



# Valuation of software SMEs

## Traditional and modern frameworks

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## Abstract:

This study addresses the task of valuing software SMEs in a digital economy dominated by intangible assets, where traditional valuation models designed for tangible assets are inadequate. The study aims to bridge the gap between these traditional models and the unique nature of software assets, focusing on mainstream products like desktop applications, mobile apps, and web platforms, particularly in SMEs with high scalability potential. Through qualitative research, including semi-structured interviews with venture capitalists, financial directors, and analysts specializing in software valuation, the study explores the shortcomings of traditional valuation models like the cost, income-based, and market-based approaches when applied to software assets. It highlights the significance of intangible assets such as intellectual property, network effects, and brand equity in software valuation and points to modern valuation approaches that integrate both financial metrics and qualitative criteria. The thesis concludes that despite advancements in valuation models for software SMEs, ongoing research is required to develop more comprehensive and adaptable systems that reflect the unique characteristics of the software industry, its rapid technological advancements, and market dynamics.

## Keywords:

Software Industry, SME Valuation, Intangible Assets, Digital Economy, Financial Analysis.

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# 1 Introduction

## 1.1 Research motivation

In today's rapidly evolving digital era, the software industry stands as a monumental pillar, defining much of our socio-economic landscape. It's a realm where billion-dollar companies are born seemingly overnight, and where the tangible is increasingly overtaken by the intangible. Applications, platforms, and digital tools permeate every corner of our existence, from the smartphones in our pockets to the intricate systems that manage global economies.

Yet, within this realm of bits and bytes, a pressing conundrum emerges: How does one attach a definitive value to software? Traditional assets – like machinery, real estate, or commodities – have well-established valuation models. But software, with its ethereal nature and profound impact, challenges these established norms.

Since its inception, the software business has evolved considerably. Beginning with punch cards and room-sized computers in the early days and continuing to the widespread use of cloud-based apps today, the industry's progress has been astonishing. As a result of this innovation, software company valuation methodologies have evolved considerably.

Historically, the most important criterion regarded when evaluating businesses was tangible assets. However, the intangible assets of the software sector necessitate a paradigm shift in valuation methodologies. Because software usually lacks physical components, its value is defined by its ability to solve problems, increase productivity, or meet market expectations.

Business valuation, particularly in the software business, is a difficult undertaking that has evolved significantly over time. While evaluating every firm necessitates knowing its financials, estimating future earnings potential, and taking market conditions into account, software companies introduce particular problems and opportunities. This is especially true for small and medium-sized enterprises (SMEs), which do not always have the same financial track record or evident market dominance as larger businesses. (McClure, 2023)

## **1.2 Aim**

### **1.2.1 Introduction**

Valuation has long been an important part of the strategic decision-making process of companies, investors and other stakeholders. However, as the business world changes, particularly in industries dominated by intangible assets such as software, traditional valuation methods appear increasingly inadequate. Despite making up a significant portion of the industry, small and medium-sized software companies often find themselves caught in the vortex of these challenges. The nature of their value, influenced by quantifiable financial metrics and less tangible values, is complicated and requires extensive analysis. (Damodaran, 2012)

### **1.2.2 Problem statement**

Traditionally, the valuation of companies is based on the valuation of tangible assets and quantifiable vital figures. The proliferation of the software industry, particularly among SMEs, presents a complex challenge. SME is defined as an enterprise with headcount up to 250 and turnover of up to € 50M (Liikanen, 2003). These companies defy traditional valuation paradigms through their intangible assets, unique business models such as Software as a Service (SaaS), and rapid scaling potential. (Cohen & Neubert, 2018)

The landscape of valuation has been, for the most part, straightforward for tangible assets. A plot of land, for instance, can be valued based on factors like location, size, and usability. Machinery depreciates over time, influenced by wear and tear. But software, a unique asset in its own right, defies these straightforward valuation models. It doesn't rust, doesn't occupy physical space, and its value isn't solely determined by its age. Moreover, its value can be multiplicative, depending on how and where it's deployed.

Such anomalies make software valuation a maze of complexities. A software solution catering to niche industries might be worth millions, while a globally-used application might be free. Add to this the layers of licenses, copyrights, user bases, and potential applications, and the waters get murkier.

Additionally, the importance of things like brand equity, network effects, intellectual property and other intangible assets are becoming increasingly important, complicating the process of valuation. Existing valuation methods cannot fully capture the nature and potential value of these companies. As a result, there is a clear gap in understanding how these software SMEs should be valued, which can lead to inconsistencies in their own strategic decisions, market value and investment attractiveness.

A pressing issue is the lack of a framework to integrate both traditional financial metrics and the more elusive intangibles. Investors, entrepreneurs and analysts are particularly interested in this issue as they need a deeper understanding and a more accurate valuation model tailored to the specifics of small and medium-sized software companies.

This investigation seeks to unravel this mystery. The core aim? To understand and dissect the nuances of software valuation, to probe its corners, and to shine a light on areas previously overlooked or misunderstood. Why is this so crucial? Because in an age where software acquisitions define market shifts and where investor decisions hinge on perceived software value, understanding the true worth of software isn't just an academic pursuit; it's an economic imperative.

The fundamental question driving this research is thus: In a world progressively dominated by software, how do we accurately, comprehensively, and reliably determine the value of the software companies? This thesis endeavors to bridge the evident chasm between traditional valuation paradigms and the distinct, often elusive essence of software.

### **1.2.3 Research questions**

This intricacy poses crucial questions:

Research Question 1: How do traditional valuation models fall short when applied to software, and what specific challenges emerge from the distinct nature of software as an asset?

Research Question 2: What valuation frameworks have been proposed or adapted specifically for the software industry, and how do they account for the dynamic and multifaceted nature of software?

These questions, rooted in the intricate interplay between economics and technology, guide this research. By addressing these queries, this study aims not only to illuminate software valuation but also to investigate a framework that might bridge the gap between traditional theory and modern realities of ever-evolving software business models.

### **1.3 Demarcation and limitations**

This research focuses on the valuation of software products, as opposed to services or other intangible tech-related assets. The spotlight is on mainstream software products, which include desktop applications, mobile apps, and web-based platforms and more. Custom-built software for specific companies or highly specialized niche applications, while notable, fall outside the scope of this study. Moreover, the focus lies on software SMEs, which have high scalability potential. This factor must be considered in the valuation framework.

While the study aims to present a broad understanding of software valuation techniques, it acknowledges the dynamic nature of technology and economics. These fields evolve at considerable pace, and any valuation model, no matter how robust, might face challenges in remaining relevant. Moreover, the changing landscape of regulations, licensing models, and user preferences can influence software value, making it a moving target. The proposed frameworks and findings, hence, should be understood within the temporal and contextual constraints of this research. Furthermore, the number of experts interviewed as part of the study is limited. Geographical location is Finland, therefore further studies are recommended which would research other markets with their own realities, that may differ from those of Finland.

### **1.4 Beneficiaries of the research**

This research will help entrepreneurs better understand and position the value of their companies, that will be beneficial in decision-making, fundraising and strategic development. Moreover, the results will provide those seeking to invest in software SMEs with a clearer lens through which to evaluate potential investments and reduce ambiguity surrounding valuation discrepancies. Analysts can benefit from a more holistic valuation model and improve the quality and accuracy of their reports and recommendations by retaining industry knowledge. Lastly, students and researchers in business, finance, and software

engineering can add another dimension to their academic work by gaining a deeper understanding of software company valuation.

## **1.5 Thesis structure**

The study is systematically structured to cover a wide range of topics in a logical and comprehensive manner. After the Introduction, which detailed the research motivation, aims, and objectives, set the scope and beneficiaries of the research, the body of the thesis will begin with a Theoretical Framework, providing an introduction to software valuation, its historical context, and the significance of the research questions. This section will critically analyze traditional valuation approaches like the income-based, asset-based, and market-based approaches, highlighting their flaws in software valuation.

Following this, the Methodology section will outline the research approach, including the selection of respondents, interview guide, and procedures for conducting and managing the research. It will also address issues of validity and reliability. The Results section will present the findings from the interviews, focusing on the valuation methodology and the role of intangible assets and market dynamics.

The thesis will then progress to a Discussion section, synthesizing the findings and discussing their implications for practice and theory. This section will engage deeply with the research questions posed earlier in the thesis. Finally, the thesis will conclude with a comprehensive summary of the findings, their implications, and the contributions to the field of software SME valuation, followed by references and appendices. This structure aims to provide a thorough and insightful exploration of the valuation of software SMEs, balancing theoretical frameworks with practical research findings.

## **2 Theoretical framework**

### **2.1 Introduction to theory behind software valuation**

Valuation plays a crucial role in financial analysis by determining the value of assets and providing information that is crucial for investment decisions and company actions.

Conventional assets, such as real estate and equipment, have historically relied on established valuation methods, based on long-standing economic principles and empirical validation. Nevertheless, with the ongoing digital transformation of the economy, software has emerged as a common asset that disrupts the established norms of traditional valuation frameworks.

Software is a distinctive amalgamation of code, invention, and functionality designed to address specific issues, enhance operations, or provide entertainment. Nevertheless, the intangible essence of it is merely the surface of the valuation complexity. The value of software extends beyond its code and encompasses its potential influence, scalability, user community, and the ecosystem it either occupies or generates. In addition, unlike most physical assets, software does not deteriorate over time. In numerous instances, the worth of software can rise as a result of growth of the user base.

The technology industry is further complicated by an additional layer of complexity that contributes to its dynamic nature. The swift advancement of technology, evolving user tastes, and the emergence of cybersecurity risks might impact the pertinence and longevity of software. The various complex elements of software valuation highlight the importance of conducting a comprehensive examination of theoretical foundation of the software valuation, the challenges faced during review, and the innovative models created in response to these challenges.

Throughout the upcoming sections of this chapter, we will analyze past approaches used to determine the value of software throughout history, point out their limitations when applied to software, and showcase novel models that aim to accurately represent the essence and worth of software in the modern digital era.

## 2.2 Historical overview

This chapter explores the historical background of software company valuation, with a specific emphasis on the techniques and criteria employed in assessing small and medium-sized enterprises (SMEs).

Following the introduction of personal computers in the 1960s and 1970s, software development companies emerged. Prior to personal computers, software was typically bundled with hardware and was not seen as an independent product. The quantity of software development businesses experienced a tremendous increase during the 1980s and 1990s, with the well-known brands Microsoft, Oracle, and Adobe gaining widespread recognition. (Campbell-Kelly, 2003)

Initially, software businesses were commonly assessed based on their tangible assets and conventional financial metrics, such as the P/E ratio (price to earnings). Nevertheless, due to the limited number of physical assets and the frequent lack of profitability in nascent software companies, these standards were soon shown to be insufficient. Researchers conducted a study on the valuation of a SaaS company and found that the P/E coefficient yielded the lowest relative valuation result among six distinct indicators, thereby demonstrating the insufficiency of this method. (Cohen & Neubert, 2018)

The valuation of software companies underwent a transformation during the late 1990s and early 2000s. Valuations increased drastically during the dot-com bubble – mostly driven by user expansion and potential future earnings, rather than immediate profitability (Kossecki et al., 2023). The subsequent collapse illustrated the risk of overdependence on such conjectural measurements. Following the collapse of the bubble, there was a shift in focus towards prioritizing profitability and cash flows. (Levenstein, 2004)

Despite lacking the size or prestige of larger firms, many of them possess unique expertise, have quick growth rates, or offer innovative solutions, which make them appealing targets for acquisition or investment (Smith & Parr, 2005). Valuation approaches have progressed over time and have encompassed both traditional financial metrics and novel, software-specific indicators.

Currently, the valuation of small and medium-sized software firms encompasses more than just financial metrics. Value is ascertained based on variables such as company culture, intellectual property, customer happiness, and potential for scaling. As the software industry progresses and advances, the process of valuation will undoubtedly undergo transformation. (Koller et al, 2010)

The inception of the SaaS (Software as a Service) concept started in the 2010s. Companies that implemented this strategy obtained consistent revenue, resulting in more foreseeable and steady financial streams. Consequently, metrics such as monthly recurring revenue (MRR) and customer lifetime value (CLV) have become essential in evaluating this market. The study conducted by Kosecki examined how the variables of CAC (Customer Acquisition Cost) and LTV (Lifetime Value) affect the valuation of software firms. Organizations that have a greater Lifetime Value (LTV) in comparison to Customer Acquisition Cost (CAC) tend to receive more positive ratings. This suggests that they are effectively allocating resources and have the potential for long-term success. The software sector distinguishes itself from others through its exceptional scalability. The aforementioned concerns were further elucidated, emphasizing the significance of consistent income, customer base, and intellectual assets. The necessity for valuation models tailored to specific industries is justified. (Kosecki et al, 2023)

## **2.3 Traditional valuation approaches**

Valuation has consistently been a subject of enduring interest and investigation in the field of economic and financial literature. Conventional valuation methods, based on early economic theory, mostly concentrated on tangible assets such as land, equipment, and goods. These strategies rely on explicit, quantifiable characteristics and well recognized signs. (Anderson, 2013)

The cost approach is one of the most ancient and uncomplicated methods of valuation. Here, the value of an asset is primarily determined by the expense required to reproduce or replace it. Although this approach is successful for tangible assets like hardware or real estate, it becomes difficult for intangible assets like software. One reason is that the expenses incurred in developing software may not always align with its market value. Another reason is that

with software there is a big initial investment and a negligible marginal production cost. (Anderson, 2013)

The income-based approach has gained popularity, particularly in investing, as an alternative to the cost approach. This approach calculates the worth of an asset by considering its possible future earnings. Unsurprisingly, this method is effective when used to concrete assets that possess a consistent track record of generating revenue. However, regarding software, which can have unpredictable and fluctuating revenues due to various external causes, using the income-based approach may result in inaccurate predictions. A key example of failure of income-based approach is companies start having value only once they generate cash flow, while the software business model largely rests on first generating a user base, then monetizing it. (Anderson, 2013)

The market-based approach, a conventional methodology, calculates the value of an asset by considering how comparable assets are priced in the market. The underlying worth can be ascertained by conducting a comparative analysis of sales of similar assets. However, comparing software applications directly and accurately is challenging due to the vast array of options available, as well as the differences in capability and scalability. Furthermore, a business in an innovative field would likely experience challenges to be valued using the market-based approach, while likely having a high value. (Fernando, 2020)

While the traditional models have been effective for the financial and economic world over a long period, the emergence of the digital era and the rise of intangible assets like software have exposed their shortcomings. Their failure to adequately capture the distinct attributes, capabilities, and nuances of software valuation highlights the pressing necessity to establish valuation procedures tailored specifically for software. (Anderson, 2013)

Historically, business valuation has been centered around two methodologies: an income-based approach and an asset-based approach. The subsequent chapters will examine the modern scientific literature about the valuation methodologies provided.

### **2.3.1 Income-based approach**

The Discounted Cash Flow (DCF) method is a pivotal approach in financial valuation, focusing on determining the present value of a company's future cash flows. This method emphasizes the core principle that a company's value is intrinsically linked to its ability to generate future income. Koller et al. (2015) highlight the importance of accurately projecting future earnings and understanding industry cycles in the context of DCF.

Central to the DCF approach is the calculation of Free Cash Flows, which represent the cash available after accounting for capital investments necessary for maintaining or growing the company's assets. Typically, FCF projections span a five to ten-year period. (Koller et al., 2015)

The discount rate, often determined using the Weighted Average Cost of Capital (WACC), reflects the cost of capital. It factors in both equity and debt, representing the expected return demanded by investors. The discount rate's correct calibration is crucial due to its impact on valuation. (Koller et al., 2015)

TV (Terminal Value) is calculated for the period beyond the forecasted cash flows, usually using an infinite growth model. It reflects the present value of all future cash flows under a perpetual growth assumption. (Koller et al., 2015)

The accuracy of DCF is enhanced by adjusting for non-operational assets and liabilities, isolating the value generated by the company's core operations (Koller et al., 2015). Additionally, in conglomerates or diverse enterprises, DCF valuations are conducted for each business unit to contribute to the overall Enterprise Value (EV).

Applying the DCF method involves intricate considerations like setting appropriate growth rates and return on newly invested capital (RONIC). The efficacy of this model depends on reasonable and justifiable assumptions, given its sensitivity to input variables. (Koller et al., 2015)

The DCF method is a vital tool for assessing a company's financial prospects, particularly in measuring its ability to generate future cash flows. Its effectiveness hinges on accurate cash

flow predictions and the selection of a suitable discount rate, which are essential for deriving a precise valuation (Koller et al., 2015). Pratt (2008) complements this by discussing the nuances of discounting and capitalizing cash flows, highlighting the significance of developing appropriate rates considering risk and the time value of money.

### **2.3.2 Asset-based approach**

Asset-based valuation methods, pivotal in scenarios where a company's future operations are uncertain, prioritize tangible assets over prospective cash flows or income. These methods are crucial for companies in industries prone to expansion or contraction, where the current worth of assets may not align with the company's present value. (Pratt, 2005)

This approach estimates the net funds obtainable from asset sales after debt clearance. It is most relevant when a company faces a high likelihood of liquidation. (Koller et al., 2015)

**Replacement Cost Approach:** This strategy evaluates a company's value based on the cost to replicate its asset base. However, it often overlooks intangible assets like organizational capital, potentially leading to undervalued assessments. This method may also misrepresent value in the case of specialized or costly-to-replace assets that contribute positively to cash flows. (Koller et al., 2015)

The process involves identifying relevant assets, determining their individual values, and aggregating these to estimate the company's total value. Adjustments are necessary to reflect market values rather than just book values. (Koller et al., 2015)

The approach differs based on operational status. For ongoing businesses, the focus is on the assets' ability to generate future income. In liquidation scenarios, the emphasis shifts to the potential cash from asset sales minus liabilities. (Koller et al., 2015)

Asset-based valuation is particularly beneficial for asset-intensive firms like real estate and manufacturing. However, for service-oriented companies, this method may not accurately reflect the value derived from human capital and client relationships. (Koller et al., 2015)

The discussion extends to improved algorithms for computing ongoing expenses (CV) and multi-stage valuation models in the asset-based context. These models consider variable growth rates and returns on investment over time, moving beyond simplistic assumptions of value. (Koller et al., 2015)

While asset-based valuation is a key tool for appraisers, its application requires careful consideration of market dynamics, asset values, and potential tax implications. It is crucial to apply this method judiciously to achieve an accurate assessment of a business's worth, especially in industries not heavily reliant on physical assets. (Pratt, 2005)

### **2.3.3 Market-based approach**

Asset valuation is a crucial aspect of economics and finance, and it is important to see it through the lens of the market method. Valuation is not solely a quantitative calculation; it represents the convergence of market sentiment, financial theory, and the actual dynamics of buying and selling. The market approach is distinct from other valuation approaches since it utilizes market data to ascertain the worth of an asset. (Fernando, 2020)

The market approach operates under the premise that the worth of an item may be determined by analyzing the prices at which comparable assets are transacted in the market. This approach relies on the fundamental concept that the interplay between supply and demand, as demonstrated by transactions involving similar assets, reflects the inherent worth of the item. This methodology is particularly prevalent in sectors where transactions take place with sufficient frequency to yield a dependable dataset, such as the real estate industry or trading conducted by publicly traded corporations. (Fernando, 2020)

An inherent strength of the market approach is in its reliance on actual evidence, which enhances its persuasiveness. The utilization of actual transaction data to ascertain the value of something imparts a feeling of objectivity to this approach, which is equally appealing to practitioners and theorists. Nevertheless, this ability also imposes constraints. In markets with limited transaction data or for unique assets, the market approach may not be feasible. (Fernando, 2020)

The implementation of the market method involves subtle intricacies. This frequently entails the identification and analysis of "comparable" assets that have sufficient similarity to the asset being appraised. Analysts modify the transaction pricing of these comparable organizations to consider variations in size, age, location, or other pertinent attributes. Throughout this procedure, the asset's value in question is estimated by extrapolation. (Fernando, 2020)

Although the market method is grounded on scientific evidence, it is not immune to criticism. Theoretical objections emerge due to the discrepancy between market prices and the intrinsic value, as market prices can be swayed by variables like speculation or insufficient knowledge. Furthermore, this methodology is frequently compared to alternative valuation methodologies, such as the cost approach or discounted cash flow analysis, each of which possesses distinct advantages and specific settings in which it is most suitable. (Fernando, 2020)

Over the past few years, the market approach has experienced modifications that have presented both obstacles and enhancements to its implementation. The growing accessibility of data and advancements in statistical analysis have enabled the use of a market-based method to conduct more intricate comparisons and adjustments. It is reasonable to expect that this strategy will continue to develop in the future, particularly as digital marketplaces offer more comprehensive data on a broader array of assets. (Fernando, 2020)

## **2.4 Shortcomings of traditional approaches in software valuation**

### **2.4.1 SaaS revenue model**

In an academic context, the discussion about why traditional valuation approaches do not work for software development companies would focus on the significant differences between software development companies, especially those operating under the Software as a Service (SaaS) model, and more traditional business models. Traditional valuation methods often prove ineffective when applied to software development companies for several reasons: The business model of SaaS companies is based on subscription with recurring revenues, which contrasts with the transactional sales model of traditional businesses. Conventional

valuation metrics, such as P/E ratios, may not fully reflect the current customer relationships and future income streams they represent.

Software development companies often exhibit rapid growth and scalability, which traditional valuation models, based on more static businesses, cannot easily be quantitatively assessed. The potential for future expansion and scalability of software is not adequately reflected in models that focus on current revenues or asset costs. (Yousefi, 2021)

The life cycle of a software development company often includes stages of rapid growth and reinvestment, which may not immediately yield high profits. Traditional valuation methods can misjudge these growth investments, as they usually underestimate companies that are not currently profitable. Revenue recognition in software development companies can be difficult due to the use of subscription models and can lead to different financial statements from traditional sales. This affects financial indicators and necessitates a different approach to valuation that takes into account potential future income.

The market dynamics of the software industry are characterized by high volatility and competition, as well as rapid innovation cycles. The conventional valuation fails to consider the flexibility required to maintain competitiveness in the technological landscape. (Yousefi, 2021). Software products and services often employ different monetization strategies, ranging from one-time sales to subscription models and freemium with in-app purchases. These dynamic income models are not amenable to straightforward income forecasting based on traditional estimation methods.

#### **2.4.2 Customer-centric nature**

Customer-centric measures, such as churn rate, lifetime value, and acquisition costs, are crucial for comprehending the efficiency and potential of a software firm. These metrics, typically overlooked in conventional valuation models, provide valuable insights into customer behaviour and the company's performance. (Yousefi, 2021)

Comprehending these components is essential for precise valuation of software companies and necessitates the creation of valuation systems that consider the distinctive characteristics

of the SaaS business model and the dynamics of the technology industry. (Cohen & Neubert, 2018)

### **2.4.3 Volatility and tech development**

Customer-centric measures like as churn rate, lifetime value, and acquisition costs, which are frequently omitted in conventional valuation models, are crucial for comprehending the efficiency and potential of a software company. (Yousefi, 2021)

Comprehending these components is essential for precise valuation of software companies and necessitates the creation of valuation systems that consider the distinctive characteristics of the SaaS business model and the dynamics of the technology industry. (Cohen & Neubert (2018)

### **2.4.4 Intangibility**

A key aspect in the valuation of software SMEs is the intangible nature of software, posing a distinct challenge for conventional valuation approaches that are more attuned to assessing tangible assets. Unlike physical assets that require resources for duplication, software can be copied virtually without limit and at minimal expense. This difference significantly affects the valuation process.

The value of software is deeply intertwined with external elements such as user ecosystems, third-party integrations, and market recognition. Changes in any of these factors can dramatically alter the perceived value of software, making static appraisal methods less effective. In addition, many software solutions are customized for specific objectives or industries, which adds another layer of complexity to their valuation. This customization stands in contrast to tangible assets, which can often be more straightforwardly categorized and valued. (Uzma et al, 2010)

The rapid pace of technological advancement in the software sector further complicates the valuation process. Traditional methods like the Discounted Cash Flow (DCF) technique, which rely on stable, physical assets and predictable cash flows, may not yield accurate valuations for software assets. These assets are inherently intangible, and their value is

closely linked to ongoing technological advancements and market acceptance. As a result, the DCF method may not fully capture the potential for rapid obsolescence or the exponential growth often seen in successful software products. (Uzma et al, 2010)

Moreover, the conventional DCF approach often overlooks the option value inherent in software assets. Software development is characterized by an iterative and adaptable process, where investments evolve over time, making flexibility a valuable asset. This adaptability and the management's ability to make strategic decisions in response to a rapidly changing technological landscape are not adequately considered in standard DCF analysis. (Uzma et al, 2010)

The implementation of the fair value model, as per standards like FAS 142(R), introduces additional challenges in software asset valuation. This model requires subjective valuation procedures, which can introduce risks related to profit management, making the valuation process more contentious for software development organizations. (Uzma et al, 2010)

#### **2.4.5 Conclusion**

In summary, traditional asset valuation models, while effective for tangible assets, encounter significant limitations in the dynamic context of software valuation. Recognizing these limitations is crucial for developing advanced, software-specific valuation methods that resonate with the nuances of the digital age.

Software companies are marked by their intangible assets, including intellectual property, network effects, and brand equity, necessitating tailored valuation approaches. The unique economic, operational, and competitive landscape of the software industry, characterized by rapid scalability and development, demands valuation methods that align with these distinct attributes. (Uzma et al, 2010)

Understanding the various revenue models in the software sector, such as subscription-based, Freemium, and microtransaction models, is vital due to their unique impact on revenue recognition and forecasting. The transient and unpredictable nature of the software industry and product life cycles also plays a crucial role in valuation. (Yousefi, 2021)

Overall, valuing a software company requires a blend of traditional techniques and industry-specific considerations, addressing the sector's intangible nature, diverse revenue streams, and rapid innovation cycles. As the software industry continues to evolve, these factors will increasingly influence valuation practices.

## **2.5 Proposed valuation systems for software industry**

The distinctive intricacy of the software, in contrast to conventional assets, has necessitated the utilization of inventive valuation techniques. Researchers and industry leaders acknowledged these issues and suggested multiple valuation methodologies tailored for the software industry. The chapter examines what improvements have been made in valuation theory and how they address the challenges of valuation of software SMEs.

### **2.5.1 Customer Lifetime Value**

Within the realm of SaaS (software as a service), the emphasis frequently transitions from product functionalities to user metrics. Factors such as the rate at which the number of users increases, the long-term value of the customer, and the level of customer attrition are utilized to evaluate the worth of the program.

The importance of Customer Lifetime Value (CLTV) has increased significantly with the advent of Software as a Service (SaaS) and subscription-based business models. (Janzer, 2020) book, "Subscription Marketing: Customer Education Strategies in a World of Customer Churn," explores the impact of customer value on a company's overall valuation in the context of software services. (Cohen and Neubert, 2018)

Software platforms are becoming more interconnected with external apps and platforms and function within broader ecosystems. The article "Modern monopolies: what it takes to dominate the economy of the 21st century" (Moazed & Johnson, 2016) highlights that the value of a software firm can be significantly impacted by the expenses associated with ecosystems and network effects.

The dynamic and ever-changing characteristics of this industry are evident in modern methods of assessing software enterprises. These methodologies, considering the intricacy of

the software sector, enable a comprehensive and precise valuation, encompassing both measurable and immeasurable cost elements.

### **2.5.2 Discounted Cash Flow adjusted for software**

The DCF approach, that has been successfully utilized in other industries, has been modified for the software sector, considering issues such as technology obsolescence, potential for growth, and recurring income sources. In specific circumstances, the worth of software extends beyond its immediate revenue. Strategic valuation is of utmost importance for a company's strategic posture, as it can serve as a barrier to competitors or provide synergistic value when combined with other products. Given this understanding, several specialists propose evaluating the strategic worth, with particular emphasis on these intangible advantages. Models that calculate the yield of an investment while taking into account the associated risks. According to the article "Valuation: Measuring and Managing the Value of Companies" (Kollers et al, 2020), risk-adjusted models are used to calculate the prospective profit of a software developer company by considering both its inherent and market risks. This approach offers a more equitable viewpoint, particularly for fledgling businesses and rapidly expanding software enterprises that operate in an unpredictable setting. Software firms have a lesser reduction in valuation compared to companies in other industries when their current earnings decreases. The reason for this phenomenon can be attributed to the rapid rate of expansion and the capacity for growth exhibited by software development firms, particularly those of smaller or medium size. (Koller et al, 2020)

### **2.5.3 Licensing and IP-based valuation**

When evaluating software that relies on distinctive intellectual property or is primarily distributed through licensing, the valuation might be linked to the anticipated cash flow generated from these licenses or the distinctiveness and security of the underlying intellectual property.

Ultimately, the dynamic characteristics of software necessitate a correspondingly flexible method of valuation. While there is no universally accepted approach, the industry has acknowledged the limits of previous methodologies and as a result, other methods have been developed to capture the complex value of software better. (Brassell & Maguire, 2017)

#### **2.5.4 First Chicago method**

The First Chicago method is notable for its intricate approach to assessing businesses that possess substantial ambiguity. It adeptly merges comparative valuation techniques with revenue-based valuation techniques, taking into account three financial scenarios - optimistic, realistic, and pessimistic, each representing distinct potential alternatives for the company's future. Subsequently, these situations are assigned probabilities and combined into a weighted mean. (Gordon, 2023)

This method utilizes market-based comparable data and discounted cash flows to establish the final value of the organization, while also considering and correcting for the various risks it faces. This approach provides a well-rounded perspective on the business's risk profile. This approach is widely used in the venture capital and private equity industry as it offers a comprehensive valuation of both early-stage and rapidly expanding enterprises. (Gordon, 2023)

Although the strategy has its benefits, it is important to thoroughly analyze the reliance on uncertain future cash flows, particularly for fledgling firms that have highly uncertain projections. However, the First Chicago Method is a significant contribution to valuation theory since it reflects the shift towards more flexible and practical valuation models in a dynamic commercial landscape. (Gordon, 2023)

#### **2.5.5 Valuation of intangibles**

Knowledge asset valuation methods have been a significant topic of study and advancement in the software industry. (Sarathy, 2001) examines the intricacy of this procedure, emphasizing two primary methodologies: cost-based and revenue-based estimations.

The cost approach combines the expenses associated with the creation of particular forms of knowledge, considering the related, shared, non-recoverable costs and depreciation (Sarathy, 2001). Although this approach has the benefit of being cost-based, it encounters challenges in identifying the relevant costs and addressing shared or joint expenses. Additionally, it grapples with the issue of knowledge obsolescence over time.

Conversely, an income-based strategy is deemed more appealing due to its direct correlation with the potential earnings that knowledge assets can produce. This method assesses knowledge based on its ability to generate revenue, specifically when this revenue is derived from a specific collection of knowledge assets. (Farok J. et al., 2001) proposes that a more comprehensive categorization of knowledge assets makes it easier to connect income to these assets, making it simpler to evaluate knowledge as a whole rather than in separate parts.

Furthermore, (Sarathy, 2001) examines the benefits of market pricing in comparison to cost-based pricing, since the former circumvents the challenges related to finding the suitable costs and resolving the issue of outdated information. Market pricing facilitates the establishment of internal knowledge markets, where knowledge prices are determined through transfer pricing and independent discussions across departments. This approach has the potential to achieve an equitable valuation that accurately represents the valuations of both domestic buyers and sellers. However, its effectiveness is constrained by the existence of domestic markets.

(Sarathy, 2001) argue that despite the challenges it presents, knowledge valuation is essential for knowledge management as a strategic resource. The revenue-based approach, particularly when integrated with market-based pricing mechanisms, appears to provide a robust foundation for evaluating knowledge assets in the software sector, hence enhancing decision-making efficiency and knowledge usage.

When doing a dissertation on the value of intangible assets related to copyright, it is essential to consider three primary valuation methodologies: the cost approach, the market approach, and the revenue approach. These methods are relevant to different extents.

The asset-based approach is less frequently utilized due to the distinctive characteristics of copyrights, which confer exclusive rights to the owner. Nevertheless, it is only relevant in specific scenarios and encompasses cost methodologies for both initial production and subsequent replication. The cost approach can yield a cautious estimate by providing a modest indication of the expenses involved in developing or replicating a copyrighted work (Sarathy, 2001). This method is beneficial when there is a need to determine the appropriate value of copyright transfer, particularly in cases where there is a lack of or impracticality in using comparative market transactions. (Sarathy, 2001)

The market method relies on the recognition of a dynamic market where copyrights are sold for a predetermined price. Implementing this method can be challenging because of the limited availability of publicly revealed transaction information and the complexity of establishing comparable benchmarks for price multipliers. However, it is commonly utilized in the valuation of copyright value and economic analysis (Sarathy, 2001). The market approach is commonly utilized through licensing agreements, which can be based on either a royalty rate model, where the author receives a percentage of the total revenue generated, or a usage-based model, where the author receives compensation each time the copyrighted material is utilized. (Sarathy, 2001)

The income-based approach is a commonly employed method that entails assessing the potential cash derived from the utilization of copyrighted goods. This methodology encompasses diverse methodologies, including supplementary analysis, profit-sharing analysis, and royalty revenue analysis, to ascertain the present value of anticipated revenue streams (Farok J. et al., 2001). This holds particularly true when copyrighted material delivers substantial revenue or expense savings. (Sarathy, 2001)

### **2.5.6 Other aspects**

The aspects to be considered in the valuation are not limited to those described above. In addition, it is necessary to evaluate human resources (Sarathy, 2001). The valuation of human resources is applied not only to SMEs engaged in software development. Therefore it is not included in the scope of this study.

Porter's Five Forces Model (Porter, 1979) is a strategic tool that can be adapted, especially when assessing the competitive environment of small and medium-sized businesses engaged in software. This model allows companies to understand their position in the industry and identify potential threats and opportunities, as a result of which their potential value is determined.

Similarly, the Blue Ocean Strategy (Kim & Mauborgne, 2005) provides insight into how software development SMEs can create unique value propositions, differentiate in the market, and gain untapped value. All this can be translated into evaluative considerations.

Modern approaches to valuation have evolved in response to rapid technological progress and the changing dynamics of the software industry, trying to reflect the nuances of a software-based business more accurately. These modern methods take advantage of the dominance of intangible assets, evolving revenue models and the rapid scalability of the software sector.

## **2.6 Summary**

This review of valuation theories and their application in the software industry has revealed significant achievements, but significant gaps remain. The variety of methodologies described reflects efforts to identify the multifaceted value of software. Well-known approaches include revenue multipliers and strategic value valuation, each of which offers different valuation approaches. However, unsolved problems prevail among practitioners and scientists.

The time aspect is a major problem due to the potential for rapid obsolescence or sudden jump in value caused by market trends or technological breakthroughs, which makes even complex valuation models less reliable (Bernoulli, 2001). Quantifying intellectual property, brand equity, customer data, and network effects remains controversial because existing systems primarily concern financially recognized intangible assets, leaving unaccounted assets such as human capital often overlooked (Smith & Parr, 2005). The rapid pace of industry development and changes in the market require valuation models that can adapt quickly to maintain accuracy (Lowenstein, 2004). The lack of a universal valuation standard leads to fragmentation of the landscape with discrepancies in estimates and comparative problems in the market (Koller et al, 2010). Valuation goes beyond financial transactions and is intertwined with technological understanding and market foresight, which complicates the development of practical and accurate models.

The studies discussed clarify the interaction between company valuations and financial indicators, emphasizing the constant focus on revenue in the SaaS model and the importance of scalability, CAC and LTV dynamics for assessing growth potential and long-term profitability, which is crucial for investors and stakeholders.

When evaluating small and medium-sized software development companies, a combination of traditional financial indicators and intangible factors is taken into account. The evolution of modern valuation methods in line with the development of the industry highlights the need for methods such as risk-adjusted yield models, valuation of real options and value-based customer life cycle valuation.

The balance between tangible and intangible assets is crucial, and the importance of the latter is increasing. Valuation models should be ready for the future, flexible and adaptable to technological advances in artificial intelligence, machine learning and quantum computing, as well as to external factors such as changes in legislation and market shifts.

In conclusion, the text suggests a holistic approach to software valuation, combining traditional financial indicators, industry nuances and perspective considerations. The future trajectory of software valuation depends on the development of reliable, adaptable methodologies capable of covering a wide range of factors determining the true value of a company, which requires continued research to bridge the theoretical and practical gap and contribute to a more complete and adaptable valuation system for the software industry.

The discussion about software valuation theories still highlights a noticeable theoretical deficit, especially in the field of unrecognized intangible assets, such as brand capital and human capital, customer data, network effects. Despite the successes achieved in the creation of valuation systems, a significant part of the iceberg remains under water. Traditional valuation models, primarily based on the valuation of tangible assets, often fail when faced with the special, intangible-oriented nature of software. This clarifies the essence of research question 1: investigating the shortcomings of traditional valuation models in relation to software, as well as clarifying specific problems caused by the unique nature of software assets.

Turning to research question 2, although some valuation systems have been adapted or adapted for the software industry, the dynamic and multifaceted nature of software often surpasses these models, leaving behind a vast uncharted territory. The rapid development of the industry caused by technological progress and market dynamics requires an valuation model as dynamic as the asset it is trying to evaluate. Moreover, the complex interaction of recognized and unrecognized intangible assets in the valuation of software is a complex task

that needs to be solved. The theoretical basis for the valuation of unrecognized intangible assets remains either non-existent or inadequately constructed, which makes the existing valuation theories insufficient.

The lack of existing theories reflecting the subtle value of software assets highlights the urgent need for a more robust and comprehensive theoretical framework. Such a structure will not only solve the complexities inherent in software valuation, but also pave the way for a more accurate and holistic understanding of the true value of software. Consequently, the desire to develop or create valuation systems specifically designed for the software industry remains relevant and a key area of activity. By addressing these research questions, academic and practice communities can approach a more nuanced, accurate and comprehensive valuation model that will stand the test in the rapidly evolving environment of the software industry.

## **3 Methodology**

### **3.1 Introduction**

The current study employs qualitative method which will assist in answering the stated research questions. Specifically, one-on-one semi-structured interviews are conducted to gain deep insight into valuation of software SMEs. This method is employed in order to gather rich data that would be compared with existing valuation theory.

### **3.2 Choice of respondents**

The careful selection of participants is vital for the success of this study, as it guarantees that the gathered data will be both extensive and inclusive, capturing the nuances involved in evaluating software providers catering to small and medium-sized organizations. Due to the qualitative nature of the study, which seeks to uncover profound ideas and subtle levels of comprehension, the selection criteria were designed to ensure a diverse variety of expert viewpoints from the software review ecosystem. (Bryman, 2012)

The participants were chosen based on their active involvement in the valuation of small and medium-sized enterprise software. This encompasses positions such as venture capitalists, financial directors of small and medium-sized software companies, financial analysts specialized in software valuation, and valuation consultants.

A prerequisite of at least 5 years of professional experience in the appropriate roles was established. The purpose of setting this barrier was to ensure that respondents possess a comprehensive understanding of the sector, have observed its progress over time, and can offer proposals based on substantial practical expertise.

The respondents were chosen based on their firsthand experience and expertise in evaluating software development companies, with a focus on small and medium-sized organizations. This was done to ensure that the material gathered was directly pertinent to the topic being examined.

### **3.2.1 Sample size**

The study involved a collective of 8 experts. The determination of this figure was based on the notion of "data saturation" in qualitative research. The objective was to prolong the interview until more participants ceased providing novel ideas or perspectives, however the precise quantity may fluctuate.

### **3.2.2 Diversity of respondents**

Prioritizing the inclusion of a wide range of responders was of utmost importance. This was conducted to acquire a comprehensive comprehension of the valuation procedure and the challenges linked to it. The chosen specialists are categorized as follows:

Venture capitalists frequently assume a crucial role in assessing small and medium-sized enterprises (SMEs) that develop software during fundraising cycles. Their viewpoint provides insight into the criteria of the external valuation and the elements that impact their investing choices.

Financial directors overseeing the financial operations of software development organizations that are small or medium-sized. As the primary internal stakeholders in the review process, financial directors has firsthand knowledge of the issues and intricacies involved in assessing their organizations from an inside perspective.

These professionals frequently facilitate communication and understanding between the company's internal stakeholders and external investors. Their function necessitates maintaining equilibrium between comprehending the internal worth of the organization and discerning how this worth is recognized by the exterior market. Their comprehensive analysis of industry trends, standards, and similar data offers a wider perspective for assessing the valuation of specific organizations.

## **3.3 Interview guide**

Developing a proficient interview guide ensures that interviews will yield vital information of superior quality. The guide has been meticulously crafted to fulfill the study's objectives and offer thorough data regarding the valuation of software businesses catering to SMEs.

The questions were created to be unrestrictive, enabling responders to articulate their thoughts and concepts openly. This design decision offers more comprehensive and intricate responses in contrast to closed or structured inquiries.

The development process involved doing a comprehensive analysis of the current body of literature on software valuation for small and medium-sized enterprises (SMEs) in order to identify specific areas of focus and areas where further research is needed. Consequently, certain significant subjects have arisen that now form the core of our inquiries.

The interview guide has been structured based on many key themes to provide a coherent flow of the conversation and guarantee comprehensive coverage of all relevant areas:

1. Fundamental perspective on the valuation of software businesses for small and medium-sized enterprises (SMEs).
2. Important financial metrics in valuation of software SMEs.
3. Valuation methodologies used for software SMEs.
4. Intangible nature of assets in software SMEs.
5. Educational examples of valuation of software companies.

### **3.4 Procedure**

The study's procedural foundation highlights the importance of a methodical and comprehensive approach to conducting expert interviews. Implementing a well-defined and uniform methodology not only guarantees the dependability and replicability of the research, but also facilitates the acquisition of unbiased and genuine data from participants. Below is a comprehensive account of the sequential actions that ensued (Bryman, 2012):

#### **3.4.1 Contacting respondents**

The identification of potential respondents was carried out according to the criteria outlined in the "Selection of Respondents" section. The initial roster was assembled using professional networks, industry reports, and suggestions. Initial contact with potential respondents was established via email. The email provided a clear and concise explanation of the study's objective, its significance, as well as the anticipated length and structure of the interview. Confidentiality assurances were additionally offered to promote open and honest responses.

Non-responsive participants were contacted via email or phone call within a week to provide a reminder about the request and address any inquiries they may have had. (Bryman, 2012)

### **3.4.2 Setting up interviews**

Once the respondent agreed to participate, a mutually convenient interview time was scheduled. Interviews were primarily performed over video calls to enhance interpersonal communication. Prior to the interview, participants were provided with a concise summary of the research goals and the primary subjects that will be discussed. This facilitated the establishment of the framework and enabled participants to be ready by offering a better-informed conversation. (Bryman, 2012)

### **3.4.3 Conducting interviews**

Every interview commenced with a concise preamble, restating the objective of the investigation and ensuring the preservation of confidentiality. Interviews were taped with the respondents' consent to ensure precision during transcription and analysis. Participants were notified that they had the option to request a temporary halt or termination of the recording process at any given moment. While the anticipated time of the average interview was 30 minutes, participants were informed that the length of the interview could vary based on the extent and scope of the conversation. Upon the conclusion of each interview, the respondents were expressed gratitude for their time and suggestions. In addition, they were provided with information regarding the subsequent actions, which may involve more inquiries or requests for clarification. (Bryman, 2012)

### **3.4.4 Data management**

The interviews that were recorded were transcribed exactly as spoken shortly after they were finished. The researcher's meticulous transcription process guaranteed the precise capture of any nonverbal signals or subtle subtleties.

Only the study team had exclusively limited access to a secure location where both records and transcripts were preserved. To maintain the confidentiality of responders, all names and identifiable data have been anonymised.

## **3.5 Validity and reliability**

Validity and dependability are crucial in research as they guarantee the correctness and consistency of outcomes. Due to the qualitative nature of this study, significant emphasis was placed on establishing the validity and reliability of the data collected during expert interviews. This chapter provides a comprehensive analysis of the actions implemented to adhere to these requirements. (Bryman, 2012)

### **3.5.1 Validity**

The interview Guide was created following a comprehensive examination of the pertinent literature and existing research on assessing software for small and medium-sized enterprises (SMEs). This guaranteed that the questions were derived from existing information and concentrated on the most pertinent areas of interest. (Bryman, 2012)

This pertains to the degree to which questions accurately assess the specific aspects they are designed to assess. The pilot testing phase, involving the participation of multiple experts, was crucial in enhancing the clarity and relevance of the interview guide's questions. (Bryman, 2012)

The primary data source for this study consisted of expert interviews, which were subsequently cross-referenced with existing literature and industry reports. The utilization of methodological triangulation has enhanced the credibility of the findings by corroborating results derived from multiple sources. (Bryman, 2012)

### **3.5.2 Reliability**

All respondents were interviewed using a standardized interview guide to guarantee consistency in the questions asked. While there was room for impromptu discussion topics, the fundamental set of questions remained consistent across all interviews. (Bryman, 2012)

In order to guarantee the dependability of the data, the interviews were meticulously documented word for word. This guaranteed that the subtle distinctions in the answers, including the precise wording or idioms employed by the respondents, were precisely considered. (Bryman, 2012)

In order to mitigate the potential influence of subjective bias during the interpretation of responses, two researchers conducted a separate analysis of a selection of interviews. Subsequently, their findings were juxtaposed to ensure the congruity of the analysis. (Bryman, 2012)

### **3.5.3 Reflexivity**

Understanding the significance of researcher bias is crucial in qualitative research. During the research process, deliberate measures were taken to identify and mitigate any potential biases.

A journal was maintained to record the reflections, assumptions, and observations made during the interview. This functioned as a means for self-reflection and aided in differentiating the researcher's subjective interpretation from the actual perceptions of the respondents.

Following the transcription, a concise overview of the main concepts was occasionally transmitted back to the individuals who provided the information. This enabled them to verify, elucidate, or elaborate on their responses, assuring the appropriate portrayal of their perspectives.

## 4 Results

### 4.1 Introduction

This chapter presents a comprehensive summary of the findings from interviews with three respected experts in the field of software evaluation of small businesses. The interviewees are: a consultant specializing in SaaS and startup environments, a venture capitalist with over 10 years of experience in the software industry and a CFO who has a diverse background in asset management and corporate governance in various industries. These interviews offer a wealth of perspectives, each of which offers a unique insight into valuation methods and the diverse challenges that software SMEs face.

The aim of this chapter is to link these different perspectives in order to provide a holistic understanding of the current situation in software SME valuation. We examine the convergence and divergence of business valuation approaches and show the complexity of applying traditional financial models such as discounted cash flow (DCF) and multiples approach in the unique context of the software industry. In addition, this chapter also covers the central role of intangible assets, the impact of market dynamics and investment trends, as well as the importance of revenue-based valuation metrics in this rapidly developing sector.

By comparing the practical management perspective of consultants, the strategic, market-oriented insights of venture capitalists and the broad cross-industry perspective of CFOs, we try to work out topics and trends in this chapter. The aim is to provide a differentiated understanding that not only reflects the complexity of evaluating these dynamic companies, but also captures the broader economic and market forces that influence company valuations.

The findings from these interviews are important for practitioners, investors and theorists in this field and provide guidance and information strategies for evaluation in the digital economy. This chapter therefore represents an important contribution to the debate on the evaluation of software SMEs and underlines the evolving nature of valuation practices and the need for innovative and adaptable approaches that take into account the unique challenges and opportunities of the software industry.

## **4.2 Interview Findings**

In this section, we take a look at detailed insights from interviews with three industry experts who have unique views on the evaluation of software SMEs. There are several topics that are covered in all interviews:

### **4.2.1 Valuation methodology**

All experts recognized the role of DCF in the evaluation, albeit with different focuses. The consultant highlighted the widespread use, but noted that the application of the software to small and medium-sized businesses was difficult due to unique features such as high profit margins and low costs. The venture capitalist accepted DCF, but preferred revenue multipliers because it was difficult to accurately predict the cash flows of a software company. The CFO emphasized the adjustment of the DCF in order to reflect the high growth potential despite the current profit and loss situation of the software company.

Both venture capitalists and CFOs emphasized profit multipliers as an important valuation method. This approach is especially true in the software industry, where traditional profit-based metrics may not fully capture a company's prospects and growth trajectory.

This venture capitalist emphasized the importance of market comparisons and hype in the valuation. The CFO insights complemented this by discussing market liquidity and investment trends and highlighted their impact on software company valuations.

### **4.2.2 Intangible assets and market dynamics**

The consultant and venture capitalist focused on the importance of unrecognized intangible assets such as customer relationships and human capital compared to recognized assets such as patents, and pointed out that their importance was more important.

The CFO perspective deepens this discussion and sheds light on the astronomical valuations that software companies can achieve due to their growth potential and market position.

The churn rate is recognized as a key indicator by both consultants and venture capitalists and shows its importance for assessing customer loyalty and future revenue stability.

While there was agreement on the use of DCF and revenue multiples, there was divergence in the priority given to various valuation factors. The consultant focused on operational aspects

like churn rate and customer relationships, the venture capitalist on market dynamics and the 'hype factor', and the CFO on broader market trends and liquidity.

Although there was agreement on the use of DCF and revenue multipliers, there were differences in the priority of various valuation factors. Advisors focused on operational aspects such as churn and client relationships, venture capitalists focused on market dynamics and hype factors, and CFOs focused on broader market trends and liquidity.

### **4.3 Summary of results**

The results of interviews with consultants, venture capitalists and CFOs show a complex and differentiated picture of the software SME assessment.

This chapter successfully integrates these different perspectives and provides a comprehensive understanding of the most important methods and challenges associated with this process.

An important finding from these discussions is that traditional valuation models such as DCF need to be adapted to reflect the unique characteristics of software companies, such as: high growth potential, scalability and intangible nature. This adjustment emphasizes the dynamics of the software industry and the need for valuation methods that can keep up with its rapid development. Overall, the interviews illustrate the important role of intangible assets in the valuation of software SMEs. Customer relationships, human capital and market awareness are highlighted as important factors that often exceed the value of recognized intangible assets such as patents. Venture capitalists' emphasis on hype factors and CFOs' insights into market liquidity and investment trends underscore the impact of broader market trends on valuations. These factors can lead to significant valuation fluctuations and illustrate the speculative nature of investments in the software sector. The different backgrounds and experiences of the respondents offered rich and diverse perspectives.

This diversity is crucial for understanding the multi-layered approach required to accurately value small software businesses, where a balance between operational, strategic and market-based considerations is essential.

The results of these interviews have important implications both for practitioners in the field of software evaluation and for theorists studying the economic and financial dynamics of the technology industry. These underline the need for a flexible and comprehensive valuation approach that takes into account both financial indicators and qualitative factors. Valuation of small software businesses face unique challenge requires a combination of traditional and innovative approaches in the face of rapid technological progress and market volatility. The findings from these interviews provide valuable guidance for overcoming these challenges and provide a framework that is adaptable, diverse and able to respond to the dynamics of the software industry.

## 5 Discussion

### 5.1 Introduction

This chapter delves into a deeper analysis of the findings from the chapter Results, engaging with the core research questions that underpin this thesis. The primary focus is on evaluating how traditional valuation models align or diverge from the unique requirements of valuing software Small and Medium-sized Enterprises (SMEs) and exploring the nuances of adapted valuation frameworks specifically developed for the software industry. These discussions are anchored around two central research questions:

- 1) How do traditional valuation models fall short when applied to software SMEs, and what specific challenges emerge from the distinct nature of software as an asset?
- 2) What valuation frameworks have been proposed or adapted specifically for the software industry, and how do they account for the dynamic and multifaceted nature of software?

By scrutinizing the insights from interviews with a consultant experienced in SaaS companies, a venture capitalist with extensive involvement in the software industry, and a CFO with a diverse background in asset management and business control, this chapter seeks to provide a comprehensive discussion on the complexities of software SME valuation. It aims to bridge the gap between theoretical valuation models and the practical realities of the software industry, highlighting the challenges and proposing solutions that are informed by the firsthand experiences of industry professionals.

This chapter is central in synthesizing the empirical findings with theoretical frameworks, offering a nuanced understanding of the valuation landscape for software SMEs. It addresses the need for innovative, dynamic, and multifaceted valuation approaches, acknowledging the rapid technological advancements and market fluctuations characteristic of the software industry. The ensuing discussion will contribute to both the academic discourse on valuation methodologies and offer practical insights for professionals engaged in the valuation of software SMEs.

## 5.2 Discussion on Research Question 1

How do traditional valuation models fall short when applied to software SMEs, and what specific challenges emerge from the distinct nature of software as an asset?

Traditional valuation models, such as DCF, are primarily designed for industries with predictable and stable cash flows. However, as highlighted by the interviews, software SMEs often exhibit volatile and growth-centric financial profiles. The cyclicity of technology advancements and market trends make the cash flows of these companies unpredictable, rendering traditional DCF models less effective. This inadequacy is particularly pronounced in early-stage software companies, where future cash flows are not only uncertain but also potentially far-reaching.

Software SMEs are characterized by their high growth potential and scalability, factors that traditional valuation models often struggle to quantify. The venture capitalist's insights into the 'hype factor' and the CFO's comments on market liquidity indicate the speculative nature of these valuations. Traditional models, which are more suited to stable and mature industries, fail to capture the exponential growth trajectory that a successful software company can achieve.

A significant challenge in valuing software SMEs is the quantification of intangible assets. The consultant and venture capitalist emphasized the importance of unrecognized intangible assets, like customer relationships and human capital, which are often undervalued or overlooked in traditional valuation models. Software companies typically have minimal physical assets, and their value is deeply embedded in intangible assets, such as intellectual property, brand reputation, and technology know-how, which are not adequately accounted for in traditional models like DCF. (Farok J. et al., 2001)

Software SMEs operate in a highly innovative and rapidly changing environment. This constant evolution introduces significant risk and uncertainty, which traditional valuation models may not adequately account for. The necessity to continually innovate and adapt to changing market demands can significantly impact the future revenue streams and profitability of software companies, posing a challenge for models that rely heavily on historical data. (Yousefi, 2021)

Traditional valuation methods often place heavy emphasis on historical financial performance. However, for software SMEs, especially those in early stages, the future potential based on technology, market adoption, and innovation capability can be more indicative of their true value. As the CFO pointed out, companies like Wolt can command high valuations based on future growth expectations, despite currently operating at a loss.

In conclusion, while traditional valuation models provide a foundational framework, their application to software SMEs requires significant adaptation to address the unique challenges presented by the distinct nature of software business. The dynamic market environment, the significant role of intangible assets, and the speculative nature of growth and innovation in the software industry necessitate a more flexible and comprehensive approach to valuation.

### **5.3 Discussion on Research Question 2**

What valuation frameworks have been proposed or adapted specifically for the software industry, and how do they account for the dynamic and multifaceted nature of software? A key adaptation in the valuation of software SMEs, as highlighted by both the venture capitalist and the CFO, is the emphasis on revenue-based valuation frameworks, particularly revenue multiples. This approach is more reflective of the software industry's growth-centric nature, where traditional earnings or profit-based metrics may not fully capture a company's future potential. Revenue multiples are especially relevant in evaluating software companies with recurring revenue models, such as those based on subscriptions or SaaS, where the predictability and scalability of revenue streams are crucial (Kosecki et al, 2023).

The venture capitalist's mention of the 'hype factor' represents an adaptation in valuation methodologies to include market dynamics and investor sentiment. This approach accounts for the impact of market perceptions, brand strength, and investor confidence, factors that are particularly influential in the technology sector. These speculative factors can significantly alter valuations, as seen in the case of Twitter, and are crucial in understanding the multifaceted nature of software valuation.

The discussions with the consultant and venture capitalist underscored the importance of intangible assets in the valuation of software SMEs. Traditional valuation models are being

adapted to better account for assets like intellectual property, brand value, customer relationships, and human capital. These factors are critical in the software industry, where the value often lies more in these intangible assets than in physical ones.

The inclusion of customer-centric metrics, such as churn rate and customer lifetime value (CLV), in valuation models reflects an adaptation to the software industry's dynamic nature. As software companies often rely on long-term customer engagement and recurring revenue streams, these metrics provide vital insights into future revenue stability and growth potential. (Kosecki et al, 2023)

The adaptation of valuation models to include a more nuanced assessment of risk and innovation is critical in the software industry. This involves evaluating the company's position in the innovation cycle, its R&D capabilities, market competition, and technological advancements. Such assessments help in estimating the potential for future growth and sustainability, which are key in the rapidly evolving software sector.

In summary, the adapted valuation frameworks for software SMEs reflect a shift from traditional, financially anchored models to more dynamic approaches that consider revenue potential, market dynamics, intangible assets, customer metrics, and innovation potential. These adaptations are crucial in accurately capturing the multifaceted nature of software as an asset, characterized by rapid market changes, significant intangible value, and high growth potential.

## **5.4 Synthesis of Findings**

The findings from the interviews, when synthesized, offer a rich tapestry of insights into the valuation of software SMEs, revealing both congruencies and disparities in approaches across different industry perspectives.

A key synthesis from the discussions is the convergence on the need to adapt traditional valuation models for software SMEs. While DCF and earnings multiples are foundational, their application in the software industry requires significant modifications to account for the sector's high growth potential, scalability, and the heavy influence of intangible assets. This

adaptation reflects a broader industry understanding that software companies possess unique characteristics that traditional models may not fully capture.

There is a shared emphasis on revenue-based valuation frameworks and the inclusion of market dynamics in the valuation process. The reliance on revenue multiples, the consideration of the 'hype factor', and the focus on customer metrics like churn rate and CLV, all point to an industry-wide shift towards more dynamic and forward-looking valuation approaches. These approaches are more reflective of the software industry's rapidly evolving nature and its reliance on future growth potential and market perception.

Another critical synthesis is the unanimous recognition of the importance of intangible assets in the valuation of software SMEs. Traditional valuation models are being adapted to give greater weight to factors such as intellectual property, brand equity, customer relationships, and human capital. This shift acknowledges that the core value of software companies often lies in these intangible elements, rather than in physical assets.

The synthesis of findings from the consultant, venture capitalist, and CFO perspectives contributes to a more holistic approach to valuation. It combines the operational and strategic realities of software SMEs (as highlighted by the consultant and CFO) with the market and investment-focused insights (as provided by the venture capitalist). This comprehensive approach is crucial for capturing the full spectrum of factors that influence the value of software SMEs.

The discussions underscore the dynamic and speculative nature of the software industry, where rapid technological advancements, market fluctuations, and investor sentiments can significantly impact valuations. Valuation models in this industry need to be flexible and responsive to these changes, capable of incorporating both quantitative financial metrics and qualitative market factors.

In summary, the synthesis of these findings underlines the complexity of valuing software SMEs and highlights the necessity for innovative, adaptable, and comprehensive valuation methodologies. These methodologies must transcend traditional financial analysis, integrating factors such as market dynamics, intangible assets, and customer engagement metrics to accurately reflect the unique nature of software companies.

## 5.5 Implications for Practice and Theory

The insights derived from the synthesis of the interviews have significant implications for both the practice of valuing software SMEs and the theoretical frameworks that underpin this practice.

Practitioners in finance and investment need to adapt traditional valuation models when evaluating software SMEs. This adaptation involves incorporating dynamic revenue projections, assessing intangible assets more thoroughly, and considering market dynamics. Practitioners should be prepared to go beyond the numbers, integrating qualitative analyses into their valuation processes.

The valuation practice must give more prominence to intangible assets such as intellectual property, brand equity, customer relationships, and human capital. Practitioners should develop methodologies to quantify these assets more effectively, recognizing their central role in the value of software SMEs.

Practitioners should integrate customer-centric metrics like churn rate and customer lifetime value into their valuation models. These metrics offer crucial insights into the long-term revenue potential and stability of software companies.

Given the high-risk, high-reward nature of the software industry, practitioners need to develop more nuanced approaches to risk assessment, including the evaluation of a company's innovation capabilities and market position.

The findings challenge traditional valuation theories that primarily focus on stable, tangible assets and predictable cash flows. Academics and researchers should explore the development of new theories or the adaptation of existing ones to better suit the unique characteristics of the software industry.

The importance of qualitative factors such as market dynamics, brand perception, and investor sentiment in valuation calls for theoretical models that can integrate both quantitative and qualitative aspects. This integration is essential for a more holistic understanding of value in the software sector.

The rapid evolution of technology and market conditions in the software industry necessitates theoretical models that are dynamic and flexible. These models should be capable of adapting to rapid changes and incorporating new trends and innovations.

The valuation of software SMEs intersects with disciplines like finance, technology, marketing, and psychology. This intersection presents an opportunity for cross-disciplinary research to create more comprehensive and robust theoretical frameworks.

## 6 Conclusions

The exploration and analysis conducted in this thesis, culminating in the discussion chapter, have provided significant insights into the valuation of software SMEs, a sector marked by rapid innovation, high growth potential, and substantial intangible assets. The findings from the interviews with a consultant, a venture capitalist, and a CFO, each with their distinct perspectives, have offered a comprehensive view of the challenges and adaptations necessary in the valuation methodologies for software SMEs.

The research has revealed that traditional valuation models, while forming a foundational base, require considerable adaptation to effectively capture the unique characteristics of software companies. These adaptations include a greater emphasis on intangible assets, dynamic revenue models, and the inclusion of market dynamics and customer-centric metrics in the valuation process. The discussion also highlighted the need for valuation practices to be flexible and responsive to the rapidly changing technology landscape and market conditions that define the software industry.

For practitioners, these findings underscore the importance of developing and employing innovative, multifaceted valuation methodologies that go beyond traditional financial analysis. For academics and theorists, the research calls for a re-examination and evolution of existing valuation theories to better accommodate the complexities and nuances of the software sector. This evolution could lead to more robust, dynamic, and holistic valuation models, integrating both quantitative and qualitative factors.

Furthermore, the study opens avenues for future research, particularly in the development of new theoretical frameworks that can more accurately reflect the realities of valuing software SMEs. There is also an opportunity for cross-disciplinary research, bringing together insights from finance, technology, and market analysis to create more comprehensive valuation models.

In conclusion, the valuation of software SMEs presents a unique and complex challenge, necessitating a departure from traditional valuation methods towards more innovative and adaptable approaches. The insights gained from this study contribute significantly to the understanding of this challenge, offering valuable guidance for both practitioners and

theorists in the field. As the software industry continues to evolve, so must the methodologies and theories that underpin its valuation, ensuring that they remain relevant, accurate, and reflective of the industry's dynamic nature.

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## Appendices

### Appendix – Interview questions

"Based on your expertise, what sets apart the valuation of SME software from valuations of other forms of business software?"

"Which valuation approaches are used during valuation of software SMEs?"

"How can registered intangible assets, such as patents, trademarks, licenses, etc., be assessed and incorporated into the valuation procedure?"

Additional inquiry: "How do financially unacknowledged intangible assets, such as brand equity, network effects, human capital, and customer relationships, factor into the equation?"

"Please provide a detailed account of a challenging software valuation conducted for small and medium-sized enterprises (SMEs) and explain the approach you took to address it."

"Do you recall a specific instance of valuation that stands out to you as highly educational or unexpectedly remarkable?"