem since the American credit structure did not change, so they had to close and default the credits. This initiated a ripple effect since a lot of western European banks were entangled in investments (Brunnermeier, 2008).

Concluding, low interest rates for loans lead to a massive increase in private credits with the goal to purchase real estate. In 2007 when the interest rates jumped, the rates on those credits could not be paid anymore and defaulted. The consequence was a massive price fall in real estate and a worldwide loss of 4 billion in bonds (International Monetary Fund, 2009)

It can be summarized that even though all crisis happened in different centuries, they had similarities. All crises were defined by the speculative character of investors, who had higher belief in the value of the product than it could possibly contain. This in turn led to unrealistic expectations and massive increases in demand and prices and the price fall in the very moment the broad mass realized that the expectations were too high. Surely other indicators like massive overpricing, high price fluctuations, an innovative trend, easy money access combined with low interest rates and an artificially encouraged demand through early investors who left the bubble before the burst came, were also available in some but not all crises. Due to this several consequences for the economy and society could be observed. There was an overinvestment in the bubble sector during its rise due to already mentioned enabling circumstances and a recession caused by uncertainty regarding investment options after the burst.
<table>
<thead>
<tr>
<th></th>
<th>Tulip Mania</th>
<th>South Sea Company</th>
<th>Real estate bubble</th>
<th>Dot Com bubble</th>
<th>Com bubble</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>1630s</td>
<td>1720</td>
<td>1990s</td>
<td>2007-2009</td>
<td>NO</td>
</tr>
<tr>
<td>New Product</td>
<td>Yes</td>
<td>Yes</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Main Reason</td>
<td>Absurd overvaluation of tulip bulbs, and unrealistic beliefs regarding the sustainability of the valuation</td>
<td>Suggested stability of share price by trading companies, support of deregulation through the government, unrealistic beliefs, Inflation of share price due to constant emission of new shares and default instalment payments</td>
<td>Emerging trend of servitization supported by disruption of old business models through new economy, reduction of period between founding and going public, ailing banking structure and overvalued IPO’s, businesses without business model</td>
<td>Lack of credit assessment through credit institutes, credits were granted to subprime lenders, credit takers could abandon the real estate in case of payment default, credit crunch caused by burst of multiple small bubbles and non-transparent assessment and rating of credit portfolios</td>
<td></td>
</tr>
<tr>
<td>Initial Stage</td>
<td>Speculation about scarce/seldom product</td>
<td>Speculation about future earnings in the South sea</td>
<td>Speculation about potential of new economy</td>
<td>Granting credits to subprime customers without background check</td>
<td></td>
</tr>
<tr>
<td>Growth Stage</td>
<td>Speculation about future value</td>
<td>Monopoly granted by government and implementation of credit structure</td>
<td>Plenty of new companies without business model get funding</td>
<td>Keep liquidity after default credits through other banks</td>
<td></td>
</tr>
<tr>
<td>Burst Stage</td>
<td>Investors realization of overvaluation</td>
<td>Default of instalment payments and overvaluation of companies potential</td>
<td>Potential was not realized, money left the market and companies filed bankruptcy</td>
<td>Credit default on a big scale, lack of liquidity and collateral in the form of real estate</td>
<td></td>
</tr>
</tbody>
</table>
2.2 Justification of the Delphi method
According to Dalkey and Helmer (1962) the Delphi methods purpose is to obtain the most reliable consensus of a group of experts. This is achieved through a series of questionnaires in combination with controlled opinion feedback. The Delphi method it is a widely applied tool for measuring and aiding forecasting and decision making in various disciplines (Rowe & Wright,1999). Furthermore, this method is not intended to challenge statistical models since human judgement is generally inferior to this. It is considered to be a judgement in forecasting where purely statistical frameworks cannot be applied due to their lack of appropriate historical, economic and technical data (Rowe & Wright,1999). The four key features for this method are anonymity, iteration, controlled feedback and the statistical evaluation of the group’s response.

Even though asset bubbles occurred in the past time, no literature was found which focussed on the prediction of such bubbles. Since the rise of those bubbles is assumed to be based on irrational human behaviour rather than rational one it seems logical to apply a theoretical framework that does not rely on statistical and rational input. This, as well as the fact that the focus lies on future developments and trends in the economy makes it only reasonable to apply a framework that does not depend on this kind of data. As a consequence, the Delphi method was chosen to structure the expert opinions in a way that makes it possible to define future trends and predict trends for company valuations.

3. Method
The prior chapter focused on the most important concepts about asset bubbles, how they occur and which methodological approaches can be applied to answer the defined research questions. In this context, the Delphi analysis was discussed, and a justification for its application was presented. The third chapter of the thesis focuses on the execution of the research and will present the necessary information in order to do so. The chapter starts with presenting the applied methods and continues discussing the sampling method, the respondent collection, the data collection methods as well as the data analysis.

3.1 Research methods
To answer the research question, the predefined sub questions need to be answered. To answer the sub questions, two approaches were chosen. The first approach contained the execution of a Delphi study. The overall goal was to aggregate a clear set of indicators with the capability to detect bubble fostering environments, based on the expertise of different industry specialists. Since the research at hand had an exploratory character it was rather difficult to find scientifically relevant papers with the capability to describe the assumed developments in the economy. Therefore, the second approach was an analysis of different financial statements of technology companies that operated during the dot-com bubble and technology companies that operate in the present and can be defined
as unicorns. By gaining a valid knowledge of the matter it was possible to detect indicators, which can be tackled by the results of the ‘Delphi method’ and financial statement analysis.

3.1.1 Delphi method
In order to validate the information gathered through the scientific literature study, a Delphi method was executed. Even though this method was used frequently for a long time there is no exact regulation regarding its execution. Due to this, scholars used it in different ways (Schmidt, 1997). As Linstone and Turoff (1975) described, the Delphi method is not a clear process but rather a method to structure qualitative data to allow a group of individuals deal with a complex problem. Nevertheless, in the context of this thesis, the process presented by Linstone and Turoff (1975) was applied to enlarge its validity. The four phases of this process can be explained as exploration phase, reaching and understanding the group’s view on the issue, exploration and evaluation of significant differences in the group’s statements and the final evaluation, based on the gathered data.

Transferred to this study the stages were executed as follows: First, an interview structure was designed based on the sub questions that were posed to answer the research question (Figure 3). To assure that the sub questions were answered properly, two items were dedicated to sub question one, four items for sub question two, one item for sub question three and five for the last sub question. After the creation of the interview structure different experts were interviewed. Posterior to the evaluation of the data the results were randomly assigned to the participants. During the second round the participants were asked whether they agree with the given answers or not and rank the statements accordingly. After the evaluation of the data it became possible to aggregate an opinion that contains the overall alignment of the participants. The results were used to validate the information gathered through the literature study.

The goal was to create a valid, aggregated opinion based on the consensus of a group of experts. The underlying assumption of this method was that the amount of knowledge a group of individuals possess is greater than the individual knowledge of every member (Rowe, Wright & Bolger, 1991).

3.1.2 Research process
Even though the participants were the most important part of the study, it was also crucial to define the structure for the research. The research at hand included four parts which were equally important. First, the potential participants were contacted via email. Thereafter the procedure, which involved the expert’s participation proceeded via the preferred channel. This process is presented in table two.

Table 2
Activities during the Delphi process
### Pre stage:
- The interviewer contacts the potential participants via email
- The task is explained to the participant
- A meeting/call is scheduled
- The interview structure is send to the participant as well as an informed consent

### Stage one: The interviews
- The process is explained to the participant
- Guide the participant through the interview
- Transcribe the interviews complete

### Stage two: Resulting statements
- Find the most significant statements in the participants reply
- Search for similarities between participants
- Eliminate duplicates
- Establish a final list of statements
- Send the statements to the participants in form of a questionnaire

### Stage three: Ranking of the statements
- Evaluate the received questionnaire
- Rank the statements with the help of the participants answer
- Assess the consensus with the help of Kendall's coefficient of concordance

### 3.1.3 Financial statement analysis
Every publically traded company is forced to publish its financial statements at the end of each year. Through an analysis of the financial statement it became possible to check whether a company generated profits, losses, grew, shrank, invested or planed an exit. The overall goal of this research was to create an effective measurement framework to predict bubbles and prevent them from bursting. Due to this, the statements which were dominant during the interviews and the resulting opinions were directly applied to the financial statement of a company that just filed its initial public offering and is assumed to be overvalued. By doing this it became possible to identify red flags based on historical data, as well as the interview data and apply the learnings to current circumstances.

### 3.2. Respondent selection
For the Delphi method, experience of the participants was crucial. Due to this, only participants were chosen which fall under the definition of an expert. According to Gobet (2015), the definition of the word expert differs between different scientific disciplines. Nevertheless, it can be stated in general that an expert is a person with extensive knowledge and expertise in his field on knowledge (Gobet, 2015). In accordance of this definition experts were chosen based in their historical experience, expertise, current profession and knowledge regarding the topic. To gather this sample, the participants were directly picked from the authors network as well as indirect through second
grade professional contacts. Even though there did not exist a particular number of participants, 10 are recommended to generate valid results (Häder & Häder, 1998). Since the Delphi method was applied in a qualitative manner it is crucial to have a heterogeneous sample of experts. This can be justified by the fact that people with the same mind-set were assumed to give homogenous answers. This was only useful in a research design with the goal to identify correlations between concepts or to confirm parallels. The goal of this study was to aggregate one opinion after intensive discussions over two rounds. To reach this goal, the participants were equally allocated to two groups to enlarge the validity of the research. The first group included experts with a direct connection to technology related companies and their money generating strategies, the other one contained experts with general industry related knowledge. This guarantees that the opinion of specialist with a matching industry background as well as the opinions of specialist with a more general industry background were gathered, aggregated, discussed and evaluated. The assumed consequence was highly valid and results with the capability to support findings from other sections as well as fruitful discussions regarding the different replies given by the experts.

3.3 Respondents

Subsequent to the definition of the selection criteria, the participants needed to be contacted. The participants were of enormous interest to the success of this study since they were able give a dedicated opinion regarding the research question and helped to answer it. Prior to the execution of the research an introductory email was written and sent to 37 experts, 20 of these experts had sophisticated knowledge in the area of investment, 17 had sophisticated knowledge in the area of technology and related companies. After the first contact was made on the 13th of May, nine participants of the investment sample refused to participate, five did not respond and six agreed to participate. One of the six participants was not able to schedule a meeting within August 2017 which led to the exclusion of the participant. Consequently, five participants agreed to the presented terms and took active part in all stages of the research. No further burden took place. Regarding the technology related experts, five refused to participate, three did not respond to the initial email and four of them asked to be excluded from the research after the first stage was completed. Due to the exclusion of four participants from the study, one from the investors and three from the technology related sample, ten interviews were transcribed and evaluated. Due to spatial separation between three of the ten interviews had to be conducted via phone, recorded and transcribed. Nine of the ten participants were male, one female. Seven out of ten were German whereas 2 participants lived in Austria and one in Switzerland. All volunteers included in the research are employed as viewable in table three.

Table 3. List of participants for the Delphi analysis
<table>
<thead>
<tr>
<th>Respondent</th>
<th>Institution</th>
<th>Position</th>
<th>Area of expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 1</td>
<td>Speedinvest</td>
<td>Associate</td>
<td>Seed funding</td>
</tr>
<tr>
<td>Respondent 2</td>
<td>WestTech ventures</td>
<td>Associate</td>
<td>Seed funding</td>
</tr>
<tr>
<td>Respondent 3</td>
<td>Volksbank</td>
<td>Management</td>
<td>Real estate</td>
</tr>
<tr>
<td>Respondent 4</td>
<td>Volksbank</td>
<td>Investment</td>
<td>Seed funding</td>
</tr>
<tr>
<td>Respondent 5</td>
<td>Ringier Digital</td>
<td>VC</td>
<td>Seed funding</td>
</tr>
<tr>
<td>Respondent 6</td>
<td>Superscale</td>
<td>CFO</td>
<td>Finance</td>
</tr>
<tr>
<td>Respondent 7</td>
<td>Concardis</td>
<td>Business</td>
<td>Finance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Development</td>
</tr>
<tr>
<td>Respondent 8</td>
<td>Orderbird AG</td>
<td>Product Manager</td>
<td>Investment</td>
</tr>
<tr>
<td>Respondent 9</td>
<td>Bank of America</td>
<td>Debt purchase</td>
<td>Investment</td>
</tr>
<tr>
<td>Respondent 10</td>
<td>Kumbaja</td>
<td>VC</td>
<td>Business angel</td>
</tr>
</tbody>
</table>

4. Data collection method

4.1 scientific and non-scientific literature review
Even though this research has a rather explorative character the basis was created through already existing data. Secondary data was scanned and evaluated to gain a basic understanding of the topic and find trends and recent developments in the economic environment the research will take place in. Based on this understanding the interview structure was designed and experts which fulfil all criteria were contacted. The gathered literature was neither focussed on the German nor the European market since economic relations did not find place in national boundaries anymore but rather on a worldwide level. Furthermore, the gathered literature was not scientific exclusively since scientific literature had a more retrospective character and did not focus on current economic developments with regard to developments on a company level. Scientific literature mainly focussed on explanations for relevant concepts as well as theoretical frameworks whereas non-scientific literature focussed on current developments. This symbiosis is expected to be the most successful approach. The following sections defined scientific data and non-scientific data.

4.1.1 scientific data
The overall goal of a literature study was to gather scientific information and to find a theoretical basis for the assumptions this research was based on. Since this research focused on the rise of bubbles and the effect those bubbles had, a scientific literature study was crucial. By doing this it became possible to collect data regarding the historical circumstances the led to the creation of economic bubbles in the past. Additionally, this approach enlarged the probability to find valid
indicators for the creation of an economic bubble and a theoretical basis to define a framework eventually. Sources of scientific literature were:

- Scientific papers
- Technology related journals
- Books about relevant theoretical frameworks and historical contents
- Publications in technology related journals
- Publically available financial statements

4.1.2 Non-scientific data
Non-scientific literature was of enormous interest for the success of this study due to its recentness. Recentness in this context meant that the literature, which was included in this study focussed on current developments of the economy and the trends, which were dominating it. They were considered because the lack of scientifically relevant literature on this topic. The goal of this approach was to define success factors and derive a recent set of indicators, which explains how nowadays companies survive. Non-scientific sources will be searched in:

- Technology and business related blogs, websites and magazines
- Online and offline magazines like Forbes Magazine, S&P 500 or business insider
- Presentations of industry experts based in recent industry developments
- Interviews of experts

4.2 Qualitative Delphi method – The procedure
The successful execution of the Delphi analysis required scanning the environment and gather expert opinions. The gathered data made it possible to identify trends and developments in future as well a measurement tool to check which assumed developments were of importance and which were not. Additionally, the interviews were treated as raw data for the second stage of expert interviews.

Prior to the conduction of the interviews a short outline about the procedure was sent to the participants in order to prepare them for the upcoming session. This outline contained, besides a detailed description about what was going to happen, the information that all interviews would be randomized in order to protect the privacy of the participants. As consequence, the institution, position and area of expertise were listed in table three but not the interviewees name.
Before the interview started the participants were positioned in a room with a recording device, a table and two chairs. They were asked for permission to record them during the session to guarantee that no data is missing. After this permission was granted the interview started. One sheet with the different questions (see appendix 3) was handed out to the interviewee, the other one was kept by the interviewer to lead the participant through the interview. The first two questions of the interview can be described as a starting question to get an idea of the expertise of the participant and to create a relaxed atmosphere. Afterwards the remaining ten interview questions were presented. Six of them focussed in current development, four were focussed in events, trends and developments in the future. After the completion of the interview the recording was stopped, the interviewer thanked the respondents for their participation and informed them about the following steps. Concluding, a date for the second interview session was scheduled.

4.3 Data analysis methods
Posterior to the conduction of the interviews the raw data must be evaluated. The first step included to transcribe the data. By transcribing the data after the conduction of the interview it can be guaranteed that all reactions of the interviewee are registered and that the data is complete. No data can be missed out because everything is recorded. The next step can be described as a structuring process. To do so the raw data will be coded with an open coding approach. The goal of this approach was to fully understand the thoughts of a participant. The open coding approach includes three phases. First, all basic schemes must be identified. Basic schemes can be defined as schemes which are prevalent in all interviews. In the second step the schemes are further developed to categories of data. These categories are the sum of the different basic schemes. Concluding, concepts are defined. These concepts are the rephrased categories of the participants to guarantee an absolute anonymous set of data. After the coding is successfully completed and the categories were defined in the form of resulting statements for stage two, the ranked statements must be analysed in the third stage. This analysis was executed with the help of Kendall’s coefficient of concordance. This coefficient makes it possible to measure agreement between the experts of the two groups and thus when a certain amount of agreement is reached (Schmidt, 1997). Siegel & Castellan (1998) stated in this context that the degree of agreement among all rankings can be described as a result of the degree of variations among the sums of ranks. The result of Kendall’s W can range from 0 (perfect disagreement) until one (perfect agreement). Kendall’s coefficient can be calculated as indicated in Figure two.

\[ W = \Sigma_{i=1}^{N} \frac{(R_i - \bar{R})^2}{N(N^2 - 1)} \]
\[ R = \text{Average of all ranks assigned across all statements} \]
\[ R_i = \text{Average rank assigned per statement} \]
\[ N = \text{Number of statements} \]

Figure 2.
Equation for Kendall’s coefficient of concordance

4.4 Item selection
Since the chosen data collection method was a qualitative one it is crucial to define items for the interview with a high degree of relevance and impact. This was accomplished by deducing the items directly from the sub questions of the research question. By doing this it was assured, that there was a red line in the structure of the interview on the one hand and that all sub questions receive the attention they need in to be answered (see figure 3). Based on the main research question, four sub questions were designed. The four sub questions are further divided into items with the ability to answer them properly. The amount of sub questions differs, depending on the degree of complexity the sub question contains. In the end, two items were designed based on sub question one, four items were designed based on sub question two, one item was designed based on sub question three and five items were designed based in sub question four.

Figure 3.
Structure for deduction of items based on the Research question
5. Results
The fourth section of this thesis was separated into four different parts. First, the initial round of the Delphi analysis was addressed. During this round, the 10 respondents were contacted in accordance to prior scheduled meeting, the twelve items were presented to them and the answers were recorded. The second part addressed the second stage of the Delphi analysis. During this stage, the gained information was transcribed, organized and different statements, based on the twelve items were designed. These items were summarized into a questionnaire and sent to the respondent. The third step contains the last stage of the Delphi method wherein the gained information was organized in a final set of statements that were assigned to the items. In the aftermath, the completed questionnaire was evaluated and Kendall’s coefficient was calculated. This coefficient was used to indicate the degree of accordance between the experts. This makes it possible to answer the different sub questions as well as the main research question, respectively. The last part of the result section can be described as financial statement analysis and addresses the comparison between the qualitative outcomes of the Delphi study with hard numbers based on publically available financial statements of unicorns which are assumed to lack a steady business model.

5.1 Delphi analysis – Stage one
The first stage of the Delphi analysis contained the conduction of the interviews and the transcription of the data (Appendix 4). In this first step, the recorded interviews were written down.

5.2 Delphi analysis – Stage two
This section contains the results, based on the interviews which were conducted by the researcher. The respondents were asked to give answer to the presented items and elaborate if they wanted to. The different opinions of the experts of both groups were gathered. Overlapping opinions were combined to create a final set of statements. In the following section, all twelve items will be discussed.

Item 1
*What is your personal definition of an economic bubble?*

The first items focussed on the definition of an economic bubble. The overall goal of this item was to provide answer to the first sub question All the five participants could give a personal definition of this concept. Six out of the ten respondents highlighted that ‘an unrealistic valuation is the main driver for an economic bubble’ (participant 1,5,6,8,9,10). Two participants stated that the ‘discrepancy between real world economy and the financial markets’ is mainly responsible for the rise of a bubble, in part due to ‘lack of opportunities for investments in the market’ (participant 4), in part due to the resulting ‘capital accumulation in particular industries’ without an equivalent
value (participant 3). One participant highlighted the ‘degree of speculation with the prospect on high returns’ and as cause (participant 7). The first item was concluded with participant 2 who described that the demand can not fit the offer anymore and the prices rise’. Subsequent to the second stage, all statements were evaluated and combined to a set of five statements for the third stage.

**Resulting statements:**

1. **High demand that can’t be satisfied through the offering and which is strongly influenced by external factors.** The consequence is, that this demand does not fit the real circumstances.

2. **There is a big capital accumulation without any equivalent value.**

3. **Economic bubble is the overvaluation of a company value or a company in general compared to the actual value or the actual cash flow of the company.**

4. **According to my definition there is a bubble if the valuation of a company stands in no relation to the fundamental value of the produced good anymore.**

5. **Discrepancy between real economy and valuation benchmarking.**

**Item 2**

*Can you think of indicators with the ability to create a bubble?*

The second item focussed itself on indicators which could be responsible for a bubble to arise. Indicators in this context means read flags which can be found in every crisis and contain, due to this a certain degree of predictability. Furthermore the goal of item two is to answer the first sub question. Four out of the ten participants mentioned that it is not possible to define specific indicators since different crisis had different indicators. Participant two stated in this ‘bubbles differ and have not so much in common. Almost all indicators were defined afterwards’ which found support by participant six who stated that ‘Bubbles are like traffic accidents with planes. ‘There is no such thing as one dominant factor, but there are several small factors which interplay leads to the rise and burst of bubbles. Bubbles differ in nature’. The rest of the sample could define at least one indicator. Even though the participants were not able to define a precise set of indicators, seven participants out of ten acknowledged some factors which could have the potential to be an indicator. Two out of the ten (participant 1 & 3) mentioned that the ‘lack of opportunities’ and the resulting hazardous investment behaviour is mainly responsible for bubble building effects. The increasing amount of companies who enter the market were also mentioned in this context twice (participant 2 & 3) Participant four and ten defined the massive increase in the valuation of companies without changing performance indicators as one cause. Greed of bankers and companies was defined as
indictor by one participant (participant 7), a ‘low interest rate due to a lack of offerings’ was mentioned by participant five. After all statements were gathered with the help of the data gathered in the second stage of the Delphi method, they were composed into a set of seven statements for the third stage.

**Resulting statements:**

1. More market participants enter the market.
2. Rising valuations as well as the increasing amount of money.
3. Trend following model - Enough people who think that the future will look bright for them.
4. Validations increase massive within without a change of the important performance indicators.
5. It is difficult to define these indicators since every crisis is differs in its nature.
6. Lack of alternative investment opportunities - A lot of liquidity caused by stupid money.
7. Massive over valuation of future potential, access to capital, liquidity

**Item 3**

*How would you estimate the evaluation of technology related companies?*

The third item focussed on the valuation process of recently founded companies. The goal of this item was to assess in how far the valuations are realistic and if not what could be the reasons for such an unrealistic behaviour. Item three, together with item four, five and six sought to provide answer to the second sub question After the conduction of the interviews it came out that five out of the ten participants identified the investment behaviour as unrealistic. Three of them were in the investment sample group (Participant 1, 3 & 4) and 2 of them in the tech expert group (Participant 6 & 9). On the other hand, five out of the ten were determined, that the investments were realistic. Three of these group (Participant 7, 8 & 10) were out of the tech expert sample and two from the investment expert group (Participant 2 & 5). Reasons which support that the investment behaviour was realistic were that compared to Europe the investments are less conservative and more optimistic (Participant 1), ‘the valuation is focussed on the hope or believe, that a hype can be created around the product or company’ (Participant 3), the investors are willing to follow a trend even though they don’t understand the technology they are investing in (Participant 4), the valuation is simply a bet whether a company manage to ‘dominate and monetize the market or not’ and that the money right now is cheap and stupid (Participant 9). On the contrary it was stated that it is not possible to give a generic statement because the different factors like the business model, the industry of the company and the structure of the company must be taken into consideration.
(Participant 2, 7, 8 & 9). Concluding participant five recognized, that the several factors like risk assessment, the targeted return of investment as well as the due diligence within the company support the thesis that the valuations are realistic. Later the comments, given by the participants were gathered and summarized into a new set of six statements for the third stage.

**Resulting statements:**

1. Overvalued. Investors follow the hype rather than executing due diligence.
2. Overvalued. The valuation of companies is simply a bet on future developments.
3. Overvalued. The strength and funding of competitors is not predictable. Nowadays, new entrant can become market leader and force an incumbent player into bankruptcy.
4. Overvalued. There is no real alternative existent, except stocks and stock similar investments.
5. It depends. Some investments are smart, based on analysis but still fail to generate the desired returns. Some investments are stupid, based on the crowds’ investment behaviour and they generate the desired return eventually. It is not black or white.
6. Overvalued. You must consider a lot of different components when it comes to value definition. Nowadays companies often neglect these components. Since a lot of investors don’t fully understand the technology they oversee the forgotten components but still invest.

**Item 4**

*In how far would you describe the current investment behaviour in technology related companies as healthy/sustainable?*

The fourth statement targeted the degree of sustainability a company has regarding the investment behaviour. Six out of the ten participants defined the investment behaviour as unsustainable (Participant 1, 2, 3, 4, 5 & 10), which includes all investment experts and one technology expert. Reasons for this response were ‘too much stupid money’ (participant 1), the crowd who is ‘willing to put money in it as long as there is growth’ (participant 2), trend following investors (participant 3, the chance to realize returns depending on the time the investment was made (participant 4), the increase in speed regarding the life cycle of a company (participant 5) and the lack of knowledge about the technology the investor put money in (participant 10). Opposed by the rest of the sample, reasons which support the sustainability are the number of professional investors who use highly sophisticated methods and tools to create a rating (participant 9). Participant six seven and eight stated that the degree of sustainability depends on the lenders investment behaviour and on the
companies’ ability to deliver on schedule. The reactions of the participants on the fourth item were revised and rewritten into a new set of six statements for the third stage.

**Resulting statements:**

1. Unsustainable. It always depends on the growth. If there is growth there will be someone who want to put money in it.
2. Unsustainable due to inadequate due diligence, lack of technical expertise on the auditing and investors site.
3. Neither. There is no one fits all solution. Focus on the sustainability of the business model.
4. Unsustainable. Right now, everybody invests into venture capital. After the hype, there will be a consolidation.
5. Neither. The kind of investor you work with is important to give a statement regarding the sustainability.
6. Neither. Companies prosper, get acquired, become market leader or fail. Most of them plan an exit or a sustainable growth but there are too many (external) factors that can influence these intentions.

**Item 5**

*Does this investment behaviour exist in technology related companies exclusively?*

Item five has the overall goal to define whether the assumed hazardous investment behavior only occurs in technology related industries or not. Fifty per cent of the sample denied that this phenomenon is technology industry exclusive, two (participant 1 & 5) were in the investment expert group and two in the technology expert group (6, 8 & 9). They argue that even though technology is a sector which is important right now, the current behavior also happened in other industries (participant 1, 8 & 9). This is supported by participant five who stated that basically the whole service sector is affected as well as participant six who explains that it is more about ‘the destruction of old paradigms’ than the industry itself. The remaining fifty per cent of the sample describe the phenomenon as industry exclusive, three out of the investment expert sample (participant 2, 3 & 4) and two out of the technology expert group (participant 7 & 10). They clarified that technology right now has more potential due to high scalability and a better multiple after the exit (participant 2), the small initial investment and the fast growth compared to manufacturing (participant 3), the upholding trend of digitization (participant 4), the amount of technology related companies who ask for funding compared to manufacturing companies (participant 7) and the lack of technology affine programmers in the founding team which causes that economic due diligence s
executed rather than an technologic one (participant 10). Concluding, five resulting statements were formulized for the second round in accordance with the raw data from round one.

Resulting statements:

1. Yes, it happens almost exclusively in technology companies because the defined trends only require a one-time investment and contain indefinite scalability.
2. No. Probably it is an industry overlapping phenomenon.
3. No. I would say there are always development in industries. Those destructive mechanisms reach from one industry over to another one. So, it is not technology specific but rather focussed on the destruction and market entering. how bigger the destruction and the related chance to enter a market how more fantasy is put into the valuation.
4. Yes. Due to a lacking technology expertise in nowadays funding teams the correct can’t be defined by them nor the investors correctly.
5. Yes. Technology drifted away from all economical mechanisms. Since there is no real market mechanism that sanctions bad technology.

Item 6

Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Item six tries to define whether high quality technology is the reason for the high valuations or if the technology is only and enabling factor like the new economy at the end of the 1990´s. This is important because gives a statement about the nature of the investment behaviour. They stated that technology has more options than other trends had (participant 1), more opportunities regarding the scalability, more efficient ways to structure the human resource and (participant 4) and the fact that technology is an enabling factor for small companies who work in niches, created by slow and incumbent companies (participant 7). Five participant out of the sample answered, that technology is an enabling trend, four of these people were investment experts (participant 1,2,4 & 5), one participant was an technology expert (participant 6). On the other hand one participant of the investment group answered, that technology can be seen as a justification for high valuations because it is a trend right now. Four investment experts (participant 7,8,9 & 10) supported this answer. Reasons for these statements were that only 10 per cent invest smart the other 90% follow (participant 4), technology is uncertain and uncertainty gives high returns on an investment (participant 7), people love technology and are willing to pay a lot for a new trend (participant 8), it does not matter which technology it is but
people get crazy because it is new and they love it (participant 9) and the investors false beliefs in the value of the company. The gathered raw data was revised and reformulated into five resulting statements which were presented during the third stage.

**Resulting statements:**

1. Yes. It is an enabler since it is easier to scale up, easier to improve than manufacturing (updates) and bares more potential (simple and cheap device with free software).
2. Yes. High quality technology is the fundament and if the maintenance costs are low.
3. Yes. Technology is an important driver that brings lot of uncertainty. High uncertainty brings high returns.
4. Yes. It is much easier to translate an app into another language than to build up a production plant on another continent.
5. No. People don’t understand the product they sell or invest in. The consequence is, that they don’t assess based their knowledge but based on the other investors behaviour.

**Item 7**

*Would you say that wealthy investors and the global economy encourage the tendency to overvalue?*

Item seven asked whether there is a general attitude of actors in the global economy to overvalue. The overall goal of this question was answer sub question four. Four out of the ten participants (participant 3, 7, 8 & 10), three in the technology expert group, one in the investment expert group, stated that it would be understandable for them if certain actors in the global economy would foster the tendency to overvalue. They mentioned in this context that investors try to initiate a trend a lot of people will follow, investors would manipulate if they had enough power (participant 7), investors would use to create a trend for their own benefit or that ‘they collect money, invest and leave the bubble before the bubble bursts. Afterwards they collect the pieces’. On the contrary, six out of the ten participants (participant 1,2,4,5,6 & 9) negated the question with the following justifications: People want the best for the society, Investors only want to give a head start to their own investments by funding them, investors try to keep the price down if they enter the market and would not plan further investments if they already own shares, investors only give opinions but don’t manipulate, they wont be interested because nobody knows when the bubble bursts and because investors rather adjust to changes in the stock market than actively facilitating them. After the conduction of the different opinions with the help of the interview, six statements were formulated for the third stage.
**Resulting statements:**

1. No. The typical investors are not interested in increasing the valuation if they are investing money in it by themselves. Only if they already own shares and want them to increase their value.

2. No. The Investors goal is to give a head start through a major investment to gain a competitive advantage rather than a market manipulation.

3. Yes. I think they can cause a share price fluctuation by themselves to create a trend following behaviour.

4. No. There is nobody who really fosters the bubble because the end of the bubble is difficult to foresee.

5. No. Since their own money is often on the line I wouldn’t think of a trend of big investors to overvalue.

6. Yes, these people try to pump the bubble up as far as possible with a little equity or own money. Often, they collect money, invest and leave the bubble before the bubble bursts.

**Item 8**

*Can you think of an industry branch you would invest in?*

Item eight is the last item of the second part of the first round and provides resolution for the fourth sub question. This item closes the part which focusses on present circumstances and creates the transition to the last part which focussed on the future. The last item therefore focusses on industries which are currently interesting to invest in. Nine out of ten participants (participant 1,2,4,5,6,7,8,9 & 10) indicated that they would invest in technology. TO further specify these statements they mentioned the industry branches which bare, right now most potential. Due to this, the infrastructure branch which includes Internet Of Things (smart cities & smart home), Fintech, Process improvements (Human resources), Augmented reality, virtual reality and artificial intelligence as well as the Health industry branch were mentioned repeatedly. Participant five referred to technology in general without specifying his statement. Respondent three who was in the investment expert group indicated a more anticyclical investment method and would invest in dividend yield stocks of big companies. The generated raw data was revised and boiled down to six statements for the third stage.
Resulting statements:

1. Smart City, Smart Home. In general, IOT.
2. E-health, Medicine and Biotech.
3. HR (Digitization of Human Resource management).
4. AI, Machine Learning.
5. Alternative Energy.
6. Privacy.

Item 9

What effect would a burst bubble have on society and economy?

The ninth item can be seen as an introduction towards a more future oriented part of the interview and the overall goal of the Delphi method. The goal of this item is to give answer to sub question four. Nine out of ten participants stated that the burst of a bubble would have negative consequences to the economy at least for a certain amount of time (participant 1, 2, 3, 4, 5, 6, 7, 8 & 9). Respondent one, two, four, five, eight and nine agreed, that the consequence would be that companies without a steady business model will go bankrupt because money will actively leave the market. The consequence would be an increasing unemployment rate. Participant three and six described a process of redistribution what includes that investors who left the bubble before the burst would earn the money the late investors lose. Concluding, participant seven described that ‘The banks, the government and the investment behavior will adapt’ to the new circumstances and will move on afterwards. A set of resulting statements which was presented in stage three was created. This set contains four statements and includes the comments and opinions from stage two.

Resulting statements:

1. A counter-reaction. Capital would actively leave the market. Only the high potential start-ups will survive.
2. Bankruptcy, unemployment, depression and consolidation of the market.
3. Redistribution.

Item 10

Can you think of mechanisms to protect society from another bubble?

This item focussed on mechanisms which can be implemented in order to prevent society from the rise and the burst of a bubble in future. The overall goal of this item was to support a final
assessment whether to accept or reject sub question number three. Four out of the ten respondents, one out of the investment expert group and four out of the technology expert group, replied that it would be possible to create and implement such mechanisms (Participant 4, 5, 7 & 9). Possible regulation mechanisms would be a ‘limited amount of capital is invested in high risk capital. A higher regulation of investment funds by governmental instances.’ (Respondent 4), a rating agencies alike process, [...] compare it a little bit to the rating process we as a bank use. The rating process we use is more or less like a black box. During this process, different indicators are gathered and at the end of the day there is an outcome. The goal is to define the probability of a credit default with more than 70%. If this figure is wrong we must adjust until it works out [...] (Participant 5), transparent communication of differences in national and international company reporting (Participant 7) or a self-protection mechanism which requires a minimum amount of capital that can be lost without bankruptcy. On the other hand, six out of the ten participants mentioned that it will not be possible to implement such a mechanism. Participant one mentioned that the bubbles are different in nature and can not be defined so easily, due to this, it is not possible to anticipate correctly based on past events. This is supported by participant two who states that ‘it is not possible to define one bullet proof mechanism’ as well as participant eight who stated that even though there were regulations after crisis in past, people always found ways to bypass them. Even though participant three acknowledges that a fixed base rate would create alternative investment opportunities, he also mentioned that society tends to forget after a few years and makes the same failures again. Concluding, participant ten recognized that ‘It is definitely possible, but it is not wanted. Not even desired because people must face reality. That is something most people don’t want to do. If somebody promises 5% interest rate on your savings, people don’t want to think about the real economy meaning of this’. After the conduction of the experts’ opinions a set of five statements was created for the third stage.

**Resulting statements:**

1. No. Upcoming industries don’t have historic data what makes it difficult to create mechanisms.
2. No, and we did not learn from past performance.
3. Yes. Regulation and maximum amounts of risk capital investments.
4. Yes. Fixed interest rates to prevent funds from getting forced into risk investments.
5. Yes. Transparency regarding investments made. Overvaluations and bubbles don’t grow around one company but around an eco-system.
Item 11

*Do you think that financial markets would be interested to prevent bubbles from rising in future?*

The penultimate statement has the overall goal to define whether financial markets are interested in the prevention of bubbles to arise or not. Furthermore, its propose is to understand the perception experts have on the financial markets and to answer sub question four. The replies, received by the participants were manifold. Five out of the ten participants, three out of the investment expert group (participant 1, 2 & 5) and two out of the technology expert group (participant 7 & 8), stated that financial markets in general would be interested in preventing bubbles to rise. They justified there answer with the fact that bubbles ‘bubbles are inefficient since everything you build will be destructed. In case you were in a situation of constant growth, then this would not happen’ (participant 1), the negative effect a bubble has on society (participant 2), money which is leaving the markets and investments which will not be made (participant 5 & 7) and the advantages of a more sustainable growth (participant 8).

Subsequently, participant three and four stated that it is not about the willingness to prevent a bubble from rising or not but about bubbles as a logic consequence of the financial markets and the purifying effects they have. Concluding, participant six, nine and ten stated that financial markets are not interested in preventing a bubble from rising. Their explanation was that ‘financial markets want movement’ (participant 6), ‘[…]everybody would love to see the stock price index increasing on regular basis. But this is not happening because humans want more than other humans. Due to this it doesn’t matter if it takes seven years or longer. There will always be wave movements caused by human nature. There will always be human who think they are smarter than everybody else.’ (Participant 9) and the fact that ‘people don’t want to listen to the truth especially if they are not comfortable. And there are people who are willing to do this. So, it is not a bank who wants bubbles but rather a customer who wants to buy products which are not realistic’. Based on the prior conducted interviews it was possible to summarize the overlapping statements and create a new set for the third stage of the Delphi analysis.

**Resulting statements:**

1. Yes. Bubbles aren’t useful for them. Investors leave markets and promising companies are not funded.
2. No. I think this is necessary for the regulation of the financial markets.
3. Yes. Bubbles are inefficient since everything you build will be destructed. In phase of constant growth, this would not happen.
4. No. crisis brings back normal market conditions. When a bubble bursts there will be always companies who go bankrupt and others which can reposition themselves.


6. No. it is not a bank who wants bubbles but rather a customer who wants to extraordinary returns. Customers don’t want to know how their investment increases but that there is an increase.

Item 12

*What would you think is the next enabling factor/ trend for high valuation?*

The last item was designed for two purposes. On the one hand, it was designed to define the next enabling factor in accordance with two groups pf experts in different fields of knowledge, on the other hand it was designed as a double check for item eight. This makes it possible to control whether the experts think that technology is a short-term hype which will be over in near future and possibly causes a bubble or a long-lasting factor. After the conduction of the interviews it came forward that all ten participants agreed that all participants thought that technology will stay ubiquitous in the next years with an increasing tendency. Participant one mentioned that we just reached the peak of the iceberg and we don’t even understand the full potential of what we can achieved. This was justified with the limited imaginary capacity of society based on their current knowledge about technology and its opportunities (‘People going to the opera in the year 2000’ and people fly with cars and everything but still wear the same cloth and still go to the opera’). This was supported by participant six who described technology as comparable to crude oil in past and participant three who referred to technology as ‘the big thing even in future’. Participant two, six and seven described possible application fields which can become very important. In this context augmented & virtual reality was mentioned under more for learning and guiding purposes. Furthermore, robotics and Nanotechnology as enabler for internet of things and machine learning application were acknowledged repeatedly by participant four and ten. Concluding, participant five and nine declared health as the next big thing since ’nobody want to die anymore’ (participant 9). Resulted from the raw data a set of seven statements was prepared for the third stage.
Resulting statements:

1. Decentralized computing.
2. Autonomous intelligence
3. Virtual reality & Augmented Reality
4. Alternative resources
5. Technology. technology is crude oil of the future
6. Space due to overpopulation
7. Biotech and Medicine

5.3 Delphi analysis – Stage three
After the evaluation of the raw data in stage two, the data gathered with the help of the questionnaire during the third stage was evaluated. In this stage, participants were asked to read through the questionnaire and rank the provided statements based on their importance. They were asked to assign the lowest number (1) for the most important statement and the ascending numbers to the less important statements respectively.

Table 4
Item 1: What is your personal definition of an economic bubble?

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Table 5
Item 2: Can you think of indicators with the ability to create a bubble?

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Table 6
Item 3: How would you estimate the evaluation of technology related companies?

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### Table 7
*Item 4: In how far would you describe the current investment behaviour in technology related companies as healthy/sustainable?*

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### Table 8
*Item 5: Does this investment behaviour exist in technology related companies exclusively?*

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Item 6: Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

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Table 10

Item 7: Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

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Table 11
*Item 8: Can you think of an industry branch you would invest in?*

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\[ R_i \]
| 27 | 23 | 38 | 16 | 54 | 52 |

\[ \bar{R}_i \]
| 2.7 | 2.3 | 3.8 | 1.6 | 5.4 | 5.2 |

Table 12
*Item 9: What effect would a burst bubble have on society and economy?*

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\[ R_i \]
| 16 | 26 | 19 | 37 |

\[ \bar{R}_i \]
| 1.6 | 2.6 | 1.9 | 3.7 |
**Table 13**

*Item 10: Can you think of mechanisms to protect society from another bubble?*

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**Table 14**

*Item 11: Do you think that financial markets would be interested to prevent bubbles from rising in future?*

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Table 15
*Item 12: What would you think is the next enabling factor/trend for high valuation?*

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5.4 Conclusion of the Delphi analysis

Posterior to the evaluation of the questionnaires, Kendall’s coefficient of concordance was calculated for the twelve items. It became clear that not all experts came to a common opinion about all items. Due to this item four (W= 0.26) and five (W= 0.25) showed only a slight correlation. Item one (W= 0.32), three (W= 0.32), six (W= 0.41) and seven (W= 0.33) indicated a slightly significant value. Significant values with regard to the accordance between the two groups of experts were found at item two (W= 0.50), eight (W= 0.70), nine (W= 0.52), ten (W= 0.52), eleven (W=0.54) and twelve (W= 0.71). These number indicate that even if the overlapping opinions differ between the items there is a common ground between technology related experts and investment related experts. The Kendall’s coefficient of concordance as well as the mean score and the item with the highest overlap in are listed in table 15.

Table 16
*Aggregation of the results*

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<th>Statement</th>
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<td>Economic bubble is the overvaluation of a company value or a company in general compared to the actual value or the actual cash flow of the company</td>
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<td>Item 2</td>
<td>0.50</td>
<td>1.5</td>
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<td>Item</td>
<td>Probability</td>
<td>Value</td>
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<td></td>
<td><strong>liquidity</strong></td>
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<td>Overvalued. You must consider a lot of different components when it comes to value definition. Nowadays companies often neglect these components. Since a lot of investors don’t fully understand the technology they oversee the forgotten components but still invest.</td>
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</tr>
<tr>
<td>4</td>
<td>0.26</td>
<td>2.4</td>
<td></td>
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<tr>
<td></td>
<td>Unsustainable. Right now, everybody invests into venture capital. After the hype, there will be a consolidation.</td>
<td></td>
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<tr>
<td>5</td>
<td>0.25</td>
<td>2.3</td>
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<td></td>
<td>No. I would say there are always development in industries. Those destructive mechanisms reach from one industry over to another one. So, it is not technology specific but rather focussed on the destruction and market entering. how bigger the destruction and the related chance to enter a market how more fantasy is put into the valuation.</td>
<td></td>
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<tr>
<td>6</td>
<td>0.41</td>
<td>1.7</td>
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<td></td>
<td>Yes. It is an enabler since it is easier to scale up, easier to improve than manufacturing (updates) and bares more potential (simple and cheap device with free software).</td>
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<tr>
<td>7</td>
<td>0.33</td>
<td>2.5</td>
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<td></td>
<td>No. There is nobody who really fosters the bubble because the end of the bubble is difficult to foresee.</td>
<td></td>
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<tr>
<td>8</td>
<td>0.70</td>
<td>1.6</td>
<td></td>
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<tr>
<td></td>
<td>AI, Machine Learning.</td>
<td></td>
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<tr>
<td>9</td>
<td>0.52</td>
<td>1.6</td>
<td></td>
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<td></td>
<td>A counter- reaction. Capital would actively leave the market. Only the high potential start-ups will survive.</td>
<td></td>
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<tr>
<td>10</td>
<td>0.52</td>
<td>1.7</td>
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<td></td>
<td>Yes. Transparency regarding investments made. Overvaluations and bubbles don’t grow around one company but around an eco-system.</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>0.54</td>
<td>2.0</td>
<td></td>
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<td></td>
<td>No. crisis brings back normal market conditions. When a bubble bursts there will be always companies who go bankrupt and others which can reposition themselves.</td>
<td></td>
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<tr>
<td>12</td>
<td>0.71</td>
<td>1.8</td>
<td></td>
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<td></td>
<td>Autonomous intelligence</td>
<td></td>
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5.5 Financial statement analysis

Financial statements can be viewed as the most interesting parts of a company because it shows the financial reality a company lives in. In order to check whether the findings of the Delphi analysis are in accordance with the hard numbers a company has this analysis will be executed. Since only publicly traded companies must reveal their financial statements in order to display a certain amount of transparency, only these companies can be analysed in the following section. The financial statement analysis will contain two parts. First, an analysis of the financial statement of the company will be presented. Afterwards, the conducted data will be used to check the correctness of the Delphi method.

Since this piece of work focusses in technology related companies that must be publically traded to disclose their financial statement, financial statements of Snap Inc. are chosen. Snap Inc. provides an app for smartphones which is called Snapchat. Besides texts and pictures which are erased after 30 seconds, Snapchat also provides different lenses (based on augmented reality technology) which cover the photographed person. The company was founded in 2011, launched the ‘Spectacles’ which are perfectly tailored glasses for the use of the app in 2016 and went public with an IPO of 34 billion dollars in the first quartile of 2017. Since major changes regarding the structure, the value and the product portfolio took place in 2016 and 2017 these years will be in the focus of the financial analysis.

Viewable in the income statement of Snap Inc. the Selling/General/Administrative expenses rose tremendously during the fourth quarter of 2016 and the first quarter of 2017. Since Snap Inc. did not have a positive profit it can be assumed that major parts of the increased budget can be allocated to selling expenses. These include under more marketing and selling activities. This is understandable since Snap. Inc. prepared its IPO for the first quartile of 2017. Also, the expenditures for Research & Design increased by 1232,67 %. This is of enormous interest, especially because the prior quarters did not show this increase although the first piece of hardware hit the market on 10.11.2016. (C\net, 2016). Concluding this section, it can be stated, that Snap. Inc. managed to increase its budget tremendously compared to the last quartile without an increase in revenues or other revenue generating channels. As consequence, the net income decreased from negative 169.94 M$ to negative 2,208.84 M$ (1300%).

The massive increase in expenditures can also be viewed in the cash flow statement. The cash flow statement starts with a negative cash flow of 2,208.84 million dollars which can be explained by the accumulation of negative cash flows during the previous quarters. Even though the expenditures from operating activities did not increase tremendously, Snap Inc. did not manage to reduce the accumulated losses. Only in the last quartile Snap Inc. increased its cash from operating activities
which was mainly caused by the increase in non-cash items. Non-cash items which are not yet realized earnings, increased by (6092,30%) 1961,28 million dollars and can be explained by the initial public offering (IPO) of Snap Inc. on the 1st of March (CNBC, 2017). These earnings describe the money which is assumed to be earned by stocks, sold over par value. Although these earnings reduced the losses, high expenditures for other investing cash flow items (996,80 million dollars) caused a negative cash flow from investing activities (1014,80 million dollars). Snap Inc. has its first positive cash flow statement in the first quarter of 2017 due to its IPO what can be deduced from the massive increase of Stock issuance by 131,71 % (2.658,39 million dollars). Concluding this section, it can be stated that the Snap Inc.’s cash flow only become positive due to the share emission and the bet that these shares can be sold for more than its par value.

The final section of the financial statement analysis focussed on Snap Inc.’s balance sheet. The amount of current assets the company holds rose by 193,5 % (3,463.21 million dollars) which can be illustrated by the increase in cash and short-term investments (3,242.56 million dollars). The short-term investments are investments which can be capitalized within one year. In the case of Snap Inc., the mentioned increase is caused by share the company hold which can be converted or sold within in twelve month. Besides the increase in short term investment, it is noticeable, that the equity is strengthened by the increase additional paid in capital of 7,157.59 which can be explained by the price that was paid for the distributed shares over par. On the other hand, the equity is weakened by the increase of retained earnings from negative 1,207.86 to negative 3,420.44 (283 %) wherefore the net losses can be hold responsible.

Even though snap Inc. as a growing software company presents a relative linear growth until its IPO in March it occurs to be highly speculative. All the financial statements clearly showed that the company is not profitable right now what can be viewed by the negative gross profit (-13,71 million dollars) and the high SGA expenditures for more than 1859 (03/02/2017) employees (Nasdaq, 2017). Furthermore Snap Inc. owns no property except the source code which only makes a small portion of the company assets and is in part reflected by the goodwill which is displayed in the balance sheet. Concluding this section, it occurs that snap chat got lucky due to the positive beliefs the investors had regarding its future, but will generate massive losses if the expectations are not met. Several external factors like the competitors’ behaviour (Facebook or a new app) as well as the boom of another trend can massively damage the companies’ reputation and the share price eventually. Especially the fact that Snap. Inc. has no tangible assets that can be liquidated or any other protection mechanism to protect the company if the any internal or external factor negatively impacts the company. Snap. Inc.’s share price started at 17 dollars a share, rose until almost 25 dollars a share after its first day of trading, and fell to 11,17 dollars a share (27/07/2017) what displays the unpredictability of this fast-changing environment. Due to this share price reduction, it
occurs that there are mechanisms that constantly revaluate the value of a company’s share. Nevertheless, a successfully executed IPO as well as the share price at the end of the first day still reflect the risky investment behaviour of investors. This clearly indicates that a bubble can still be blown up in this industry. Even though the behaviour occurs to became more rational compared to the dot com bubble during the 1990’s since technology as a trend only started off there and will continue to grow and become ubiquitous for society in future. If this is the case, a bursting bubble will cause industry overlapping damage with the potential to surpass the previous crises.

6. Conclusion & Discussion
In the final part of the thesis, two major parts will be discussed. On the one hand the discussion section which includes the answering of the research questions as well as the Interpretation for the future of technology related companies based on Delphi method and the financial statement analysis. Furthermore, managerial implications as well as strength and weaknesses of the research and possible future research examined will be examined.

The second part, the conclusion will contain a final statement with the overall purpose to wrap the most important findings up.

6.1 Answering the Research question & sub questions
In this section of the discussion the research question as well as the four prior defined sub questions will be discussed and answered. In order to answer the main research question properly it will be accepted or rejected at the close, based on the sub question. The other sub questions will be answered, starting with sub question one and continue ascending.

In how far will already familiar indicators influence the encouragement of the global economy to create a bubble?

The first sub question focused on indicators with the ability to pump up a bubble. After the conduction of the interviews, the experts agreed that a bubble on a company level can be described as the overvaluation of a companies’ value or the follows ‘Economic bubble is the overvaluation of a company value or a company in general compared to the actual value or the actual cash flow of the company’. The sum of these overvalued companies within one industry in turn can cause an industry wide bubble effect. Even though Kendall’s W is relatively low (0,31) regarding the accordance of the experts definition on a company level, the definition clearly matches with most industry wide definitions. After the explanation of this concept it was crucial to define indicators. Even though it was mentioned several times during the initial stage of the data collection that different bubbles had different indicators, mechanisms and dynamics, the experts agreed on a set of
indicators which were present during every crisis in the last years. These indicators were ‘Massive over valuation of future potential, access to capital, liquidity’. The relation between the lack of alternatives which was mentioned frequently by experts of both groups can be seen as cause and effect. Due to the unprofitable returns on most investment opportunities a lot of people become investors. Even people without sophisticated knowledge can follow the trend, based on the idea to be the first mover but follow the trend eventually. The access to capital due to low interest rates and the governmental need to boost the consumption and reduce recession makes it possible for investors of all kinds and skills to access money and pump up the valuation by doing this. Keeping this in mind, these factors were not the cause for every bubble which was also mentioned by the experts. The real estate bubble for example had a much more complicated dynamic due to bundling of subprime credits with the goal to achieve a triple A ranking and much more other factors. Nevertheless, the defined set of indicators was also present since low interest rates, easy access to money and blind trust towards banks and the resulting share purchases pumped up the bubbles. Concluding, even if different bubbles arose based on different causes, it can be stated that at least some indicators did not change during the last bubbles and that society tends to ignore the acquired knowledge after a few years and goes back to risk capital investments due to high returns. These findings can be supported by the financial statement analysis of Snap Inc. The IPO of the company found place even though there is no business model or any prediction regarding the break-even point. Nevertheless, shares were bought on a big scale, based on the opinion of rating agencies and expert which in turn led to a share price increase of 40%. This deviation between the face value and the selling price supports the assumption that there are familiar indicators that influence the encouragement of the global economy to create a bubble. Sub question one can be answered with yes.

To what extent foster the current investments in technology driven companies an asset bubble?

Sustainability in the context of this research means whether companies which are founded nowadays with a focus of technology will be capable to capitalize on their business model, grow and prosper, break even and become market leader or at least leader in the niche they are operating in. Furthermore, this term contains whether the company will be able to compensate their investors with the prior defined multiple of the original investment made? To answer these research question, four items were designed. These items asked how investors would assess the current investment behaviour, if the investment behaviour only counts for technology related companies, if the investment behaviour is sustainable and whether it is the technology that causes the height of the valuation or if it is rather and enabler to justify the height of the investment made? Regarding the assessment of the investment behaviour it became clear that a lot of investors did not fully
understand the technology what resulted in misinterpretation of the potential and overvaluation eventually. Even though the accordance was relatively weak between the experts (W = 0.31) regarding the reasons for the overvalued status quo, five out of six statements which resulted from stage two described an overvaluation in technology related companies. Both findings are in line with the financial analysis which clearly indicate that investors purchased shares of a company with negative income and unforeseeable potential. Regarding the degree of sustainability three out of four final statements described an unsustainable behaviour. This was also mirrored by the statement with the most accordance between the experts of both groups (W= 0.26) which acknowledged that ‘[..] everybody invests into venture capital. After the hype, there will be a consolidation’. Concluding, the experts agreed with slight accordance (W = 0,25), that the investment behaviour is not technology related exclusively but that the disruptive environment industries operate in and the resulting destruction of markets is more important. Nevertheless, they agreed (W = 0.41) that technology is enabler ‘[..]since it is easier to scale up, easier to improve than manufacturing (updates) and bares more potential (simple and cheap device with free software)’. The fact that technology related companies are right now in the most interesting industry with enormous enabling potential on the one hand but unsophisticated investors who are not capable to execute adequate due diligence on the other hand it occurs that the investment behaviour right now can be described as unsustainable. These results can be supported by the analysis of financial statement which clearly indicates that the company difficult financial situation. A negative net income of 2,208.84 M$ as well as embellished cash flow through an increase in unrealized earnings (1961,28 M$) are prominent in this context. These figures indicate that Snap. Inc. mainly went public to finance their operations rather than offering shares of a functioning company. Due to this the second sub question can be denied, the current investment behaviour is not sustainable and will not be as long as technology is the enabling factor or changed in investment opportunities occur.

*How strong is the predictability of emerging technology bubbles?*

Sub question three focusses on the degree of predictably of asset bubbles. Item 10 was mainly concerned with this question. During the second phase, it came forward that three out of the five experts had the feeling that it is possible to predict a bubble before its burst. This could be possible through the already mentioned indicators as well as more regulations by the government. Experts of both sides agreed (W = 0,52), that transparency is most important in this context since bubbles do not arise around a company but rather around an eco-system. Due to this fact is understandable that if companies, even those who are not publically traded should provide full disclosure. This would present a more moderate picture of the company that a worth to invest in. If Snap Inc. is taken as an example we can see that they are not profitable nor did they figure out how to generate money from
its customer base that is young and unwilling to pay or how to defeat competitors with a much broader portfolio like Facebook. The transparency which is only provided since Snap Inc.’s IPO discourage investors who can not afford big losses of high risk investments what in turn reduces the stupid money in the market and hinders the bubble from getting pumped up. In order to answer the research question, it can be concluded that there is a certain degree of predictability of technology related bubbles which can be enlarged by certain theoretical mechanisms.

*Will the global economy encourage a change of the status quo?*

After the definition of the status quo, it was crucial for the success of this research to estimate in how far the current circumstances will change in future. Due to this fact five time were designed focusing on whether rich investors are capable to provoke the rise of a bubble, industry branches which will be of interest in future, the effects of a bursting bubble, the interest of financial markets to prevent bubbles from rising and what the next enabling factor will be?

Regarding investors who actively participate in pumping up a bubble the experts agreed (W = 0,33) that bubbles have negative consequences for all parties and that its most likely that investors try to capitalize on a bubble if it occurs rather than actively fostering it. The already mentioned consequences would be severe in forms of a counter reaction which forces the capital to leave the market, companies to lose funding and file bankruptcy and a consolidation of the industry eventually (W = 0,52). In the long run, also unemployment will be a consequence. Nevertheless, experts of the investing sample as well as experts of the technology related group agreed (W = 0,54), that bubbles and the prior mentioned consequences have a purifying effect on society since only companies with a working business model will survive which in turn consolidates the market.

To check whether the enabler in future will stay technology or not, item 8 asked in which industry the experts would invest right now and compared this to item 12 which asked what industry will be the next enabling factor. Item 8 was answered with ‘Artificial Intelligence (AI)’ and ‘Machine Learning’ with an accordance of W = 0,70 which is above average. Item 12 was answered with ‘Artificial Intelligence’ as well with W= 0,71 which is also a high value regarding the accordance.

To answer the sub question, it can be stated that even though bubbles keep on rising, the economy seems to be not actively involved in changing this circumstance. Additionally, technology seems to stay the enabling factor for the next time what means that this industry will most likely not be disrupted within the next years and the hazardous investment behaviour can remain until the point is reached where nobody want to pay anymore. Due to this the fourth sub question can be denied since the global economy is not interested to encourage a change in the status quo.

*In how far will the global economy encourage the creation of a technology related asset bubble?*
Based on 12 items as well as a financial statement analysis, four sub questions were answered. The overall purpose of this questions was to answer the research question which was the motivation for this thesis. The function of the financial statement analysis was to verify the findings of the Delphi method on the one hand and to describe the financial reality of a current technology based company on the other hand. Based on the sub question it is possible to summarize that indicators are existent which are present during every bubble that get pumped up, the current investment strategies and the assessment of a companies’ value can be described unsustainable, a certain degree of predictability is possible and could reduce the chance that a bubble can arise if changes regarding the reporting structure would be facilitated by the government and that the global economy has little interest to change the way they are operating right now. These factors taken together, it seems that there is no real motivation to prevent or at least predict a bubble by the government because they executed no severe steps after the last bubble in 2007. Furthermore, players of the global economy are forced to invest in technology due to a lack of opportunities what in turn attracts small investors, who face the same situation only on a minor scale, to invest. This vicious cycle will encourage a bubble to rise even if this is not actively pursuit but rather a side effect. Nevertheless, it can be concluded that the global economy encourages the creation of a bubble even if it is neither a conscious decision nor an with calculus executed schedule.

6.2 Interpretation for the future of technology related companies
This section of the thesis keeps itself busy with the interpretation of the findings made during the Delphi method as well as the financial analysis. Furthermore, an interpretation about the answered research question is provided. As deducible from the Delphi method, technology will be ubiquitous and thus stays in the focus of industry and economy. Due to this it becomes possible to define technology and its ongoing disrupting character as one mega trend which could last as long as a Kondratieff cycle. This is especially true since technology is so evolving incredibly fast that even paradigms which were clearly defined, just like Moore’s law become disrupted and outdated. Even though this can be seen as a great achievement it also bares dangers since these Kondratieff cycles contain waves with upturn and downturn, with depression, recession and boom. This also indicates that there can exist asset bubbles which burst as soon as the recession starts due to a lack of buyers for the provided supply. The problem that occurs is that no involved party is interested in preventing such a bubble from its burst. If the government is taken into consideration it seems only logic that mechanisms should be implemented to ensure this. As mentioned during the interviews these mechanisms could be regulation of investments, a fixed interest base rate and more transparency regarding the economic situation of a company. From an VC’s perspective, investors could be forced to at least have a minimum knowledge about the industry they invest in or an adequate due diligence. The technology companies could focus in sustainable growth rather than
the classic ‘hockey stick’. All these options would give the chance to an overheated market, which completely lost the relation between the value of a company and the valuation of it to become more realistic again. This development can be seen as desirable because at a certain point, nobody is willing to pay for the shares of a company and bubbles begin to burst. The problem will then be that nowadays companies do not have any tangible assets left to pay their investors off since most of the technology companies which are popular today are end consumer oriented service providing applications that will file bankruptcy as soon as their competitors catch up. Furthermore, as already mentioned in the first stage of the interview, the target audience of this application is young and unwilling to pay for services what makes it even harder to capitalize on a business model. This is indicated in the financial statement of Snap Inc. where besides the revenues generated through unrealized earnings by shares sold over face value and the distribution of shares no revenue structure is present. Even though the consequences of a crisis would be severe for the industry as well as the people who work in it, all involved parties work towards the burst of the bubble and tend to forget about all consequences and start over with the same mechanism towards the same outcome.

In conclusion, it becomes important to regulate this behaviour by laws since neither the investors nor the affected economy is interested in doing it. This is especially true if the prognosis of the experts is true and machine learning and AI will be the next dominating factor. This would have an industry overlapping effect that will be exploited as far as possible. Consequential, if the unsustainable investment behaviour stays the same, without any regulations, an industry wide bubble with the ability to cause a world-wide crisis after its burst can be pumped up.

7. Implications
Based on the prior sections, a list of implications was designed. These implications will focus on three different corner stones since five parties are involved. These parties can be identified as the government, capital providing instances in the form of banks, venture capitalists, angel investors private et cetera and the technology providing companies. First of all, the government should be more involved in investment activities in order to assure that the gap between the financial economy and the real economy will not increase. First, government should try to understand upcoming trends and foster a more transparent environment wherein investors can learn about the asset they invest in. Second, they should enlarge this transparency to the disclosure of financial statements. Third the government should try to provide more funding for young companies. By doing this, companies could improve their products until they are ready to hit the market and companies won’t depend on angel investors as they do right now. Regarding the capital providing instances should learn to understand the technology before they invest rather than following the trend. Furthermore, they
should revaluate their return on investment schedule to a more realistic and sustainable one. Even though some technologies are ready to be scaled up immediately, others are not. Due to this a sophisticated due diligence should be applied with the goal to define an appropriate return on investment schedule that fits the product the company creates. Third, private investors should accept their lack of expertise and sophisticated tools and reconsider their investments wisely to prevent themselves from becoming a trend follower. Concluding, also companies have to reconsider their business strategy because this strategy is the trigger for all technology bubbles which can arise. Due to the fact that companies try to get funding rather than providing a great longlisting product is highly counterproductive. Additionally, the strategy to go create software in order to get funding and leave the market with an exit as soon as possible in order to generate profit rather than building up a company with future potential is absolutely unsustainable an only attract investors with the same hazardous intention. Concluding, technology companies need to be led by people who understand the product rather than people who can sell the product. Otherwise the most important part of the company is neglected what in turn leads again to unrealistic assessments.

8. Limitations of the research
The goal of this study was to examine whether economy is currently in an unsustainable, hazardous circumstance with the tendency to create a bubble. Even though the method section was carefully planned and executed it was not possible to generate significant values for every presented statement. Due to this it can be stated that the alarming circumstances can only be confirmed to a certain degree due to insignificant values of Kendall’s W.

Due to the fact that even with adequate planning there can be flaws, this section of the thesis focuses on the strength and weaknesses in order to give future researchers the chance to build upon it. Regarding the strength, it can be mentioned that introduction into the topic as well as the literature study was executed thorough in order to guarantee that all concepts and technical terms are mentioned and explained. Furthermore, the method section was planned carefully and executed with as much professionality as possible.

On the other hand, the research also contained flaws which must be improved for further research. Regarding the introduction, it was difficult to find proper literature. Even though the subject is rather new, a certain amount of scientifically literate expected. Due to the limited amount of literature, the introduction as well as the literature study were mainly focussed on non-scientific literature. Regarding the method section, it came forward that the wording of some of the items could have been a little bit more precise in order to prevent confusion. Due to this the researcher was forced to clarify what was asked precisely.
9. Further research
This concluding section includes suggestions for further research that could be executed based on this thesis. First of all it would be interesting to check whether the knowledge gained form this thesis contains enough value to build a theoretical framework on it. This theoretical framework could take the information gained by the experts into consideration and could be applied on historical crisis to check whether it is right and in case to what degree.
Secondly, it could be fruitful to elaborate on the advantages and disadvantages on the free markets as we now them if more regulations would be applied. By doing this it could be controlled whether the economy becomes safer and if would still be able to generate enough money and return to attract potential investors.
Thirdly, it could be of enormous interest for future research to check whether the predicted trends are realized and if so to estimate how recommendable it would be to expand the study in a quantitative way to get better insights.
Concluding, a simulation of the mentioned implications could, on the one hand enlarge the validity of the Delphi method as well as this research, and on the other hand check what would happen if these implications were real.
Dear Sir or Madam,
My name is David Kruse and I am currently studying Management & Entrepreneurship at the Technische Universität in Berlin. Currently I am working on my master’s thesis. The thesis lays its focus in the rise of investment bubbles (a special focus is put technology related companies). To finalize my thesis, I am actively looking for experts with expertise in in the field of investment. Due to this fact, I am contacting you and hope that you are willing to spend a few minutes of your time to answer me some questions.

I would be grateful if you would give me the chance to further elaborate about my project in short call.

Thank you very much in advance

David Kruse

10.2 Appendix 2 – Interview scheduling

Dear…,
First, thank you very much for the quick response and the willingness to support me with my thesis. I would really like to schedule a meeting within the next week to finalize my project. Nevertheless, I am flexible regarding the precise date. Please find below a list of time slots that would be my schedule.
Furthermore, I wanted to ask which communication channel you prefer (Skype/hangouts/phone).

In order to give you the chance to have a look at the questions I am going to ask you, I attached them to this email.

Thank you very much in advance.

Kind regards,
David

Time Slots:
DD/MM/YY   HH/MM
DD/MM/YY   HH/MM
DD/MM/YY   HH/MM
DD/MM/YY   HH/MM
10.3 Appendix 3 – Interview scheme

Warm-up
1. What is your personal definition of an economic bubble?
2. Can you think of indicators with the ability to create a bubble?

Part 1: Current trends and drivers
3. How would you estimate the evaluation of technology related companies?
4. In how far would you describe the current investment behaviour in technology related companies as healthy/ sustainable?
5. Does this investment behaviour exist in technology related companies exclusively?
6. Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?
7. Would you say that wealthy investors and the global economy encourage the tendency to overvalue (pump up a bubble)?
8. Can you think of an industry branch you would invest in?

Part 2: Disruptive technologies in the future
9. What effect would a burst bubble have on society and economy?
10. Can you think of mechanisms to protect society from another bubble?
11. Do you think that financial markets would be interested to prevent bubbles from rising in future?
12. What would you think is the next enabling factor/ trend for high valuation?
10.4 Appendix 4 – Transcript of the Interviews

10.4.1 Interview - Participant 1

Interviewer:
Hi. First of all I want to than you very much for your time especially after the problems we had during the last session.

Participant:
No problem.

Interviewer:
Okay, then I don’t want to waste anymore of your time and start directly with the interview. I want to go through the questions which I already sent to you. I would be very happy if you just answer the question with good faith. I will make record this session and write it down afterwards. Okay cool. The first two questions will be warm up questions. So, what is your personal definition of an economic bubble?

Participant:
Of an economic bubble ehm [...] I would say, an asset does have a value. If the price that is payed for the asset is much higher than the internal price of the asset than you have an economic bubble and this [...] on a macro level.

Interviewer:
Great, this what I found during my research as well. The decoupling of the fundamental intrinsic value of an asset and its price. Would you say that there exist indicators with the ability to create a bubble?

Participant:
Good question. Afterwards it is always possible to explain such things. Me personally, I wrote my master’s thesis about this as well. And I tried to remove fundamental factors from this construct [...] and one part was the irrational one. But what precisely are the irrational factors [...] you can not really predict. In my example it was GDP growth, interest rate [...] if you look at these fundamental factors but are these factors the correct ones? Afterwards it is easier to say I guess.

Interviewer:
Yes, I can imagine. Afterwards it is always easier to do define this. If this wouldn’t be the case you could capitalize on this before the bubble bursts.

Participant:
Yes, it is hard. If it would be so easy It would probably already have been defined. You are not the only one with this problem.

Interviewer:
Okay, great. We finished the warm up questions. Now we are talking about more current events. The first question would be, how would you estimate the evaluation of technology related companies?

Participant:
We, as a European investor we are looking at the USA and see, that these valuations are completely different than the evaluations we have in Europe. Consequential the question arises whether these companies are different than the companies we have here in Europe the answer is, not really. The
US companies pay a multiple of our valuations. On which basis [...] like already said, are there fundamental differences between the companies or is the market much more interesting? Based on this I have to admit that this is not really justified [...] it can’t be justified except we in Europe still pay too little.

Interviewer:
Yes, that was more or less the starting point for my master’s thesis. I read through the usual websites and found the IPO of snapchat and I asked myself how is this possible, that a company without working business model can get such a high valuation especially if you keep the annual losses in mind.

Participant:
Yes, it is really crazy. Maybe from a micro perspective, they see things we don’t. Maybe Snap will rule the world in the next few years [...] but this is happening right now at so many companies. And the question is, is UBER worth 70 billion dollars? Maybe yes, UBER is somehow a really cool firm but you see it all over the place. All of them are really cool companies but this number of unicorns mhm [...] either they got something we don’t or it is too much. Me personally I would say it is too much.

Interviewer:
A lot of people mentioned the lack of opportunities to invest money. Would you agree?

Participant:
Yes, of course. There are a lot of family offices which used to invest careful and even they start to move towards this sector. Because somehow you must make money and the current trend is investing in private equity and in venture capital. This seems to be an opportunity to generate money. And you can directly see the change. The funds which are raised right now are crazy. I don’t know whether you saw it but take for example NEA, ehm [...] 3.3 billion investment on an early stage. That is crazy. And the money has to come from somewhere.

Interviewer:
Would you say, keeping in mind Europe or the USA that the current investment behaviour in technology related companies as healthy/ sustainable?

Participant:
I would not say that this is sustainable because right now everybody wants to invest into venture capital. Just because there is so much money, that does not mean that you don’t have to be skilled anymore. And especially in the sector of venture capital you can say that past performance is very much an indicator for future performance. And there is a reason for this. And after a while the current circumstances will change and situation will calm down.

Interviewer:
So you guess would be a consolidation?

Participant:
Yes, absolutely.

Interviewer:
Okay. Would you say, especially caused by the hype of technology firms? Or, would you say that this investment behaviour exists in technology related companies exclusively?

Participant:
Ehm [...] we invest in technology companies exclusively right now. Due to this I can not give you a 100% estimation. Probably it is an industry overlapping phenomenon. On the other hand, technology is the sector where, right now all the potential is. But this is right now also only our opinion.

Interviewer:
Yes, I also see a trend there right now. There are so many seminars, TED talks and so forth in the last years focussing on Tech 2.0 which gives a clear indication. Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
I think, with technology related companies you have much bigger opportunities. If you sell a product for example, the question is how far can you go, how high is the scalability and how far can you further develop the product. If you take a tech company, we ca take UBER again as an example, you take the whole potential. The world we live in right now will change completely and we build the technology for that. There are almost now costs behind that [...] it is simply easier to scale up we would say. There will be major developments and the investment is relatively low.

Interviewer:
The next question is, would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
I can not imagine what incentives these investors would have. I would say, they think that venture capital is a cool investment opportunity. Except you jumped on board on a really early stage. But even in this case why would they be interested to burst a bubble? But of course, friends of mine invested into amazon and wall mart [...] but I would think that people always want the best in economy even if it's a little naive.

Interviewer:
Okay great thank you for this answer. If I would ask of an industry branch you would invest right now, can you think of one?

Participant:
Technology, generally. There are some industries which are really interesting. Me personally I think digital health is a super interesting industry at the moment and HR. HR because the whole process is still problematic. It is one of the biggest pain points of a company and it won’t go away. If you can make it more efficient right somehow that would be really great. Think for example of all the CV’s you get, if you standardize them. They are already more or less standardized. Why would you screen every potential candidate if you know what skill set the candidate must have? You could better use a software which screens all the candidates and looks for the most appropriate one. But this is only an example. there are so many things you can do. The perfect solution is out there but not completely defined. Health on the other hand is really really interesting. There will be a lot in future. Other industries are Fintech or industry 4.0.

Interviewer:
Okay. Now we finished the second section and start with the third one which is more future oriented. What effect would a burst bubble have on society and economy?

Participant:
Ehm [...] Good question. I think there are two answers. First of all there are a lot of different funds which came into being during the last years. This number will reduce itself in the next time. There is so much money in the market that start-ups have to opportunity to say that a particular investor does not give the desirable amount of money or something else and that the start-up can despise this investment. The start-ups have the opportunity since you always get money but not always from high quality investors. In our positive view in the world we say that after the burst of the bubble only the top investors will survive. On the other hand you have a lot of companies that got fresh money recently but should not have got it because the lack of a working business model. Those companies will go bankrupt and there are a lot of employees involved. But if you have a working business mode you should survive the bubble.

Interviewer:
Can you think of mechanisms to protect society from another bubble?

Participant:
No, we can’t really anticipate a situation correct nor can we define future mechanisms. A lot of funds came into being that focus on subprime companies. So basically, it is all the same and we learned nothing. And that is trend. It is like the story where Warren Buffets shoe polisher said to him that he is also investing into the share market and Warren Buffet took that as a sign to leave the market. Right now there are to many people who think they can do venture capital and ignore that this is a high risk industry.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
[..] Again, the positive point of view, bubbles are inefficient since everything you build will be destructed. In case you were in a situation of constant growth, then this would not happen. If you use your resources efficient. Ehm [...] Because in the end you return to kind of balance. If this would not happen than the investors would not lose money, the start-ups won’t go bankrupt.

Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
[..] everything which is based on technology. I think people can’t really imagine right now. I have to think of a really old picture. On this picture with the caption ‘People going to the opera in the year 2000’ and people fly with cars and everything but still wear the same cloth and still go to the opera and that is simply not the case. I think we look at things we are currently using and can imagine that these things will become faster and more efficient. I imagine a world wherein VR is a big thing and cars drive autonomous but what comes afterwards [...] I can tell you something but this is probably out of the general imagination.

Interviewer:
Okay. That’s great. Isabel these were my questions. I would love to contact you for the next round as soon as I finished the transcript of this interview. I hope that is okay?

Participant:
Cool, sure.

Participant:
Great. Thank you very much an have a nice evening.
Interviewer:
I would propose, that we go through the questions, you try to answer them and I will take notes.

Participant:
Yes, of course let’s do this.

Interviewer:
Okay, then let’s start with the first question. What is your personal definition of an economic bubble?

Participant:
Ehm […] that is a really interesting question. To be honest I didn’t really prepare in a scientific way. For me this would be a high demand that can not be satisfied through the offering or that is strongly influenced by external factors. The consequence is, that this demand does not fit the real circumstances.

Interviewer:
Okay, even though it is not scientific, it is pretty straight forward I would say. In this context, Can you think of indicators with the ability to create a bubble?

Participant:
Ehm […] if you look the past bubbles, starting with the tulip bubble and ending with the dotcom bubble, there is not so much overlap. I would say in some industries it is possible to […] but most often people only realized afterwards what indicators were existent. For me personally, there is a least one reason. This reason is that more and more market participants enter the market even though they shouldn’t due to a lack of expertise. Furthermore their estimation is not realistic and they are not capable to estimate the real value of the investment good. But real indicators are difficult for me to think of.
Yes, I can imagine, for me it was also difficult to define those indicators for all bubbles. Of course, some of them were significant due to cheap credits but not all of them. But may I ask you, how would you estimate the evaluation of technology related companies?

Participant:
Ehm [...] on the one hand, if you look at Uber and the revenue growth, you can see that the last five years still show the typical hockey stick, investors like to see so much in the market. This is definitely an indicator for the potential that is still in that company, especially if you keep the market size in mind. And I think that Peter Thelen said in his book, the moment you invest in a company, this company is already underprized. At least if you try to put the future growth of the company into this evaluation [...] ehm you can apply this as well at Uber. If you take a look at the whole automotive industry, the taxi market, the trucking market [...] this is an insanely big market. The only question is, how much of this share can be taken and how much can be earned I future. In the case of Uber, it is difficult to define, what would happen for example if they terminate all marketing campaigns. What impact would this have on the revenues? Would the earnings decrease, would they only grow slower? Nobody can say this at this point of time because the machinery is still running. In part, you can compare Uber with bigger companies because during a fund raising round they always tried to link the fund raising to a vision. At the beginning, there was a chauffeur than the taxi market, the trucking industry and now self-driving cars. Due to this, investors always found a reason why the amount of money was reasonable. Compared to Snapchat you must say that the characteristics were pretty good a certain point [...] simply through the market power given by Facebook and the fast product iteration. Nevertheless, they showed that they are comparable to twitter which also generates a limited amount if growth. Snapchat has a complete different target group and it is difficult for them to monetize on this target group. There is the question, if it is possible to build a sustainable business model, like Facebook did in the advertisement sector.

Interviewer:
You just said sustainable. Would you describe the current investment behaviour in technology related companies as healthy/ sustainable? I was really surprised when I saw the share price after the IPO [...] so would you say it is a general trend to close the fund raising rounds in an unsustainable way?

Participant:
I think you can compare the situation to Uber. They really lost a lot of money in China to DIDI. A lot of investors probably asked themselves in how far this strategy is sustainable. The revenue
growth showed that Ubers strategy was correct. The revenue growth will always show in how far a strategy can be financed. As long as there is growth there will be someone who want to put money in it. At a certain point of time there must be some way to reduce the losses. Take for example Rocket companies. I would not say that these companies are forced to grow but they are always confronted with the question how much they can increase their profit margin […] and when the EBIT is going to be positive. This is the task for the different companies, to check how the financing looks like, what options do we have to get money, like loans credits or whatever ehm [...] is this worth it or do we have to try to save money at some point. One option is to reduce the number of employees. The founder of hotel tonight gave an interesting interview/ documentation and mentioned that they must break even in six to nine month because they wouldn’t get further funding due to their miserable number. This is the challenge for a lot of companies. You have to become profitable or [...] you become profitable because the business model is working pretty well. In the consumer area this is a little bit more difficult because earnings must be generated with good marketing. In the B2B sector this can be much easier because due to a higher margin the break even can be reached much faster.

Interviewer:
So would you say the sustainability has to be created by the founders not the investors because investors will not create this sustainability?

Participant:
Investors can have a certain degree of influence. The thesis is that you spend money to profitable in the end or to have positive numbers that give you the option to raise more capital. One out of these two scenarios should be fulfilled. In the consumer area […] the way is much longer to become profitable because the audience will bring added value if you can keep them in the ling run. In the B2B sector it is possible to write you profitability plan for a longer period.

Interviewer:
Would you say, that this investment behaviour exists in technology related companies exclusively?

Participant:
I can’t give you a precise answer since we only invest in software. I would say, the potential of software is much higher regarding the scalability than in a manufacturing company. The scalability of software companies gets higher multiples also for the exit than in other industry. A friend of mine is working in a middle-class manufacturing company and when we talk about exits than he
would always reply that a multiple higher than two is extraordinary. Compared to the software sector [...] of course you should keep in mind which sector you are operating in, for example software as a service, market places or E-commerce. Especially in the software as a service sector you have high multiples or at least was. You can see from statistics that the multiples also decreased in this area.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
I would say also during the Dotcom bubble there were really high valuations. A lot of companies went public. KPI’s were the height of the burn rate. There we can see that the fundamental circumstances in the market changed ehm [...] I think a lot of people have smartphones today. Three maybe for billion people in the world possess a smartphone what makes a huge difference. This has to with the fact that the manufacturing of smartphones became much cheaper. For 50 to 100 dollars you can get a smartphone which is capable to run all common applications. That means you have access to knowledge and information which was not possible at during the Dotcom bubble. A lot of companies started as thesis. Just like Amazon with the book buying business. This was a thesis that works today ehm [...] cloud computing makes it much easier to start a company and deliver software to all over the world. There are a lot of enabler that makes it easier today. On the other hand you have to keep in mind that the big player can react to changing market much faster since they can replace a complete product with one update. In this sector the innovation speed is much higher ehm [...] This should not mean that there is no other sector but the manufacturing sectors are much more non-transparent.

Interviewer:
Okay. Great answer, that really helps me. Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
From my perspective, I can’t really tell you. Funny thing is that a few days ago a saw a though experiment applied to Bitcoin. In this experiment a certain amount of people had a huge amount of bitcoin and kept them. At the peak they sold, the demand went down after a time. When the demand is down and the prices fell, these investors bought the Bitcoins again to generate earnings. This
simulation was also given with the stock market. I cannot say whether this is appropriate. As a start-up this is much more difficult due to a lack of influence.

Interviewer: Would if I would be interested in Augmented reality. Would you think, that I can lift the valuation of firms in this sector up through my investment if it is big enough?

Participant:
In this case, I wouldn’t talk about manipulation. One observation you can think of especially in start-ups is that a lot of wealthy companies invest in the start-ups […] especially in a competitive environment in order to give them a head start. In this case you as investor would try to organize a relatively big funding round in order to discourage other investors to go into the market and to safe your market leadership. So it is more about the competitive advantage.

Interviewer: So it is not about the share price but the price of the company?

Participant:
It depends on the company […] you check how positive the numbers are, how much growth there is and how hot the company is right now. But this must do with the valuation […] of course the start-up should get a higher valuation in future. But also, a valuation that is too high can cause problems for the company. So, the basic interest of the investor is not to manipulate courses but to make the company as profitable as possible in order to generate high profits at the stock market as soon as the company goes public.

Interviewer:
Last questions of the second part. Can you think of an industry branch you would invest in?

Participant:
I would stay with technology and with software. The goals we reached until today are just the peak. There is so much potential, regarding smart city, smart home so in general IOT. Also, the health sector in the area of machine learning. How to save the human from getting sick. So, the big headline AI is becoming realistic and this will be important soon.

Interviewer:
Okay. This was the second part. The next one is focussing a little bit more on the future. Let us assume there is a bubble right now in the technology sector […] What effect would a burst bubble have on society and economy?
Participant:
Take for example the US company Juiercro which is a company that puts packaged fruits and vegetables into a juicer a sells the press for it. So, in the end you get juice. The founded roughly 100 million dollars. A US publication made the test and squeezed the packages which should be put into the juicer by hand and they almost get the same amount of juice. There the questions occur, are we in a bubble. When a product which has no real USP is funded. Additionally, I think this is supported by low interest rates. So, a lot of private equity funds came into being and want to invest money due to promising returns. If the investors don´t get the expected return because of lack of industry knowledge for example it can be that these investors will leave the market gain. The consequence is that companies who took high valuations and did not deliver, will not be funded in the next round if key investors left the market. In that case only the really working companies with a steady business model and a USP will stay and the other one can go bankrupt.

Interviewer:
Okay. Can you think of mechanisms to protect society from another bubble?

Participant:
I think it is about the investors opinion. A lot of upcoming industries don´t have historic data what makes it difficult to estimate the value. Than the due diligence is important. Than it is about how good investors did their homework. On the other hand their will by always people how have another perspective and invest based on this perspective. Due to this Vc´s bring some advantageous [...] what does not mean that Vc´s are a good decision to work with. In the end, I don´t think that some companies are good or bad. You always must focus in the numbers and interpret them right. These are the option you have if the numbers are valid. Depending on the investor the interpretation can be really different.

Interviewer:
I was thinking about this as well, to design a framework based on KPI´s and ratios but these ratios are of course not significant for all companies and industries. Do you think, in general, that financial markets would be interested to prevent bubbles from rising in future?

Participant: I cant really imagine that this is common sense. If we take a look at the bubbles prior to this one, we can see that they always had a negative effect. Doesn’t matter whether it is the Dotcom bubble which hindered a lot of upcoming and promising companies from getting funding, the
tremendous monetary restraint what caused that a lot of social problems occurred due to bold loan granting [...] so I don’t see any positive developments out of this. It is more from a regulatory perspective, that the greed became to big.

Interviewer:
Great […] last question. What would you think is the next enabling factor/ trend for high valuation?

Participant:
I would say technology will keep the important position it is currently having. Right now we are facing a real change in the way how technology is used. We switch from a more centralized to a decentralized way of computing data […] another point ehm [...] as already mentioned is artificial intelligence which can improve the quality of life in several areas. Even though these are all buzzwords they are still valid and the potential will be exploited within the next five to ten years. Virtual and augmented reality also has different application fields. One of them can be the health sector. It can help to reduce fears, maintenance of industry machinery, gaming or entertainment. We were a little to early before we had real application fields but in future this application fields will be extracted. There is not really a limit to imagination.

Interviewer:
Great. These were my questions. Thank you very much for your time. I will inform you about the next round in a week.
10.4.3 Interview - Participant 3
Interviewer:
Okay, let’s go. The first question in general is ‘What is your personal definition of an economic bubble?’.

Participant:
Yes, an economic bubble means, that there is a big capital accumulation without any equivalent value. This means for example, a non-producing company without any kind of real estate. But due to the share structure or whatever there is a high demand. This can be described as a bubble. In the end, if it comes to the liquidation of the shares, there would be now real value because the shares are not backed up by assets.

Interviewer:
Okay. Can you think of indicators with the ability to create a bubble? When I did some historical checking, I found that there are some indicators. One example which is often mentioned is low interest rates. Can you think of other indicators?

Participant: […] Yes, do you think of indicators like performance indicators more focussed on reasons?

Interviewer: more focussed on the reasons.

Participant:
Okay […]. If you refer to a bubble you always think of an overvaluation of companies’ assets. This overvaluation focusses on the broad mass of people who want to be part of an investment. If the broad mass says, ‘Yes, I want to be part of this investment’ than you are right, what fosters this motivation? The answer is a lack of alternatives. This means, if there is a low interest rate than all investors get only a small interest on the classic investment markets. This is true for overnight deposits, bank savings bonds and everything that is related to this kind of investment. Due to this low interest, alternative investments are searched. Classic alternatives are always bonds or resources. Basically, it is a classic trend following model. If there are no interest rates, people look for alternative investments. Everyone invests in bonds, the price of the bonds rise extremely. Sooner or later, this can take two or ten years, this bubble is about to burst. The consequence is a price slump due to panic sales of investors. Very often, a contrary investment is the consequence. This means that if the price of bonds is highly volatile, resources are bought and vice versa. So, in
general there are different reasons but in general you can mention a lack of alternative investments since the ordinary private saver. If a saver gets 4 % on his overnight deposit which is higher than the inflation rate, he will be satisfied. But if a saver get 0,0 % and even the newspaper reports about 2% of inflation, then even a conservative saver gets nervous due to a lack of alternatives.

Interviewer:
Okay, I understand that. I don’t know whether you heard about that but companies like Snapchat exploded during the first days at the stock market. They started at 15$ and finished at 25$. And there are plenty of those examples. How would you in general estimate the valuation of such companies?

Participant:
In the end, the valuation of such a company is simply a bet on future developments. This means, it doesn’t matter whether it is Snapchat or Facebook or whatever, in the development phase these companies have nothing. Then there are people who trust the idea, are willing to invest in the company and plan on future revenues. In general, via commercials or user data which afterwards get used to create good commercials. That is more or less the only return potential. Unless there is another adding value like for example a music streaming platform which can be hyped but also plays music. There it is possible to introduce a revenue generating model where at least a small amount for the monthly subscription can be generated. Due to this, I would say that every valuation is focussed on the hope or believe, that a hype can be created around the product or company. So it is not possible to talk about a profound valuation.

Interviewer:
Yes, that’s the feeling that I have relatively often. Of course I am not that deep into shares and bonds so I can argue about the price of a share. But, even for me it was surprising that a lot of companies don’t generate money on a regular basis, have no subscribing customers and sometimes, see Snapchat, even don’t save the data they get. But, would you say that this this investment behaviour exists in technology related companies exclusively?

Participant:
I would say, this can happen everywhere. This phenomenon is always there where a worldwide hype comes into being. Five years ago, for example Ed Hardy was a hype. There was this crazy guy who put pictures on T-shirts, Madonna wears them and from one day to the other everyone goes crazy about the T-shirts. And the company is worth thousand times their initial value. Two to three
years later when the hype was over the company lost its value and you can get the shirts on a flee market for nothing. So I wouldn’t say, that this is technology sectors exclusive. I would say it is more often in the technology sector because companies can grow much faster. In other industries you need a product, so you need to produce to grow. For example, Ed Hardy, if the company wouldn’t have a production company, a printing plant and all the necessary fixed assets, the company wouldn’t be able to produce the T-shirt in the first place.

Interviewer:
So, you would say that it is easier with a technology company because you don’t depend on other people and their fixed assets.

Participant:
You need much less money.

Interviewer:
So, you would say right now it is one enabler but not in general?

Participant:
Precisely. In the end, the technology industry requires less money and grows faster. This means for the founder less barriers to overcome.

Interviewer:
Okay. I talked to a colleague of mine about this and he mentioned that wealthy investors like Warren Buffet are able to actively influence the value of a company. Would you say that wealthy investors and the global economy encourage the tendency to overvalue (pump up a bubble)?

Participant:
This is the trend following behaviour I already mentioned. If you check for example the share price development of the share index. There are always investors with a high affinity to the markets and maybe even have a good feeling about a share. Those people always buy at first. After a while, the fools, so the every days private investor jump on board. The resulting share price rise of 10% motivates them to buy and the broad mass decides to enter the market. That this price fluctuation is caused by Warren Buffets investment is not visible for the investor. So, if a Warren Buffet buys shares, he by himself can cause two or three per cent price fluctuation because he can invest so much money. So, Warren Buffet creates a trend and the price rises. The broad mass realizes the
price fluctuation and enters to generate some money. The share explodes and Warren Buffet leaves the market. So, he made his money whereas the broad mass still has the shares. As soon as they want to sell the share due to Buffet who also left the market, the price is falling. So, the combination of enough money to have influence and a understanding of the topic is sufficient to influence economy. If you manage to create a trend by yourself you are market influencer.

Interviewer:
For me as a private person it is so funny to realize that one person is capable to change a market structure if the investment is high enough. For me figures we are talking about a just out of my imagination. The next question is also personal interest to a certain degree. Can you think of an industry branch you would invest in? So, if you were Warren Buffet where would you put your money right now?

Participant: [...] Right now, I would buy a high dividend yield stock. This means big companies with high dividends. There is a lot of data which indicates how much an investor gets only by dividend payments. You can see BMW or Mercedes who generate roughly 5% dividend. These are classic investments like Dividend yield stocks, DAX 30 listed companies where you can’t really do anything wrong. I would put my money there, with a wide spread and if there is a market that exits in a few years – due to crisis, war – than I would invest.

Interviewer: You say crisis. What do mean by this?

Participant:
Yes, take for example VW, the exhaust scandal becomes more extreme. The cars industry faces major problems. From one moment to the next one you will have six or seven, stock listed car manufacturers with high losses. With high probability, these losses are only on a short term since cars are substantial in our society and will be bought after a while again. These means there is a classic crisis process which means that the crisis occurs, the share prices fall and then is the time to buy. So, act anticyclical, when everyone sells you have to buy. This means that you as investor have to have enough money to wait until the courses regenerate themselves. It is important that you don’t depend on the money.

Interviewer:
This makes absolutely sense.
Participant:
Yes, but this is also true for smaller investors. If you have 20.000€ on your bank account you can invest for 10 years. During this time, the money is not liquid.

Interviewer:
Of course. Even though I am more risk averse I understand this because even the person who gains money the save way and only earns the difference between net present value and the value in 10 years needs to riskier if there is no money to gain anymore. Okay. Than my next question is, ‘What effect would a burst bubble have on society and economy?’

Participant:
[...] in general, for society there are effects. No matter what happens there are always people who become rich and other ones who become poor. Of you want to put it on the macro level, the money stays it is only redirected to someone else.

Interviewer:
If we take Warren Buffet as example there will probably 20.000 losers and one winner, right?

Participant:
Not necessarily. This can happen but the reason would be that big investors like Warren Buffet have a broad portfolio of investments they can put their money in. It is possible for him to invest in 15 industries. If one of them dies it doesn’t really matter because there are 14 other industries which further develop. The small investor often stays in one market for example Germany. If the market goes down for some time the small investor loses his money. Big investors will spread their money all over the world. Probably in Europe, Asia, USA and the emerging markets and these markets will never lose simultaneously.

Interviewer:
And economically?

Participant:
Of course, if you destroy tons of capital from one moment to the other it would be only logic that the purchasing power is shrinking. Or, the good for consumption. So, if VW goes down you have presses, real estate and a lot of fixed assets. If a software company goes bankrupt you have code.
both cases, you have a lot of shareholder who paid over price for a share and only get parts of the liquidation money, depending on the par value times number of shares they hold.

Interviewer:
Alright. […] Can you think of mechanisms to protect society from another bubble?

Participant:
One option would be the base interest rates. This would present an alternative investment. But also in this case, the broad mass is always forgetful. After a bubble the investors always say that they will never invest in high risk investments again. This takes a few years and people start to act the way they did before the last crisis because of greed. So, if somebody promises me 10%, it has to be a good investment in the eyes of the investors. The problem is, if somebody offers me 10% for my investment, the investment can’t be safe. As soon as people start accepting this again due to their greed, the next crisis is coming. A crisis is occurring on a regular basis. In the past, it was said that a economic cycle takes seven years. So, from boom to depression to boom it takes the cycle seven years no matter what industry. Check the last 40 years and you will see that this is still valid.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
Basically, the financial markets need rules to start a normal level. Nevertheless, I wouldn’t say that one market participant wants this or is capable to influence the markets. One thing is always true, when a bubble bursts there will be always companies who go bankrupt. So, a single market participant don’t want the bubble to burst whereas the broad mass profits and can reposition itself in the markets. So, a crisis brings back normal market conditions. Before the bubble bursts, all stock markets go up. Everyone in these markets makes profits. Some make more than other participants but they all make profits. During a crisis, the prices go down and there will be winner and losers. This means that opportunities occur. For example, the winner buys the loser or companies who could never survived in a normal market environment go bankrupt.

Interviewer:
Okay, last question. What would you think is the next enabling factor/ trend for high valuation?

Participant:
Technology will be the big thing, also in future. If we think that the technology industry collapse on a big scale, this would a major crisis. Maybe not a world economy crisis but a big crisis. Usually alternative resources are interesting again in such a case. One example would be gold.
Interviewer:
Hello, as promised, O wanted to contact you today regarding the interview for my master’s thesis.

Participant:
Yes, of course, hello Mr. Kruse

Interviewer:
First, I have to say, I am very happy that we were able to organize this meeting today. Due to this, first, thank you very much for your time.

Participant:
No problem.

Interviewer: ehm [...] okay. For me, today it is most important to ask you a few questions since you as an expert can give me insights and information about the investment behaviour of companies. I would be very happy to ask you a few question. You can answer these question in good faith.

Participant: Yes [...] of course this is no problem. We can do it this way.

Interviewer:
Great, I am very happy to hear that. As you wish, I would read the questions one by one and you can start to answer them. I would take some notes during the interview. Okay, to give you a structure, I structured the questions into three categories. So, first of all a small warm up to be on the same page. Afterwards a few more recent questions, followed by some more futuristic questions. All in all this should take no longer than 20 minutes. If you are ready, I would start with the first question. The first question would be, what is your personal definition of an economic bubble?

Participant:
[...] of an economic bubble, my definition is [...] when there is too much supply and money in the market, than it comes to an economic bubble.
So, you would say that the oversupply of money brings investors to spend more money which in turn creates a bubble?

Participant:
Precisely. This was the same at the real estate market. There was too much money, to expensive real estate and an increasing interest rate which created a bubble. This is the same [...] investors didn’t want to go to other lucrative opportunities in the financial markets. As consequence, they invested in start-ups. Due to this it would be possible that another bubble is pumped up right now.

Interviewer:
Building up on this, my questions would be, can you think of indicators with the ability to create a bubble? 2007 we had low interest rates and easy access to credits. Can you think of other indicators for such a bubble?

Participant:
So, [...] if you observe the investment bubble than you can define the rising valuations as well as the increasing amount of money per investment round as indicator. These are for me the two most appropriate indicators. Furthermore, you can keep the amount of investment rounds, not only the amount of money per round as well as the amount of new founded companies in mind.

Interviewer:
Okay, great [...] than we finished the warm up section. Now I would like to ask you some questions regarding more recent events. The first question would be, how would you estimate the evaluation of technology related companies?

Participant:
You mean on the part of the companies or the part of the investors?

Interviewer:
Ehm [...] the investors.

Participant:
Ehm [...] at the moment, a lot of investors are willing to follow a trend. This means, trends like Fintech or Insuretech or other trends. And there are founders as well as investors who follow this trend. The consequence is a lot of bad money. Investors partly don’t examine the companies properly, don’t examine the technology behind the surface but rather focus on the hype. The
consequence is, that bad money is invested into the companies. Not always, there are of course companies who execute a more precise due diligence and put their focus more on the technology, the scalability and not only on the hype.

Interviewer:
Would you say, that investors don’t execute a precise examination of the technology because they don’t understand it or is it because they follow the trend blindfolded?

Participant:
[..] I would say, there are two kinds of investors. On the one hand the professional investors who manage funds who refuse to follow the trend blind. And there are private investors like business angels who simply lack of the necessary knowledge how the technology works. Due to this they were not able to execute a professional due diligence. Still they spend their money because the financial markets offer no alternative investment opportunity.

Interviewer:
Would you say that the current investment behaviour in technology related companies as healthy/sustainable?

Participant:
Ehm [..] yes, it always depends on the investment managers and the business angels. There are investors with huge knowledge. These investors know where to invest and this is a sustainable behaviour. But there are also investors without this knowledge. People who recently made a lot of money and who decide to follow a trend. Regarding investment managers, there is a really limited eco system and basically all investors know each other. Also, Germany and Switzerland. And if there is an upcoming trend, almost everyone gets on board. Ehm [..] regarding the sustainability I would say, it is sustainable when the trend is upcoming and you come on board it is sustainable. If the trend is already on its peak and you come on board it is not. There is always a little bit of luck but you can’t really relate it to sustainability. For example, at funds the spread of investments is relatively broad what gives a certain degree of sustainability. If the risk is spread which is probably not the case for the portfolio of a business angel due to a limited investment volume it is sustainable, if not than it is not the case.

Interviewer:
Okay [...] I understand that. Would you say, that this investment behaviour exist in technology related companies exclusively?

Participant:
This behaviour can probably also occur in other companies but I did not see it by myself to be honest. I would say it is more related to technology and digitization. But still, I can imagine that this could be the case in other industries. Take for example real estate. If there is a lot of money and everyone invests in real estate, the prices go up even for inferior real estate. Than you can see the same pattern. People buy expensive houses and real estate agents buy multiple houses and sell them for a higher price even if they are inferior.

Interviewer:
Okay seems legit. My next question would be, would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
You must say, the companies who did a good job while programming the software and founding the company and by doing this save human resources, also have the power to put the man power into other channels. This brings them forward and generates more revenues and lowers the costs. The better the technology the better the scalability if the company and the better the fundament for a successful company. So we say, a technology is an important fundament for a company.

Interviewer:
Okay, great. Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
Me, from my personal perspective, I can't imagine it since we have a limited fund which is managed very carefully. We try to get as much shares of the company for our investment as possible. Due to this we also try to lower the valuation. If it comes to my experience, [...] I would say the typical venture capital companies are not interested in increasing the valuation if they are investing money in it by themselves. Only if they already own shares and want them to increase their value. In this case, they would not invest new money in it. In case they invest new money, they
want to do it. What I can imagine from my own perspective is, that the founders want higher valuations because they want a higher market value. So, a conspiracy, maybe but I can’t imagine it. For those investors who invested money in the industry and see that there is a lot of bad money in the market [...] and they want this money to be gone with the help of a bursting bubble [...] it is possible but I can’t imagine. As long as we are talking about venture capital companies and the possession of shares I don’t think so.

Interviewer:
Can you think of an industry branch you would invest in?

Participant:
In which one [...] I think, E health due to its unbelievable potential. E health especially regarding legal circumstances which will change from the old to new ones within the next few years. There could be interesting investment. Now I would say, at E health you have high risk for high return.

Interviewer:
Of course, since it is a new sector there are a lot of opportunities. More mainstream developments are probably not that interesting anymore. Okay, [...] this was the last question of the second part. According to your opinion, what effect would a burst bubble have on society and economy?

Participant:
This is a good question [...] uiui [...] I really don’t want to imagine this. Of course, the unemployment rate would increase drastically. Especially in the start-up sector. A lot of young people work in start-ups. For concerns and bigger companies, it would have a strengthen effect since they have more capital. They would not get forced into bankruptcy that fast. The market would shrink and consolidate and as already mentioned the unemployment rate would increase drastically and more people would start to work in the corporate sector again, which in turn would bring the money back to the corporate sector. Right now innovation management of bigger companies is often outsourced to innovation labs, start-ups are bought instead of own R&D efforts by concerns. Probably R&D departments would return to the concerns instead of staying at the start-ups.

Interviewer:
Can you think of mechanisms to protect society from another bubble?
Participant:
Ehm [...] mechanisms could be, that a limited amount of capital is invested in high risk capital. A higher regulation of investment funds by governmental instances. I can imagine that the investment strategy will be more regulated. And also, the licenses which are handed out by supervisory authority are limited and the digitization [...] how can I formulate it [...] that online banks for example are more regulated which in turn brings customers back to more incumbent banking structures by the BAFIN for example. So, more regulation and more precise auditing.

Interviewer:
Mhm [...] but would you say that financial markets would be interested to prevent bubbles from rising in future?

Participant:
I think this is necessary for the regulation of the financial markets. There will always be some small bubbles which burst to regulate the market.

Interviewer:
Okay [...] then there is only one question left. What would you think is the next enabling factor/ trend for high valuation?

Participant:
I am working relatively long in the business [...] but a trend that did not emerge until now but will within the next years for sure will be robotics. There I can see the next bubble. How robots are made and how robots will accomplish to make the human redundant in the process. But also, assisting the human with implants and prostheses.

Interviewer:
Okay, these were my questions. Thank you very much for your participation. I will evaluate your data and contact you for the second round as soon as all interviews are conducted and evaluated.
10.4.5 Interview - Participant 5

Interviewer:
Okay. As you can see from the structure I sent you, there are two warm up questions. So, my first question would be, what is your personal definition of an economic bubble?

Participant:
First of all, an economic bubble is the overvaluation of a company value or a company in general compared to the actual value or the actual cash flow of the company.

Interviewer:
Alright and can you think of indicators with the ability to create a bubble?

Participant:
Ehm [...] I think, that the point of view is always important. On the one hand the circumstances to raise equity or a loan. So, the question is how do the financial markets look like in the very moment you want to raise money? If it is difficult to get loans for a low interest rate due to a lack of offerings, this can be the cause for a bubble. This is also something that went wrong at the stock market. On the other side, also the technology evaluation is important. What do I expect, what cash flows do I expect? That is a necessary question because the money must flow back at a certain point in time. There it doesn’t matter what investment we are talking about. Take for example photovoltaic systems. As long as these investments were supported by the government everything was fine and investors generated high cash flows. But the moment the support left out the companies struggled because the prices had to be increased what led to decreasing cash flows for the firm and everything went down. There were companies who delivered and installed photovoltaic systems and there were a lot of manufacturers as well. If I compare this to the current situation, there is no manufacturers left in this part of Germany.

Interviewer:
Thank you very much. The next questions focus in more on current events. How would you estimate the evaluation of technology related companies?

Participant:
Okay, most important are different points of view. First of all, the technical point of view. There you have to keep in mind how realistic something is, how easy it is to realize a project and how
sustainable a company or product will be in the long run. So, which risks are there regarding the technical requirements. Next, there is the legal perspective. Which laws do I have to keep in mind and which requirements do I have to fulfil. Does these requirements have an impact on me or my company? Take Uber as example. Ehm [...] in how far do I still have a legal responsibility when there is no driver behind the steering wheel anymore and what about the legal environment in which I would operate in. In Germany, we had this as well with bio ethanol. It was planned that bio ethanol should be mixed with usual fuel. A lot of investment took place from people who wanted to build production plants and from one day to the other the government made new laws and the idea was dead. So also, this must be kept in mind. Concluding this there is the economic risk. The question, whether a company has the potential to become profitable because at the end of the day, the value of a firm is defined by the combined future cash flows of the firm. The question is how these cash flows are defined. The cash flows are defined based on the quantity as well as the price I can ask for. Dependent on that it has to be controlled whether there are competitors in the market with the same offer and so forth. You can observe this in a lot of technology companies. Take for example Amazon which managed to become the dominant force. And a lot of competitors who basically wanted the same went bankrupt.

Interviewer:
Would you describe the current investment behaviour in technology related companies as healthy/sustainable?

Participant:
You mean from an investors perspective?

Interviewer:
Yes, from an investors perspective.

Participant:
Well, I think the investor get the idea of sustainability. The question is in how far he can really assess this. Me for example, I am working in the Fintech sector and the regarding payment transactions. And there are a lot of Fintechs. And there is always one question. How realistic is it and how sustainable is the idea? Sometimes it is difficult to assess this. The thing is [...] today the way how a product is developed or how a company is founded completely changed in the digital age, compared to a few years ago. In the past, you created long time planning, developed concepts and everything has to be proved really intensively. This doesn’t happen anymore. You develop
ideas, try to build an MVP and afterwards everything that is important is done. This happens in a very limited amount of time. So the tactic how to found a company also completely changed.

Interviewer:
Most of the companies we are talking about are in the technology sector. Would you say that this investment behaviour exists in technology related companies exclusively?

Participant:
It is not in the Fintech sector or the technology sector exclusively. It is also for example in the banking sector. Basically, in the whole service industry. We work the same way. The German bank comrades offer innovation labs which can be used to improve the financial supply chain. So, we try to find a way to link our bank to the financial supply chain of our customers. Right now, we are developing a software product which can take all tasks a secretary did the last years. And like this there are several ideas for example a start-up which managed to get a banking license and which is focusing on receivables management. Someone tried this at a big bank, was rejected and starts now over with a start-up. And this project seems to be successful.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
Yes, I would say [...] technology is one example of a mega trend. It doesn’t really matter what trend we are talking about. But in our society, there are a few trends which become popular and these trends are mega trends. A lot of people want to follow these trends. Today as a product manufacturer I must produce a product with a technological important feature. If the product has now high tech features than nobody will buy it. If you need the product or not doesn’t play an important role anymore. Whether it is a car that must be connected to the smartphone. The smartphone itself is the best example. In the early days, it was just a mobile phone. Nokia itself was in the position to create a smart phoned but didn’t because they thought people only wanted to use it as a telephone. And this list goes on and on. Everything is about the technology sector where a lot of changes happened. A customer can write invoices and take pictures of bills via smartphone. So there is a lot that changes in the behaviour of the customers and this attracts potential investors.

Interviewer:
Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
No that is a fact. Of course, big investors with a positive image can definitely have impact on other investors. Other investors who maybe don’t have the capabilities to control everything but also want to get money.

Interviewer:
Can you think of an industry branch you would invest in?

Participant:
Yes, basically I would say yes. Our lives will always be influenced by technology. Therefore, the question is [...] I always ask about what are we talking right now and for whom does it fulfil a purpose. If I can say there is a technology which is capable to solve problems in today’s society than the technology will be always successful. Take for example medicine. Every medicine that was capable to help people became very popular. The same is the case for everything else. As soon as there is a technology is able to solve a problem which executes pressure on the market there is money. In these sectors, I would invest. It is much more difficult to invest without knowing which target group you have. It can happen that a hype comes into being but most often this hype is only for a short time and then it is over.

Interviewer:
The next section is focussed on future scenarios. So, what effect would a burst bubble have on society and economy?

Participant:
In the end, it would be a counter-reaction. Capital would actively leave the market. The industry would have tremendous problems to get capital for investments. The same goes for the stock market. If there is a crash, the stock price goes down which is a psychological effect eh [...] the winners will be the capital strong investors who can afford to lose some money. The companies that are strong enough will survive due to good management, money or the best idea. So, in part a market shakeout.
Can you think of mechanisms to protect society from another bubble?

Participant:
No, I would compare it a little bit to the rating process we as a bank use. The rating process we use is more or less like a black box. During this process, different indicators are gathered and at the end of the day there is an outcome. The goal is to define the probability of a credit default with more than 70%. If this figure is wrong we have to adjust until it works out. That is basically a rating process and this is also basically how I would start to define such a framework. In your example, you have to define what are the most important drivers or indicators for the success of a start-up. This can be hard numbers like return on investment or the equity structure of a company positioning in the market. In the end, you just have to check on an annual basis whether you reached the goal or not and are the remaining market factors still the same or did they change. The moment something changes this has impact on the framework and has to be adjusted. By doing this it should be possible to predict a trend.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
I don’t think that they would be interested in it because in the end, the money also leaves the financial markets. In the end the money goes to the companies. The trust in the financial markets would be much higher if those risks were there anymore. It doesn’t matter where the investment was made, at the end of the investment I made money. The only thing I have to do is to bridge the time when the courses are falling. Even if I experienced the biggest crash I will leave the market with plus. This is similar with the financial markets. People only invest if there is money to make. On the other hand, crises are substantial and companies who are not competitive in the market will automatically exit.

Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
Regarding the mega trends [...] technology includes different sectors. Everything that has to do with health is still very close to humans and I can still make a lot of money with is. If it is about real estate or technical stuff, a lot is related to health. Start for example at the banks. We have a lot in our portfolio like private retirement funds. If we talk about real estate than we talk about credits for
age-appropriate living. Different phases in life require different housing. You don’t stay in the same house for 80 years. If you go to the supermarket, every market has its own organic food sections. People are willing to spend the money for these goods.
Interviewer:
Alright I would suggest we start with the interview. Read the question and let me know when you are ready.

Participant:
Alright. According to literature, the classic definition of a bubble is the separation of a product from a realistic value. We experienced this several times in the energy industry as well as in the oil and fossil fuel markets. On the other hand we experienced in 2008 until 2009 in the real estate sector in the united states. And the most important factor is the separation of the value. Comparable to the tech bubble right now is the Dotcom Bubble in 2000. What happened there is also relatively easy to explain afterwards, namely a massive over valuation of future potential. These are the typical main factors of a bubble. The secondary factors are access to capital, liquidity of the markets and the existence of alternative investment opportunities. This means, if classic products like bonds and fixed- interest bonds are not attractive anymore, but also the short liquidity yields of bank typical products cant promise success due to low interest rates investors tend to invest in alternative opportunities. This leads most often to share derivate investments. These are from my perspective the relevant factors of a bubble.

Interviewer:
So, there are relevant factors like low interest rates?

Participant:
Bubbles are like traffic accidents with planes. There is no such thing as one dominant factor, but there are several small factors which interplay leas to the rise and burst if bubbles.

Interviewer:
So you would say, what happened at the end of the 1990’ s or 2007 as a good example can not be a framework of factors that can be applied for every crisis?

Participant:
No. In the subprime mortgage bubble the problem was much more complicated. This has to do with the USA model how to handle mortgages. As German consumer, you can´t really imagine this but in the US, it is possible to dump your house from one moment to the next one. So, you dump it because you are not interested anymore and you also leave all the obligations behind. In the end, the
bank keeps the house and the debt. In America, it is also possible to refinance a mortgage without putting the resulting money in the house. So, if you bought a house in 1990 and decided to negotiate new terms for the mortgage 20 years later, the money you gained through this process was put into a new Mercedes rather than into mortgage repayments. This has nothing to do with the real product, real estate but you have to pay it back. But now the interest rates went crazy a lot of people couldn´t cope with these developments what forced banks into liquidity issues. The consequence was refinancing through the banks to their customers. The reaction of the customers was to leave their houses and leave the bank with the debt.

Interviewer:
Okay. How would you describe company validations of nowadays companies? Take popular examples like Uber, Snapchat or Spotify.

Participant: Per se it is a bubble lookalike situation because there is no real alternative except stocks and stock similar investments. Bonds are, right now completely unattractive for investors because we are currently captured in low interest rates or even minus interest rates. So, the money automatically goes to the capital markets. This is also supported by the central banks world-wide except FED who back up their stocks what forces a lot of investors to check for alternatives since they promised their investors financial gains as well. So, there is a lot of money in the market and the money doesn´t know where to go. This can be seen at the real estate markets. If we observe the price development between 2007 and today in real estate there is rise of roughly 50% within the big five cities in Germany. The wage level rose, during the same time about 10%. This indicates 40% of price increase which can´t be paid with normal salaries. This shows how the development of the markets in Germany as example. On the other hand, there are also positive examples, like Facebook. They also went public without a classic business model and were criticised for roughly 2 years. But they showed that their methods work and are successful now. This means they manage to monetize their business model. The consequence is that other late arrivals are willing to bet on the same success Facebook had. That is also the reason why investors back them up with money. The bet is, does someone manage to enter, dominate and monetize the market or not.

Interviewer:
would you describe the current investment behaviour in technology related companies as sustainable?
Participant: I would say, when we see an investor’s portfolio, than there is no winner takes it all because it is only 5% of the portfolio of investments. A valid portfolio cannot be based on such companies. The question regarding the sustainability is more whether the industry people invest in has enough potential to realize a monetizing strategy in the long run. Tesla for example has the problem whether they will be capable to realize a profit generating business model. Can Tesla realize a profit of 8-10% or not after they entered the target segment? This segment is interesting because they have money. And that is the question. What we can see at Tesla are higher revenues but also higher debts. This is not really sustainable. What I really don’t understand is Snapchat because they tackle the target segment of people with an age between 12 -20 years. This is roughly 90% of the customer base and this segment is not wealthy nor is there any long-term commitment. As soon as there is a better opportunity all the customers are gone. Contrary, Facebooks average customer age is roughly 30 years old and there are a lot of groups. One time the customers created groups and these stuff, they will stay with Facebook until it goes down. The intention to switch to another platform is much weaker than in the other example. Parallel to this the willingness to pay some money is higher. So, step by step the customer base can be monetized relative fast. So, to answer the question, you can’t define a solution that fits everything. You always should keep in mind the business model and judge in that. Generally spoken, a market overheating is observable because there is too much money at the market without any idea where to invest in.

Interviewer:
Almost all examples you mentioned were technology related. Would you say that this investment behaviour exists in technology related companies exclusively?

Participant:
I would say there are always development in industries. Those destructive mechanisms reach from one industry over to another one. This started in obvious sectors, namely communication. Due to this the Facebooks of this world who started really early. Afterwards the trend went to Fintech, automotive and right now we are relatively advanced and focussing on the health technology sector which is the most regulated sector. So, it is not technology specific but rather focussed on the destruction and market entering. This means, how bigger the destruction and the related chance to enter a market how more phantasy is put into the valuation. There are also negative examples, Twitter for example. They still have no idea how to monetize their idea. It is a little bit like Wikipedia. It is extremely valuable for the world but lacks a commercial right to exist at the market.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
Partly I think yes. There is too much stupid money in the market right now. This is supported by the central banks. On the other hand, we have major problems with the raw material markets which are extremely volatile. So, investors have less options to go to. So, the primary factor is too much money and the secondary one is inhibited potential through industry 4.0. There is a strong tendency towards change in every sector. Incumbent players in the market can’t cope with this circumstances that fast and open the niche for competitors like Facebook who can. The reason is that incumbent players don’t seek for change. They have a steady business model and generate high revenues. Due to this the willingness to tackle your own business is relatively low. Take for example Tesla. They applied a modular principle in their cars and the body from a Lotus. This is not really innovative but other companies would not even think about since they had tremendous profit margins. There are not many companies who are really innovative. Only a few examples like IBM or Microsoft have this potential. Apple on the other hand always failed. When they introduced the apple watch it was a flop. Microsoft created the first mass suitable operating system.

Interviewer:
Would you say that wealthy investors and the global economy encourage the tendency to overvalue (pump up a bubble?)

Participant:
I think there are two kinds of investors. On the one hand Investors like Warren Buffet who administrate their own money and on the other hand investors who work with other people money. The investors who work with other people’s capital do not have the intention to manipulate the markets if they get their 10% to 20% cut. The only investors who would have this intention would be investors of private equity funds or hedge funds. This kind of investors could do it and also did. If we take Mr. Soros as example who almost managed to eviscerate the British pound. So basically, it is possible but most investors do not participate in economic bubbles. What they are doing is do arbitrage business which are more short time oriented business models. This was demonstrated by US banks and how much money they made when German banks bought the subprime bundles from the banks. The ones who really understood the business weren’t in the bubble for a long time but rather in the arbitrage business. So I would answer with no. There is nobody who really fosters the
bubble because the end of the bubble is difficult to foresee. You can see that the bubble will burst but not when.

Interviewer:
Can you think of an industry branch you would invest in?

Participant:
Probably health.

Interviewer:
What effect would a burst bubble have on society and economy?

Participant:
Redistribution. The burst of a bubble is comparable to the aftermath of wars. Most often the people suffer most who failed to get money during the rise of the bubble. During the Mortgage bubble, you can see that the real estate agents made the most money and suffered at least. The people who suffered were the pope who had no idea that they were taking part. Take for example a 60-year-old couple that invested into a subprime business without knowing it. The money redistributed.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
No, I don’t think so. Financial markets want movement. They want that goods, services and derivates go from A to B as often as possible and as fast as possible. Financial markets are interested in a working economy. Were the share prices is really irrelevant. Seen in a big scale it is not important whether the DAX is at 10,000 or 2.00 points. It is always relative related to the investors.

Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
I would say technology is going to ubiquitous in the markets. Years ago, it was only an industry but it becomes more important in every segment. So, technology for me is a little bit like crude oil of
the future. The question is what are the Googles and Facebooks doing with this resource. I would say that there are several sectors. In the aftermath, I think that the health sector is really interesting one because it is really regulated and outdated.
10.4.7 Interview - Participant 7

Interviewer:
Okay, lets start with the first question. What is your personal definition of an economic bubble?

Participant:
Okay, my personal definition of an economic bubble. According to my opinion there is always a speculative business and a driver that makes a lot of money through these speculations. This was the case during the past crisis. So, you need a drive that makes money, through this the bubble gets pumped up until the bubble bursts. Until this point a lot of money can be made.

Interviewer:
So would you say that the term can be really understood as a bubble which get pumped up until it bursts?

Participant:
Absolutely. Maybe not in the very moment the bubble is pumped up but [...] it is a good comparison to see this phenomenon as a bubble. In the meeting prior to this one, we talked for example about different food delivery services which are also highly overvalued. For start-ups, the most important figure is growth. If you want to grow you can take over other companies. But the very moment you buy a company to cheap, this would have negative influence on your own valuation because it looks better on the financial statements of the firm that takes over.

Interviewer:
Why is it better to pay more than the value of the company?

Participant:
Because it goes directly to the company’s balance sheet. How many people consider the specifics of the trade afterwards? How many customers, how many assets did the company gave us? Not much. But all people have in mind for how much the company was bought. That is one popular trick to raise the valuation and also over evaluate a company. So, the idea is that I can say my company is much more worth than it is because I bought another company for a value higher than the intrinsic one.

Interviewer:
Can you think of indicators with the ability to create a bubble?

Participant:
A lot of bankers made good money with the rise of the bubble. And people who make a lot of money are motivated to keep the status quo up. The same logic is also true for companies. What I already mentioned at the beginning of our interview, for the rise of a bubble overvaluation is necessary.

Interviewer:
How would you estimate the evaluation of technology related companies?

Participant:
This depends highly on the company and the business model they have. Some are overvalued, for sure. Others are not.

Interviewer:
In how far would you describe the current investment behaviour in technology related companies as healthy/ sustainable?

Participant:
I would say, this depends on who is investing. In general, Venture capitalists have work sustainable. So, it has to be focused on who invests when and in what. A Venture capital fund with a wide spread is definitely sustainable. Business angels on the other hand focus more on risk and hope that 1 out of the 10 investments is really booming. To check whether the investment structure is sustainable it is important to check what kind of investor is investing. In general I would say that the investors believe in sustainability because otherwise they won’t do it. I don’t think that the goal is not to burn money for 5 years’ bur to work sustainable. If we consider how long risk investments are existent than it becomes obvious that this investment did not start with Facebook but was already common during the 80’s.

Interviewer
Does this investment behaviour exist in technology related companies exclusively?

Participant:
I would say yes since most companies who ask for funding right now have some technology related background. To elaborate on the last question a little bit more […] if you relate to the crisis from 2000 than you are right because the companies did not produce any goods and the business model wasn’t tangible at all. If you compare this to an investment for example at N26 than you realize that
this company is a bank like every other bank only with a more customer oriented image. This creates value by itself and lead to a current valuation of roughly 150 million dollars and 300,000 customers. It is definitely worth to ask whether this valuation can be justified or not but according to my opinion it is not heavily overvalued. I think if you check other companies and segments like the already mentioned food delivery companies than it looks somehow different. I would say, that there are overvaluations. The same goes for Krypto currencies, AI and machine learning. I would say that there is a hype. I think the attention is justified but bares high potential for disappointment. The consequence would be a disappointment for the investors and burned money. Due to this I would say right now we have overvaluations in some segments. Since they are all somehow related to each due to the technological connection it could be stated that right now a lot of overvaluations takes place in this sector.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
Of course, technology is one important driver that brings a lot of uncertainty and high uncertainty brings high returns. The real estate crisis was under more caused by loans, given to people who couldn’t effort to pay back their loans. The situation in the US is now improving but we in Europe still have the base interest rate of 0,0%. It is possible to get a real estate for 1,7-1,8% if there is at least a little bit of equity. And still, the banker calculates a standard repayment of 1,0%. If I have a low interest rate of 1-2% I can adjust them in 15 years and optimize them. By doing this I as investor have a certain buffer for a raise in interest rate.

Interviewer:
Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
I Don’t know the influence of Warren Buffet and co during the last real estate bubble. But It think it was Warren Buffet who bought big stakes of apple shares and raised the stock price by doing this. So, these people have a lot of power. On the other hand, these people are in the business and have a tremendous amount of experience. Due to this, at least 80% of the markets they manipulate are probably publically available information which are only used in a smart way by those people.
Nevertheless, greed, making money […] and the chance that someone pushes this further to make money always bares the chance that someone will try to manipulate to take an advantage. Whether they are capable to produce a bubble is beyond my knowledge. If you focus on the situation in Europe, the investment strategies are not transparent. Due to this ownership structure changes without anybody taking notice of this. Another option is to go via small bubbles like project A, which is a rocket internet company, to pump up a bubble. Nevertheless, I don’t think that a real bubble can be pumped up by one person alone but the trend for other investors to follow can definitely be there.

Interviewer:
Can you think of an industry branch you would invest in?
Participant:
AI is a super interesting topic. Maybe I would say something else in six months from now but right now I would invest in this branch. Even though I would have to learn a lot I would say it is a branch which is worth to put money in. Another branch which will grow, even though not that fast are alternative energies. There was a lot of money burned with all these solar companies here in Europe. The last big solar power companies filed bankruptcy a few weeks ago but in the end alternative resources are a branch I would put my money in. And privacy company. You know, we reached a certain point we realize that we ae not the owner of our own data anymore. Due to this I think that step by step companies will be founded with the focus on privacy. This has potential for private users but also for governments. How will an ID look like in a few years for example, how can I identify myself, how can I assure that my data is safe and only an authorization finds place and not everyone can get my data? This phenomenon is ubiquitous. It doesn’t matter where you are or what you are doing, your life can be analysed pretty well.

Interviewer:
What effect would a burst bubble have on society and economy?

Participant:
Yes […]. That is difficult to define because we don’t know which bubble is about to burst. Regarding the economy, especially when we focus on an industry which is mainly financed by foreign equity and risk capital, the investment structure will adapt to these changes. The banks, the government and the investment behaviour will adapt.
Interviewer:
Can you think of mechanisms to protect society from another bubble?

Participant:
I don’t know whether this opportunity exists already, especially this subject is a pretty sensitive one. If we talk about investment structures it would be possible to check which companies make an investment and at which point in time. Companies like Uber communicate these investments transparent but the broad mass does not until today. A bubble does not rise around one company. I think overvaluations for single companies are made daily. Nevertheless, these investment does not have the market power to create a bubble. Investors will only use their money and but that is a risk the investors take voluntarily. But if we are talking about a industry wide mechanism including all companies who are operating in this assumed bubble than all companies have to be screened parallel. Right now this is really difficult due to national differences in reporting and transparency.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
From an investor perspective, this makes sense because they make a of money in a short amount of time. The question is how the industry will react. Wrong recommendations can lead to severe damage in the industry what will lead to a decrease in investment and the industry can’t evolve.

Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
This is a little bit like asking Albert Einstein what will follow the age of industrialization, so pretty visionary. Ehm […] I think it will go along with wealth. The question is also, what is technology? Almost everything hast to do with technology, technology only constantly evolved during the last years. Difficult to say, difficult to say. Technology will have a long journey with us together. AI, machine learning. I think that the limiting factor won’t be technology but rather, wealth, time and how we cope with this in our everyday lives.
9.4.8 Interview - Participant 8

Interviewer:
First of all, I want to thank you very much for your time and your participation for my master thesis.

Interviewee:
No problem.

Interviewer:
Okay great than let us directly start with the first question of the interview which can be seen as an warm up question. What is your personal definition of an economic bubble?

Interviewee:
Ehm [...] I would say, an economic bubble is the consequence of a deviation between the intrinsic value of a good and the value that a person is willing to pay for this good. So, it is a misinterpretation. Take for example the late 1990’s. During that time, a lot of young companies which were two maybe three years old went public, just because they knew, that there will be someone who is willing to pay a lot of money for the shares. And it happened, the people went crazy for crazy single tech company IPO.

Interviewer:
Okay. That is a quite direct definition and a good example. Can you think of indicators with the ability to create a bubble?

Interviewee:
I would say that this is difficult to define because the nature of the bubble is always different. The Dot.com bubble for example was a classic economic bubble because people bought the good no matter what it cost [...] just a little bit like the tulip crisis, the first recorded crisis. If we compare this scenario to the real estate bubble in 2007 there is no common sense. There we had the problem that loans and mortgages were granted to completely subprime customers. And the banker did not stop the problem because they knew what would happen if this fragile equilibrium is disrupted. Due to this they started to bundle the debts, gave them a high rating and sold them to hedge funds bank and so forth. This was really clever, but compared to the tulip crisis it was a more rational crisis in my opinion. To conclude this question, it is not so easy to define classic indicators otherwise someone would have done it after the huge amount of bubbles we had in the last 100 years. But there are
always the false beliefs of people. These people could be banker with the intention to get high returns or private investors who think they are smarter and leave the bubble before its burst [...]. always the people who think they are so smart, but in the end, they are part of the crowd.

Interviewer:
True, those were different bubbles in their nature. Can you tell me, how would you estimate the evaluation of technology related companies?

Interviewee:
That is a though question [...] I think that as consequence of the last bubble there are some mechanisms, regarding the valuation of a company which perfectly fine. These valuations focus on the potential of the company on the other hand but also on the Key performance indicators like growth, revenue et cetera. If these indicators have no chance to reach a certain point in a certain time than the critical mass can’t be reached and the investment will often not happen. On the other hand, you are also investing in the potential of the company which is really hard to define with hard numbers. Also, potential can’t predicted that easy because you have no idea when a trend occurs and how big it is going to be. If you are investing in an innovation which is currently a trending thing than you are probably already too late. So, it stays a gamble on the future revenues of the company. And this gamble is makes the difference between the losers and the winners. Some of the biggest investment during the last time were highly overvalued like Facebook but were successful afterwards due to their ad building. Snapchat on the other hand suffers from decreasing share prices. Both were radically new, had potential and were hyped but yet only one of the two companies were capable to commercialize in this. A business model is the start but the potential of the idea is hard to define.

Interviewer:
Great that is more or less in line with my findings. In how far would you describe the current investment behaviour in technology related companies as healthy/ sustainable?

Interviewee:
That is difficult to define right now. As you probably know, we as VC’s always look for great opportunities that give us the chance to Exit with a nice multiple of sometimes five or eight times our investment. Furthermore, the time horizon is important. Even we as private equity provider can’t effort to wait 15 to 20 years before an investment breaks even and returns the money. Due to this we are looking for fast growth like the so often mentioned hockey stick [...] Eh but in a more
realistic way. We know that the time horizon of 5 years until the break-even point is not always realistic, especially in a business that requires a lot of customers paying small amounts of money like software users. So, again I would say, that we as VC try to work sustainable but the company is not always capable to do the same. Furthermore, we are, compared to some colleagues quite conservative. There are a lot of VC’s with a quite wide portfolio and they are willing to invest in a lot different sectors even if they have no clue. Take for example Rocket Internet. They did a good job for ten years but face major problems right now […] I would say that the investment behaviour is often not sustainable.

Interviewer:
Okay great thanks for this elaborated answer. Does this investment behaviour exist in technology related companies exclusively?

Interviewee:
I would not say that this in this industry exclusively because there were several industries and several products which were in a bubble. Also, there are a lot of bubbles which occur on a regular basis. We don’t see them because the impact is not that big but other industries like oil, gold or whatever have ups and downs as well. The difference is, that not everybody is interested in gold or oil right now but everyone is interested in technology. What is the latest smartphone, how can I augment my reality and so forth. Due to this it is not the industry which is interesting but paying customer base which makes the industry and possibly dangerous at it is. So, no it is not only in tech industries but right now it is very often because tech is trending.

Interviewer:
Okay, that makes sense […] ehm Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Interviewee:
Yes, definitely […] because everyone loves his technology and is obsessed with the latest stuff. It doesn’t even have to be useful. It is about being up to date. Take for example banking which was a absolutely death and boring subject for decades, at least for everyone who was not playing the big game […]. A few years ago a lot of Fintechs came into being and executed a lot of pressure on the banks. These Fintechs are exactly the same thing as the banks before but only digital and with a focus on the customer needs. Or the Blockchain […] nobody cared how personal data or certificates
can be stored at Mercedes. This changed after the invention of Bitcoin and the first occurrence of Blockchain. So yes, this is an enabler.

Interviewer:
Okay, great. Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Interviewee:
[..] I say, it would make sense. If you have enough money to foster an upcoming trend and make it a real thing [..] and you can wait quite a long term for the return or even lose it than yes. Augmented reality was already used in the 60’s but it took almost 50 years until it became a trend. If we go through this scenario with bitcoin we know, that it is a highly volatile investment but high risk means also high return. Within a few weeks your investment could be 20 or 40 times the initial one. Would you do it if you are sure that you know when a trend starts and when it becomes dangerous?
I would do it because I cause the trend and leave when it becomes dangerous based. So, I would say it is possible and people are doing it.

Interviewer:
Can you think of an industry branch you would invest in?

Interviewee:
I would not invest in one branch but rather an eco-system. I would go for health I think. People are getting older and older and they don’t want to die. So, I would invest in drug R&D as well as experimental therapy option with augmented reality for example. So, everything were people are willing to pay all their money for in order to have a good live afterwards [..] everyone is happy.

Interviewer:
Smart idea. This was the second part. Now I want to continue with the third one. What effect would a burst bubble have on society and economy?

Interviewee:
I would say it depends on the nature of the crisis. If it is a tech bubble like in 1999 than one industry is screwed and all other industries stay stable. The money will only leave this market and is
distributed to other markets because money must be invested. If it is a crisis like in the real estate crisis than the everyone is affected because it affects the business man as well as the small mortgages taking family father. After boom, there is depression. After depression, there stagnation and upturn. So, the first reaction would be that the money leaves the market and regulations will discussed. This goes hand in hand with companies’ bankruptcy and unemployment.

Interviewer:
Can you think of mechanisms to protect society from another bubble?

Interviewee:
I think this is difficult to say […] after every crisis there were so many regulations and some of them are still active. They define who can spend how many capital on what and when. They define everything. But still there are people who find a small crack in the wall and slip through it to take advantageous. This is especially possible because no crisis is the same. There are some indicators which are always there like a lot of money in the market without return brining investment alternatives. But still, the crisis is different every time. Due to this would say there are no one fits all solutions out there.

Interviewer:
Alright. Do you think that financial markets would be interested to prevent bubbles from rising in future?

Interviewee:
Ehm […] I think it is not positive for the markets to have a bursting bubble because of the recession which often follows the burst. On the other hand, low interest rates and a lot of destroyed companies foster the economy. I think economy is not in favour of a crisis because steady growth is a more convenient strategy but in case of a crisis the financial market and the companies which are affected will consolidate and start over.

Interviewer:
Okay, then I have only one question left. What would you think is the next enabling factor/ trend for high valuation?

Interviewee:
It stays with technology I would say. The thing is that all the mega trends of the last centuries like industrialization were there for quite a long time and still have influence on the way we do things. The current mega trend is roughly 30 years old what means it is roughly at 50% of its potential. Furthermore, you have to consider that we try to put technology in things that don’t require more technology. Take for example a fridge which is connected to the internet or the illusion of flying cars. The market is there and people embrace technology in their lives. It is only understandable that this trend stays. But me personally, I can think AI and machine learning, that could be the next real big thing. Not reacting but rather anticipating what comes next, find a solution based on trial and error just like humans do.

Interviewer:
That was a great last close for the interview. Thank you very much for your time.

Interviewee:
You are welcome.
Participant:
The question for me was how can a company which exists for roughly two years, with a business model which can be copied easy can get such a high valuation. And if you go back in time and look at Facebook the question was the same in the beginning. A lot of Vc´s entered the market and supported the funding round and the only thing you can think of is ‘how is it possible, that this company gets such a high valuation’ and what is the revenue model. After a while, two value adding components became obvious. On the one hand ehm [...] you had an access to the end consumer, the costumer however you want to phrase it. The second component is, especially at Facebook, that it is an extreme data leech. Maybe they are a little bit restricted in Europe but in the US they can get much more data from the customer. Out of this data they start to create value. The first step, of course is commercial and there are a lot of other purposes. Take for example the Cambridge magazine which claimed the ability to aggregate useful data from Facebook during the last election. And if this is true than there is a lot of value that can be extracted. Big data has its right to exist and can be used in numerous ways. And Facebook tries to position itself as the overlapping link. I don’t know much about the technical background. I was more occupied with banks and the investment, so pretty boring compared to this.

Interview:
And that is exactly what I am interested in. I know that there are business models like Facebook or twitter who actively conduct data. But on the other hand, I found Companies like Snapchat which claims to delete data after a day and asked myself how those companies will accomplish to generate money?

Participant:
I am not so sure about Snapchat and Spotify but there are a lot of companies who became rich with such models, take for example amazon, Google or Facebook. What you say is true in principle. The data of the user does not get lost and you have no idea what they are doing with this data. They can delete the content which was produced by their customers but the behavioural patterns and the way the user works can still be used. Based on this you can create commercials and a lot more. You learn so many things about people, based on their behaviour.

Interviewer:
Thank you for the great introduction. Now I would like to proceed with the interview structure. What is your personal definition of an economic bubble?
Participant:

[...] According to my definition there is a bubble if the valuation of a company stands in no relation to the fundamental value of the produced good anymore. For example, during the 1990’s when all the technology companies came into being because they were new ehm [...] the problem was to evaluate them. Of course, this evaluation was partly a bubble and partly a hype. So, a learning effect first had to be established because you as investor have to understand how such companies behave, what is important and what the real potential behind the idea is. If you take for example virtual reality, we are talking about for years but the real potential and the real application fields is only now more or less defined. This is relatively crazy because a lot of people thought that the potential would be very high and after a while people realized that the fundamental usage of the technology wasn’t really defined. The consequence was that the valuations decreased. According to my opinion ehm [...] this is the difference between the options which are there, so the fundamental application fields and what investors see as potential investment in the short term. This must be corrected afterwards, if the rose- coloured glasses became too rose coloured.

Interviewer:

Okay but Can you think of indicators with the ability to create a bubble?

Participant:

I think this is really difficult to define. You have to differentiate between the different kinds of bubbles. If you compare the tulip crisis [...] I would argue that 2007 was really something special because there was a long growth phase of the bubble, the belief, that the depression was overcome, huge changes in the financial systems, regulations and so forth. Furthermore, there was a mix of products that nobody understood anymore. This is completely different in an asset crisis. During this crisis in America there were not only the house wives who did not understand the situation but plenty of investors who also didn’t understand the situation they were in. Of course, we can talk about low interest or whatever but [...] at a real stock bubble you don’t really need low interest rate, you need enough people who think that the future will look bright for them. They assume that everybody will become a user of this technology and this in turn will bring the big benefits. Take for example apple. Right now the share price is relatively stable but the bet is that they will launch a real innovative product which is used by everyone and the courses rise. How longer it takes to launch the product the more stagnation will be there in the stock price. The question is when does the innovation come, when does the next generation come, what does the people really want? And
can you make money out of it? So, what I want to say is, that in past the focus was on short term earnings. The problem with these short time earnings is, that it is difficult to foresee how much you can expect. You can say, these are my past earnings or these will be my future earnings. You can say for example, my profit expectations for year 2019 were really high but two years later you have to revise them. So, this is not really and indicator [...] It only helps you afterwards.

Interviewer:
Would you say that a lack of opportunities to invest in is also a reason for this investment behaviour?

Participant: In times were money really cheap and stupid money is everywhere, the money has to be spend. So, it has to be invested profitable. And in this case the goal is to get a little bit more out of my investment. The question is in how far the collective believe into one hype helps to realize it. As long as the majority things that it is possible, it often is possible.

Interviewer:
How would you estimate the evaluation of technology related companies?

Participant: I think some of the companies have correct evaluations. Take Facebook or Google. Both had high valuations. Look at them today, they are conglomerates which are operating in so many sectors. Look at Amazon. How many years was Amazon profitable? Maybe two? And now look at the division that became one of the biggest revenue drivers. It is AWS what probably nobody expected. So, some companies have revenue generating model and some not. But to really be sure which company is going to be successful and which is not you have to read tea leaves. Sure there are investors who are ‘hard money’, these investors know that there is someone entering the market and they follow. But you also must keep in mind that these investors put a lot of effort and time into the fundamental analysis of the companies they plan to invest in. This is not only stupid but also smart money. If you have broad but smart selected portfolio you can make real big money. Of course there is the option that you hear about a product and you invest and you get lucky [...] but for me it is more like roulette. You can better execute a professional fundamental analysis.

Interviewer:
So, would you describe the current investment behaviour in technology related companies as healthy/sustainable?
Participant:
Of course, there are companies that get acquired by bigger ones like Facebook or Google. So you can enter the company and pursue this strategy [...] after all it is also a strategy to make money. Take another example [...] take Yahoo! which was a real stock market start with a lot of potential. They could become what Google is today. And what is the current value of the company [...] I have no idea. And the investors who put their money into Yahoo! weren’t stupid at all. The problem with investment is that you must be hard to yourself and also confess that you are not the smartest person and that you make mistakes. The thing is that people wants to believe their own bullshit especially after they put so much time and effort into the project. But most of the people don’t make an investment with the intention to make losses. Most of them start an investment with the belief that they can generate real money with a share [...] they realize this only afterwards. Nobody buys an IPO to make losses.

Interviewer:
No, that’s for sure. Does this investment behaviour exist in technology related companies exclusively?

Participant:
I would say that this behaviour is especially the case for technology companies. It doesn’t really matter whether this company is a Fintech, biotech, insurance tech or whatever tech. The question is more [...] you tackled a good subject. There are two components. The first one is the question what is new and what will be standard in future [...] what will be the product, everybody wants to possess in future? The second component is of course the scalability. Consider Facebook compared to apple. Hardware is much more difficult to scale than software. What apple did [...] apple is more a traditional firm compared to the new tech companies. Facebook in turn is another generation of firm but also extremely successful. Consider Microsoft, they exist for decades and still accomplish to keep a relative high market share. This is also not a new tech company but extremely scalable. An old tech company like IBM generates a lot of money with consulting services. Every company has to evolve. But, you are right, if you have a product which is extremely easy to scale up and has the potential to generate money. Low fixed cost and revenues would be a reason for me as investor to buy or invest in the product. The idea is to recognize the next trend.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
This is definitely an enabler because it is much easier to translate an app into another language than to build up a production plant on another continent.

Interviewer:
Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
I think this is a difficult question ehm […] see if you manage a hedge fund today you must keep the alignment of interest in your mind. This means you as an investor must put a lot of your own money into the hedge fund as well. I think on a big scale the investor is the idiot […] when I am a big investor, it easier for me to get money. This means that I have different resources. I have better tools to get and evaluate information have access to different option to trade. This means that I as a professional investor have different opportunities than the small ones. If I make more money with my investment doesn’t really matter anymore. On the other hand, there was a research with three monkey and three hedge fund managers who will make the better deals and in the end the monkey won. Than you have to think if you want to pay the 2 % for someone to manage you fund. Real investors often only react if the courses react or when the media reacts in the form of news or newspaper articles. Than the investors knock at your door and complain that the stock is not secured.

Interviewer:
Can you think of an industry branch you would invest in?

Participant:
I would do two things. I would buy a cheap Share holder index tracker and then I would invest in Fintechs. Not because I think that Fintechs are the future or something like that but because I have knowledge about this industry. This means I can check a few stocks and look whether I see potential or not. Okay […] on a more macro level I would go for the next enabling technology of course. Also, there is a market for technology that keep the society busy ehm […] Health care subjects for example. I believed the renewables are cool […] not anymore because it is
probably to mainstream. Nevertheless, these are macro subjects with potential. Or you do a classic move. You can invest into alcohol, drugs and rifles. Another idea would be Biotech because as soon as someone sees that there is a value it will explode. The thing is you have to understand your business and if you spread small investments over a range of opportunities than only two or three of them have to explode to get you return back for all other investments made. This is how angel investors work, this is how Venture capital works. Furthermore, if you are a well-known and good investor you will get completely different opportunities. So, you can enter the company before other people do. And if there are enough well-known VC in a company than this is a good indicator for an IPO.

Interviewer:
What effect would a burst bubble have on society and economy?

Participant:
I would say this always depends on the kind of bubble. Of we are talking about a copper crisis than the effect will probably smaller than the effects of a bank crisis. But [...] look you always have to see this uncertainty and as soon as you burned you fingers once, you will be more cautious next time. The same amount of overshooting you have on the way up, the same amount of undershooting will be there on your way down. Then the question is how big the impact on society is. If we are talking about [...] I don’t know resource which is only needed for special goods than the impact will be relatively low. If it is a bank than you have people who sit on the street, lose their jobs kill themselves. Then there is a complete different situation. But sure, the same trust you had on your way up on the rose- coloured glasses, the same way you will see everything negative on the way down even if it isn’t that negative. You always try to find the middle course but you will never find it.

Interviewer:
Can you think of mechanisms to protect society from another bubble?

Participant:
Yes [...] if you can’t invest in risk capital than there is also no reward. I would recommend that only people who can afford to lose their money should gamble like this. Another chance is that advisories are heavier regulated. But you always have to take both sides into consideration. On the one hand people are always afraid of taking risks for their investment but on the other hand they
complain if the saving interest rate is low. And you have the problem that there is too much money in the market, which is caused by a low interest rate and also retirement funds. If you say that the money for retirements funds is generated through long term investments the situation occurs that the fund gets more money per month and the money must be invested in order to pay the retired people. So you as fund manager are happy to buy an IPO. So, you have different parties who want to invest like retirement funds, banks, the EZB, hedge funds and so forth and all of them want money. You don’t necessarily need low interest rates because there is more and more money that must be invested. This is more or less the problem but the money must go somewhere. The retirement fund can’t just say that they stop to invest and live with the negative interest rate because their investors need the money someday. Than you must invest in whatever you get. Those funds are extremely big. So yes [...] it is possible that bubbles occur on this way but just because the money has to be invested somewhere.

Interviewer:
Do you think that financial markets would be interested to prevent bubbles from rising in future?

Participant:
Good question [...] from a micro perspective, the investment banks love the movement of goods and the relate movement in stocks. Of course, with a certain degree of variability. If everything goes into one direction this would be really bad. In the end, everybody would love to see the stock price index increasing on regular basis. But this is not happening because humans want more than other humans. Due to this it doesn’t matter if it takes seven years or longer. There will always be wave movements caused by human nature. There will always be human who think they are smarter than everybody else. And there will always be humans who think that this first person maybe right and are willing to follow. Ja [...] everybody does that. If a student gets a good grade at university than his fellow students will also check how to improve their grade. The same goes for the stock market. We as humans always want to be better than the other ones. On the other hand we have a strong herd instinct. And then, have look at our consumer society. Everybody has three televisions. Look at the American trailer Parks. There is one television on the one side of the trailer and another on one on the other side. For the first one they filed bankruptcy and for the other one they got a new credit card. This has nothing to do with rationality but this is the problem. You can’t always explain behaviour with rationality but we as analyst try to do this and think about what has to be done in a rational way.
Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
Wow […] good question. To be honest it is difficult. I believe that there are a lot of different sectors with potential like health care since nobody wants to day but also mobility because the current solutions won’t be enough in future. There are to many people on this planet right now and there will be more in future. Maybe even space technology. There are plenty of potential candidates but for me they are all technology related.
10.4.10 Interview - Participant 10

Interviewer:
Okay great, then let’s start with the first question. What is your personal definition of an economic bubble?

Participant:
For me it is first discrepancy between real economy and valuation benchmarking. Ehm […] For example if you think about the value of customer data which is a factional value but still you need a buyer who wants the data. And monthly generated revenue with a real customer. The one thing is real, you have a contract with you buyer […] and a fixed amount of money is generated on a monthly basis. The other thing is fictional value. And if the scissor between the two values goes more and more apart then the value of the company is also drifting more an more away from the value that can be gained. The consequence is a bubble. Furthermore, if investors have no idea where to put their money, they prefer putting it in something unreal than putting it into the bank account. The consequence is, of course, that the bubble becomes bigger and bigger.

Interviewer:
Can you think of indicators with the ability to create a bubble?

Participant:
But that is more or less for the second question. An indicator for an economic bubble is […] if company validations increase massive within a certain period without a change of the important performance indicators. With massive I mean two to three years. This ehm […] if you look at us, the people don’t know where to put their money. If they bring it to the bank they must pay a negative interest rate. Due to this they invest in start-ups, they can’t grow fast enough to their expectations and then boom.

Interviewer:
How would you estimate the evaluation of technology related companies?

Participant:
[… at the valuation of tech companies there is one important indicator for me which is total cost of carry per customer. This means how much money do I have to invest per month, per year to keep my IT infrastructure going or to fix bugs. So, everything just to keep the thing going […] no additional feature only staying alive. There is a particular amount of money you have to pay per month, this is a significant driver. Scalability works into two directions. On the one hand, you can try to increase your customer base, on the other hand you can try to offer more features per
customer. These are the significant directions you can scale up to at technology driven companies. But if you decide to bring new features without getting new customers than it is important that the costs decrease per new customer. Otherwise you have an uplift and the costs go parallel with the growing number of customers. If you scale up to more features per customer it is important [...] for software drive companies you don’t have any human resource expenses per piece. This means, to design software, you have a one-time investment and afterwards nothing. If you produce a car you have per car a certain amount of costs which occur every time you produce a car. On the contrary, to produce the first disc with an new Windows iOS almost costs the whole amount of money. Afterwards it doesn’t matter if I sell it two times or 20 million times. There is no relevance. Ehm [...] this also implies, for every feature you want to bring, you have to consider on how many people you can split the costs. That is the other significant factor [...] I call it business value per feature. This means you control how many revenue you can generate with the feature and check how you can money with this. This is one important factor. The other factor I consider is how sustainable the software is. If you plan to implement a new feature, all with the same technology stack but with a different goal you would have completely different costs. Some things go fast but not sustainable which means that the costs grow afterwards. Other platforms have an initial high investment but in the end the costs decrease. Easy example, if you several technologies mixed up [...] usually this is done because different sources from different technologies help to finish the product faster. Than you have a lot of different technologies and the costs for security increase massively. You have to consider all the different components. Are you going to do everything with one technology stack or with different technologies [...] of course there are advantages and disadvantages. And last but not least, software is people business. The people who create the software are more important than the software itself. Programmer are artists and you have to check how the team is working, how high is the degree of automatization, how high is the transformation and how do the founders work together.

Interviewer:
In how far would you describe the current investment behaviour in technology related companies as healthy/sustainable?

Participant:
No, it is not. On the one hand, if you have a tech company you always execute a technical due diligence. How much effort, even at a tech company is put in auditing the books and to proof the technology. It is still the case that the technical due diligence, even at tech companies, is relatively small. This is because the people who are planning to invest into the company simply don’t have
any idea about technology. Ehm [...] this means even if they pay someone to do the due diligence, they have no idea whether this guy does his job or not. This means how precisely he is going to audit the software and with which tools doesn’t end up for the investors. They rely that the job is done thoughtful and I personally didn’t get to know a lot of people who do good technical due diligence. Most of them aren’t top shelf or just auditing the surface. Ehm [...] and since this is one major part of the valuation it is weird that there isn’t more focus on this.

Interviewer:
Does this investment behaviour exist in technology related companies exclusively?

Participant:
A real interesting thing is, that there are a lot of tech companies that are founded without a techy in the founders’ team. Ehm [...] companies where the founding team has a marketing or economies background but there is no techy in the founding circle. There are plenty of them. On the other hand, even it is more a valley thing, I don’t know one successful tech company that is successful and doesn’t have at least one techy in the founding circle. Most often the techy is the founder. This is a big weakness. If there is nobody at the managing board or whatever company they have, who can give technology the needed attention, then it is very likeable that technology doesn’t get a voice in future. This is simply because people without technological background don’t understand what the techy is talking about. Every start-up has lack of time and money and the companies without a technical voice in the managing board doesn’t get attention which in turn leads to a bad positioning. Additionally, most of the techies, even if they are in the founding circle are capable to manage a tech company economic sustainable. Programming and economy is a thing that doesn’t go hand in hand. This causes, that the IT engineer who develops the software does not keep in mind the business plan. In the best case he is focussing on revenue but he will most likely neglect costs, security and all this stuff.

Interviewer:
Does this investment behaviour exist in technology related companies exclusively?

Participant:
Ehm [...] does this only apply for technology companies […] let us please specify technology related companies. Daimler Benz is a technology company as well. What you are aiming for are tech companies with a focus on software. Ehm [...] yes this is a basic pattern. Technology definitely drifted away from all economical mechanisms. There is a pretty easy reason. If you fire a software
engineer because of his shitty job [...] and I would write him a really bad recommendation, then the only consequence would be that he would have another job by tomorrow. Only with better payment. There is no real market mechanism that sanctions bad technology. On the contrary, there will be more money invested and the companies do the same bullshit again. So, it is a fact, that technology companies all over the world support this undesirable development that technology and economy drift apart. A good example in this context, yesterday I talked with the CFO of Mercedes and asked him if there is one department at Daimler which production processes are not audited and improved? He answered that this would be the case. I recommended him to consult the IT department and ask them how much time per day they spend on reading code. Almost all developer will answer that they spend at least 50% of their time to read code, not produce it. If you ask them how much money there was invested to improve this process they will answer zero. So, 50% of the IT developer budget is invested into a black box. Every economist would say you are crazy. Ehm [...] it happens and nobody cares. So, yes there is a general trend. But this is mainly because the guys can do whatever they want simply because nobody understands it and they always get the salary they want to.

Interviewer:
Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?

Participant:
I am not 100% sure what you ask for with this question.

Interviewer:
The question focusses on the enabler. Take for example 2007, subprime credits, low interest rates and so forth. Would you say that technology is the reason for the high investments?

Participant:
Ehm [...] yes and no. If we consider the real estate bubble in 2007 and the Dotcom bubble in 2000, they have in common that a lot of people in the market don’t understand anymore what they are trading. Ask any finance guy and ask for a credit default swap, a lot of them couldn’t answer the question. All of these products are highly complex and the regular bank employee who sell products to his customers doesn’t have any idea what is happening there. It is to abstract and not remotely connected to what he learned during his job. The products he buys can’t be assessed by this
employee anymore. The Dotcom bubble was the same. The investors who entered the market were probably euphoric because everything was new and promised a lot of money but on the other hand they didn’t understand the technology and how to judge it. What are the drivers and the matrices you could have applied? What they do is to bet on the outcome which is basically the nature of the finance market. With valuations, it is the same because in both cases you bet on something you can’t assess at all. You don’t assess based on your knowledge but based on the other investors behaviour. And that was the reason for the collapse of the first stock market, the Dutch tulip market. In the beginning, there are mechanisms and stuff but after a while people jump on board because they think the index will rise and rise […] but no, someday the stock price will fall. There is a point where this should be the case, namely the point where real economy and financial markets drift apart but this doesn’t happen. Simply because it takes a while before it is common knowledge. Even than it goes on because a lot of investors, even the investors who got it heat up the market to make sure that they can sell their shares profitable. Only the investors who really don’t get it still buy the shares and then […] boom. Right now, there is a process of consolidation, if you look at this company, the management of Revel was changed completely, a lot of our competitors couldn’t finalize their last financing round. But this knowledge is only for those who really observe the market. Yesterday I talked to another investor and asked him whether a consolidation is upcoming and he answered yes. He saw this as a chance since he actively works on this consolidation. So everyone with enough knowledge and liquidity is looking forward to the next bubble because you can bet on falling share prices. A lot of them hope that as soon as the bubble bursts, the share price will fall, often more than necessary and then you buy. That is the reason why we collecting liquidity […] to take the bodies from the field.

Interviewer:
Would you say that wealthy investors and the global economy encourage the tendency to overvalue?

Participant:
Yes, […] as already suggested, pumping up a bubble is a mechanism, a legal one. From a legal perspective, it is legit since everyone who is investing is a businessman. Due to this I don’t feel compassion for them. I have to say there are market participants who understand that a bubble is pumped up in a very early stage. These people try to pump the bubble up as far as possible with a little equity or own money. Often, they collect money, invest and leave the bubble before the bubble bursts. Afterwards they collect the pieces. Maybe it is not a moral behaviour but it is daily practice.
Bubbles occur on a regular basis because humans are humans and I think it is not bad. So yes, this happens, this must happen this will happen also in future.

Interviewer:
Can you think of an industry branch you would invest in?

Participant:
Just right now? Of course, I have my own investment fund so it is my job to think about investment opportunities. Ehm [...] compared to the Dotcom bubble the bubble right now is more specific since it is not focussing on digital in general but on certain segments. I wouldn’t say there is one big bubble but several middle-sized bubbles and between these bubbles are spaces with potential for bubbles. You can consider taking the money out of the bubble segments and put into the free spaces or, that is what I prefer, I collect liquidity. I don’t invest in potential bubbles because if a bubble bursts, you should be fast with your investments. You can’t say when the bubble bursts [...] due to this I don’t invest long-term right now but more into the short- and middle term investments. This way I have money after the burst and can invest in this very moment. Due to this I focus on the already made investments with the potential to survive a bubble and focus on liquidity. Or better formulated I don’t give money to them but I look forward to have money for them when they need it in order to keep the valuation low. Someday they need money and then I can provide them with liquidity but for a better deal. Otherwise, if you don’t want to save the money [...] there are a few industries which are interesting but also with a relatively high valuation, for example alternative energies. Everything that has to do with infrastructure. For me personally it is not the industry but the country. Take for example Africa, there you have the chance to make big tickets with relatively low effort. Of course, there is always the chance that the money is gone, due to political instabilities but therefore you can spread the money broad. Instead of one investment of one million per investment you can do 100 investments with a value of 100.000 Euros. Ehm [...] there you have relatively high chance to make some money.

Interviewer:
Okay, great. What effect would a burst bubble have on society and economy?

Participant:
Ehm [...] and the society? First, a lot of money is gone. This is only virtual money since we only have virtual money. Does this influence the real economy? Of course, there is an effect on the real economy. Nowadays retirement funds are not allowed to invest in start-ups. This is the consequence
of the economic bubble from 2007. They are only allowed to invest in government bonds and this stuff. The problem is that you can’t really make money with this. Due to this they tried to find ways how to survive. Ehm and Ehm a highly complex structure of funds was created. If the bubble burst on the one side there are a few protection mechanisms between the banks and the funds but in case the burst is to extreme than all the mechanisms will fail and that will have an impact on the capital market. If you destroy billions and billions of dollars within a short period of time than there will be consequences on the capital market. I am sure about this. Since we are still in regeneration after the burst of the last bubble, I am quite sure, that if the bubble bursts ehm [...] there will be aftereffects which can lead to a financial crisis. All investors I am currently talking to will say the same. I case this scenario is going to happen, nobody will invest anymore. Right now, for example nobody wants to invest in Italy because they know, in case of a bursting bubble, Italy will have major problems. Due to this every start-up will face struggle. Due to this will have an effect on society but also a purifying process. Even if that is hard for the people who lost money, it is healthy for the economy to shrink to a healthy level, that is not nice but true.

Interviewer:
Can you think of mechanisms to protect society from another bubble? Would you say it is possible?

Participant:
It is definitely possible, but it is not wanted. Not even desired because people must face reality. That is something most people don’t want to do. If somebody promises 5% interest rate on your savings, people don’t want to think about the real economy meaning of this. If you go to a company and ask them to give all profits away which were made with finances, which would leave them with their real core products ehm [...] then there is almost no industry which is capable to generate more than 10 to 15%. Check for example REWE or REAL, these companies live with a profit margin in the per mil area. So, this means, if you have a maximum, real economic profit of 10% but have to generate more than it is not possible. There are n layers between you and the money. There is your account and your bank gives your money to an investment bank, this money is given away to the next instance and so forth and everybody wants his cut of the profit. This is simple not possible. But people don’t want to hear that. And that is how bubbles come into being, because people want bubbles. They only want to be the winner and not the loser. But there is always a winner where a loser is since it is more or less redistribution of money. So yes, I am sure that there are mechanisms but people don’t want them. So not they are not interested.
Interviewer:
That would be my next question, if the financial markets are interested in preventing bubbles.

Participant:
It is not about the financial markets, it is about the average people who don’t want to know. It is the
same if people go crazy about low quality meat and in the next moment buy a steak for 1,20€. It is not
possible to produce high quality meat for this price but nobody wants to know about this. Ehm
and ehm [...] Humans are weird animals. We talked about this already once. People demonstrate in
front of the AEG building to keep their work place but in the next moment they go to media market
and buys a SONY DVD player. It is schizophrenic but people don’t want to listen to the truth
especially if they are not comfortable. And there are people who are willing to do this. So, it is not a
bank who wants bubbles but rather a customer who wants to buy products which are not realistic in
a sustainable way. But if they want too we do it. I think they are all guilty in the same way. For me
personally the consumer is even more guilty. The mass is always guiltier than one single person.
That is a basic question. Who is to blame for drug dealing? The dealer or the junkie?

Interviewer:
What would you think is the next enabling factor/ trend for high valuation?

Participant:
You mean what the next technology bubble would be in case it is a technology bubble?

Interviewer:
Yes precisely.

Participant:
Ja Ja ehm [...] than what you were talking about in advance is not really a tech bubble but rather a IT
bubble. I think it is really difficult to keep these concepts apart. Compare a car from 50 years ago
with a car from 10 years ago and a car in 10 years. 50 years ago, there was no software cars and you
could repair everything with a hammer. If you look at the amount of money that is directly
distributed to cars and that is the generation that was designed five years ago, there is a lot of
software in it. Consider a Tesla car, yes there is a fucking E engine in it and compared to a
combustion engine everything in a Tesla is bullshit. Technologically considered it is much simpler
to create a electronical engine than an combustion engine. The complexity of a Tesla lies in the
software. Same goes for medicine. If medicine is produced, a lot of software is needed for simulations and so forth. If you consider nano technology then you realize that we are talking about real blurry lines. Biotechnical engineering is another example [...] so where is the boundary between tech and medicine. I think what is important is the beliefs of the people. So, I would say the health industry will become one of the next bug bubbles because every human wants to live healthy and long. We had this 15 years ago with functional food. Concluding, you always have to think of the product which is delivered. If a lot of people like it than other people will like it as well and a bubble is going to rise.
### 10.5 Appendix 5 – Consolidated questionnaire with statements based on interview data

#### What is your personal definition of an economic bubble?
- High demand that can’t be satisfied through the offering and which is strongly influenced by external factors. The consequence is, that this demand does not fit the real circumstances.
- There is a big capital accumulation without any equivalent value.
- Economic bubble is the overvaluation of a company value or a company in general compared to the actual value or the actual cash flow of the company.
- According to my definition there is a bubble if the valuation of a company stands in no relation to the fundamental value of the produced good anymore.
- Discrepancy between real economy and valuation benchmarking.

#### Can you think of indicators with the ability to create a bubble?
- More market participants enter the market.
- Rising valuations as well as the increasing amount of money.
- Trend following model - Enough people who think that the future will look bright for them.
- Validations increase massive within without a change of the important performance indicators.
- It is difficult to define these indicators since every crisis is differs in its nature.
- Mass of alternative investment opportunities - A lot of liquidity caused by stupid money.
- Massive over valuation of future potential, access to capital, liquidity

#### How would you estimate the evaluation of technology related companies?
- Overvalued. Investors follow the hype rather than executing due diligence.
- Overvalued. The valuation of companies is simply a bet on future developments.
- Overvalued. The strength and funding of competitors is not predictable. Nowadays, a new entrant can become market leader and force an incumbent player into bankruptcy.
- Overvalued. There is no real alternative existent, except stocks and stock similar investments.
- It depends. Some investments are smart, based on analysis but still fail to generate the desired returns. Some investments are stupid, based on the crowds’ investment behaviour and they generate the desired return eventually. It is not black or white.
- Overvalued. You must consider a lot of different components when it comes to value definition. Nowadays companies often neglect these components. Since a lot of investors don’t fully understand the technology they oversee the forgotten components but still invest.

#### In how far would you describe the current investment behaviour in technology related companies as healthy/ sustainable?
- unsustainable. It always depends on the growth. If there is growth there will be someone who want to put money in it.
- Unsustainable due to inadequate due diligence, lack of technical expertise on the auditing and investors site.
- Neither. There is no one fits all solution. Focus on the sustainability of the business model.
- Unsustainable. Right now, everybody invests into venture capital. After the hype,
<table>
<thead>
<tr>
<th>Does this investment behaviour exist in technology related companies exclusively?</th>
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<tbody>
<tr>
<td>Yes, it happens almost exclusively in technology companies because the defined trends only require a one-time investment and contain indefinite scalability.</td>
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<tr>
<td>No. Probably it is an industry overlapping phenomenon.</td>
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<tr>
<td>No. I would say there are always development in industries. Those destructive mechanisms reach from one industry over to another one. So, it is not technology specific but rather focussed on the destruction and market entering, how bigger the destruction and the related chance to enter a market how more fantasy is put into the valuation.</td>
</tr>
<tr>
<td>Yes. Due to a lacking technology expertise in nowadays funding teams the correct can’t be defined by them nor the investors correctly.</td>
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<tr>
<td>Yes. Technology drifted away from all economical mechanisms. Since there is no real market mechanism that sanctions bad technology.</td>
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<tr>
<th>Would you describe the technology related character of nowadays companies as justification for high investments or more as a factor which enables a trend?</th>
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<tbody>
<tr>
<td>Yes. It is an enabler since it is easier to scale up, easier to improve than manufacturing (updates) and bares more potential (simple and cheap device with free software).</td>
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<tr>
<td>Yes. High quality technology is the fundament and if the maintenance costs are low.</td>
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<tr>
<td>Yes. Technology is an important driver that brings lot of uncertainty. High uncertainty brings high returns.</td>
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<tr>
<td>Yes. It is much easier to translate an app into another language than to build up a production plant on another continent.</td>
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<tr>
<td>No. People don’t understand the product they sell or invest in. The consequence is, that they don’t assess based their knowledge but based on the other investors behaviour.</td>
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<tr>
<th>Would you say that wealthy investors and the global economy encourage the tendency to overvalue?</th>
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<tr>
<td>No. The typical investors are not interested in increasing the valuation if they are investing money in it by themselves. Only if they already own shares and want them to increase their value.</td>
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<tr>
<td>No. The Investors goal is to give a head start through a major investment to gain a competitive advantage rather than a market manipulation.</td>
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<tr>
<td>Yes. I think they can cause a share price fluctuation by themselves to create a trend following behaviour.</td>
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<tr>
<td>No. There is nobody who really fosters the bubble because the end of the bubble is difficult to foresee.</td>
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<tr>
<td>No. Since their own money is often on the line I wouldn’t think of a trend of big investors to overvalue.</td>
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<tr>
<td>Yes, these people try to pump the bubble up as far as possible with a little equity or own money. Often, they collect money, invest and leave the bubble before the bubble bursts.</td>
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<tr>
<td>Can you think of an industry branch you would invest in?</td>
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<td>-------------------------------------------------------</td>
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<tr>
<td>Smart City, Smart Home. In general, IOT.</td>
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<td>E-health, Medicine and Biotech.</td>
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<tr>
<td>HR (Digitization of Human Resource management).</td>
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<td>AI, Machine Learning.</td>
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<td>Alternative Energy.</td>
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<td>Privacy.</td>
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<tr>
<th>What effect would a burst bubble have on society and economy?</th>
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<tr>
<td>A counter-reaction. Capital would actively leave the market.</td>
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<tr>
<td>Only the high potential start-ups will survive.</td>
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<tr>
<td>Bankruptcy, unemployment, depression and consolidation of the market.</td>
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<tr>
<td>Redistribution.</td>
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<tr>
<td>More regulation for foreign / risk capital.</td>
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<tr>
<th>Can you think of mechanisms to protect society from another bubble?</th>
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<tbody>
<tr>
<td>No. Upcoming industries don’t have historic data what makes it difficult to create mechanisms.</td>
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<td>No, and we did not learn from past performance.</td>
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<tr>
<td>Yes. Regulation and maximum amounts of risk capital investments.</td>
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<tr>
<td>Yes. Fixed interest rates to prevent funds from getting forced into risk investments.</td>
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<tr>
<td>Yes. Transparency regarding investments made. Overvaluations and bubbles don’t grow around one company but around an eco-system.</td>
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<tr>
<th>Do you think that financial markets would be interested to prevent bubbles from rising in future?</th>
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<tr>
<td>Yes. Bubbles aren’t useful for them. Investors leave markets and promising companies are not funded.</td>
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<td>No. I think this is necessary for the regulation of the financial markets.</td>
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<tr>
<td>Yes. Bubbles are inefficient since everything you build will be destructed. In phase of constant growth, this would not happen.</td>
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<tr>
<td>No. crisis brings back normal market conditions. When a bubble bursts there will be always companies who go bankrupt and others which can reposition themselves.</td>
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<tr>
<td>No. Financial markets want movement. Financial markets are interested in a working economy.</td>
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<tr>
<td>No. it is not a bank who wants bubbles but rather a customer who wants to extraordinary returns. Customers don’t want to know how their investment increases but that there is an increase.</td>
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<th>What would you think is the next enabling factor/ trend for high valuation?</th>
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<tr>
<td>Decentralized computing.</td>
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<td>Autonomous intelligence</td>
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<td>Virtual reality &amp; Augmented Reality</td>
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<tr>
<td>Alternative resources</td>
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<tr>
<td>Technology. technology is crude oil of the future</td>
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<tr>
<td>Space due to overpopulation</td>
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<tr>
<td>Biotech and Medicine</td>
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11. References


