



UNIVERSITY OF GOTHENBURG  
SCHOOL OF BUSINESS, ECONOMICS AND LAW

# Capitalization of software development costs

*- a comparison between EU and U.S.*

**Master thesis**

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## **Abstract**

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**Title:** *Capitalization of software development costs - a comparison between EU and U.S.*

**Background:** The world is moving towards a knowledge-based, rather than manufacturing-based, industry. During the last decade both EU and U.S. have increased their R&D spending, especially for software development. This makes the accounting choices for these costs of great importance. Since the two markets use different accounting regulations, IFRS and US GAAP, it is of great interest to study if and why there are differences between the two standards' treatment of software development costs. Although the similarities between the two standards are predominant, still we hypothesize that there are differences in how firms in the two regions account for their development costs for software.

**Research design:** The hypotheses are investigated by comparing a sample of companies in the software industry for both EU and U.S. Hypotheses have been created and data has been gathered from the database *Datastream*. To analyze the data and see if the null hypothesis can be rejected, multiple statistical tests have been executed. Both non-parametric test as well as parametric tests has been utilized in this thesis.

**Conclusion:** The thesis provides evidence that there is a difference in the propensity of capitalization of development costs in the software industry between EU and U.S. Moreover, it provides evidence that neither of the incentives age, turnover or total assets affect the amount capitalized. Furthermore, neither of the two target-beating variables affected capitalization of development costs. This can be due to the small sample tested. Only the variable US GAAP is an affecting factor on capitalization. This suggests that other factors, such as enforcement and differences between the markets, most certain influence the accounting choice for software development costs.

**Keywords:** R&D, capitalization, IFRS, US GAAP, software industry

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Gothenburg, 28 may 2014

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Emelie Chappell

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Magnus Dettmar

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## **Abbreviations**

ASC = Accounting Standards Codification

EU = European Union

FASB = Financial Accounting Standards Board

FAS = Financial Accounting Standards

FPI = Foreign Private Issuers

GNP = Gross National Product

IAS = International Accounting Standards

IASB = International Accounting Standards Board

ICT = Information and Communication Technology

IFRS = International Financial Reporting Standards

IPO = Initial Public Offering

R&D = Research and Development

SEC = Securities and Exchange Commission

SFAS = Statement of Financial Accounting Standards

U.S. = United States

US GAAP = United States Generally Accepted Accounting Principles

# 1. Introduction

## 1.1 Background

The importance of research and development (R&D) is increasing since the industry is becoming knowledge-based rather than manufacture-based. One region that understands the importance of this is the EU, which today is one of the leading markets in the world in the R&D sector. During the last decade, EU's expenditure on R&D has grown by 43.5 percent that has increased their competitiveness in the world. However, EU plans to continue to increase their R&D investments and implemented an objective in 2010 to devote three percent of EU's gathered GDP in R&D, named the *Europe 2020 strategy*. (Eurostat, 2012) This occurs despite the fact that that Europe is one of the regions that spends most amount of their R&D in relation to GDP than any other region in the world (The World Bank, 2013).

Likewise, the U.S. is one of the leading markets of R&D. The number of software and information technology service companies exceeds 100 000 with a spending of over 126.3 billion dollars (2011) on R&D. This results in more than 55 percent of the global spending on R&D within information and communication technology (ICT). Their spending's increased by 6.3 percent on R&D ICT (2011) and is expected to continue to grow. This makes the accounting standard, which regulates R&D investments, of great importance as the company's finances can vary considerably when different accounting choices are made. (SelectUSA, 2013) Consequently, it is a current and interesting area to study more closely.

In 1999, Microsoft stated that they were under investigation for their accounting practices by the Securities and Exchange Commission (SEC). (Pulliam and Buckman, 2002) The investigation focused on the company's revenue deferral and what is called "unearned revenues" where hundreds of million of dollars were set aside for future earnings. The company partly smoothed their revenue by not directly recognizing the revenue due to future upgrades and services that were included when purchased software. Additionally, they did not capitalize the development costs of the software according to the Financial Accounting Standards (FAS) No 86, says SEC. The standard states that when internally developed software reaches the stage of "*technological feasibility*", which is established upon completion of a detail program design, it shall be capitalized as an intangible asset. Since Microsoft is a major player in the market, especially in the software industry<sup>1</sup>, this gave wide publicity since many American software companies apply this standard according to Maffei (2000). Microsoft argued that "*Research and*

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<sup>1</sup> Software and computer service is a sector within the technology industry and technology supersector. The sector contains three sub sectors: computer services, Internet and software. These companies do services such as consulting related to information technology, computer system design, internet-related services, computer software development etc. (Industry Classification Benchmark, 2012)

*development costs are expensed as incurred. Statement of Financial Accounting Standards (SFAS) No. 86, accounting for the costs of computer software to be sold, leased, or otherwise marketed, does not materially affect the company.*" (Maffei, 2000) This makes the topic "software capitalization" interesting as a subject of research.

Moreover, in the journal Business Week (2008) a journalist points out that SEC is thinking about adopting IFRS. This due to the fact that US GAAP is complex and outdated, along with having two different regulations which can lead to misleading information. Furthermore, it is stated that 63 percent of the multinational-companies reporting under both IFRS and US GAAP, show higher earnings using the international standards. (Henry, 2008)

## **1.2 The accounting problem**

In 2005, EU adopted International Financial Reporting Standards (IFRS) and simultaneously IAS 38 *Intangible assets* were put in use (IFRS, 2013). This was the first comprehensive standard for intangible assets. According to the standard, it is not allowed to recognize research costs but development costs should be capitalized when they fulfill certain recognition criterias as, for example, "existence of future economic benefits" (IAS 38).

In relation to IFRS, Financial Accounting Standards Board (FASB) has since 1973 regulated the standards for financial accounting in the U.S., US GAAP. Furthermore, SEC and the American Institute of Certified Public Accountants recognized the standards as authoritative. In the middle of 2009, FASB reorganized the standards' codification and implemented a new system. For example, FAS 86 was changed into ASC 895-20<sup>2</sup>. (FASB, 2013)

When following US GAAP, all R&D expenditures shall be charged as expenses when they occur, except for some categories. For example, assets related to internally generated computer software programs should be capitalized according to ASC 895-20 when "technological feasibility" can be established. The phrasing technological feasibility can be aligned with IAS 38 recognition criteria "future economic benefits" as they essentially have the same intention. Though IFRS and US GAAP are phrased in different ways the fundamental ideas are still the same. (EY, 2011)

Although the two standards (IAS 38 and ASC 985-20) are in many aspects similar we still believe we will find a difference in the propensity capitalized development cost for software between EU and U.S. This may be inferred from Agoglia's et al. (2011) study where the authors found that companies are inclined to capitalize lease to a greater extent when following IFRS rather than US GAAP. The accounting treatment for leasing according to the two standards is very similar. Likewise, software accounting is similar between the

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<sup>2</sup> More information concerning the standards can be found under the section "Institutional settings".



two standards as well, which makes us believe that the propensity of capitalization of software costs will differ as well.

According to Ball (2006), the differences can in many cases be explained by endogenous factors (e.g. incentives and enforcement). Enforcements will not be tested in this thesis, instead incentives will be the focus as managers can be influenced when preparing the financial statements. For example, incentives concerning beating the targets, or lowering taxable profit will be taken into consideration. Also, reasons like the firms' life-cycle, turnover and size may influence the accounting choice<sup>3</sup>. This can cause differences in the accounting. Our aim is to investigate following hypotheses.

*H<sub>1</sub>: There is a difference in the propensity of capitalization of development cost for software between IFRS and US GAAP.*

*H<sub>2</sub>: The difference is due to incentives, such as target-beating, turnover, company size and/or life-cycle.*

The hypotheses are described more thoroughly in chapter 5.

## **1.3 Purpose**

Both IFRS and US GAAP allow capitalization of development costs for software. With regard to this, the purpose of this study is to examine following question. If there are any differences in the propensity of capitalization of development costs in the software industry between IFRS and US GAAP. Also, the aim of this thesis is to see if there are any reasons for accounting in a certain way. This is to examine whether or not the reasons affect the companies' accounting choice, rather than the standard and the institutional setting in the country where the company is placed. Reasons that may affect the accounting choice can be endogenous factors such as incentives and enforcement. The reasons and incentive we will focus on in this study are turnover, life-cycle, the company's size and target-beating.

## **1.4 Limitations**

During this study we will use *Datastream* as a source for financial accounting data. The financial information that will be used in this study is from 2012. Moreover, the program only contains figures for listed companies and we have to rely on the data presented as being complete and correct. Hence, we will only study those companies that are presented in the database.

## **1.5 Delimitations**

Both IFRS and US GAAP are widespread practiced and accepted accounting regulations. The study is delimited to companies within the software industry in EU and U.S. and compares their accounting standards. IFRS is not only

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<sup>3</sup> More information about incentives will be presented under chapter 3 "Earlier Research".

adopted in Europe, it has also spread to other parts of the world, for example, to Oceania and Asia. This study, however, is delimited to listed companies in the EU, which consists of 28 member states. We will not include Croatia since they joined the EU during 2013 and accordingly did not have requirements to adopt IFRS before they joined. This results in 27 countries in the sample. As for US GAAP, only listed companies in the U.S. will be studied. The reasons for these delimitations are: first, EU and U.S. are similar in size and will therefore give a sufficient sample. Secondly, the EU has to follow IFRS according to the EU directives; hence, the utility of standards between the countries is similar (IFRS, 2013).

Since this study uses Datastream as a database, it will only cover those companies that are classified as software companies in this database. Moreover, the development costs that occur in these companies are all collected together as R&D costs for software and are not further distinguished. Another delimitation is that we have decided to not focus on enforcement in this thesis, instead our main focus is incentives.

## **1.6 Contribution**

With this thesis we would like to contribute with research about the current and increasingly important subject research and development. Since the industry is moving towards more knowledge-based, accounting choices for R&D are vital to give a faithful view of the companies' financial statements. The subject is also current with regard to FASB's willingness to adopt IFRS. Furthermore, this thesis will contribute with the observation that there are different accounting choices made regarding research and development costs. This may be because of many different reasons, as we will present in this study.

## **1.7 Outline**

This thesis will continue by describing the two different standards, IAS 38 and ASC 985-20, and their similarities under chapter 2 *Institutional settings*. Further on, chapter 3 will present the development of the hypotheses and the used literature. After that, the method will be described in chapter 4 *Research design*. Chapter 5 contains the empirical findings and analysis and in chapter 6 conclusions will be presented. Finally, chapter 7 will discuss further research.

## **2. Institutional settings**

To account for development costs of software EU uses IFRS standard IAS 38, while U.S. uses FASB's standard ASC 985-20. These standards have many similarities, even though IAS 38 focus on all development costs, while ASC 985-20 specifically focus on software development costs. Below will be examined how the two standards have developed their present content and investigates when software can be recognized as an intangible asset according to the two standards.

### **2.1 IAS 38 - Software accounting in EU**

During the late 1990s the precaution to expense most of the parts of intangible assets were criticized. This was due to the fact that more and more companies increased their holdings of intangible assets, which they could not capitalize on in their balance sheet as an asset. The dominant precaution during that period made it difficult to recognize intangible assets on the balance sheet. Due to this, future return was more difficult to estimate than tangible assets. As an example, a company can easily estimate the return on a machine since usually the rate of production and the cost of the machine are well known. An intangible asset, however, is continually dependent on the staff of the company, and additionally it is important to keep in mind which opportunities they have to exploit it. This criticism decreased during 2000-2001 when several IT companies and technology companies fell sharply in market value, which again brought up the question of the consequences of capitalization. (Marton et al., 2013)

Before IAS 38 was implemented, many of the intangible assets were categorized as goodwill under the standard IFRS 3. This came to an end in 2005 when the new standard was implemented. IAS 38 aims at intangible assets, which are non-monetary assets without physical substance. (Marton et al., 2013)

IAS 38 addresses a certain part of the standard to cover internally developed intangible assets and the development-phase of intangible assets. The standard divides internally developed intangible assets into two phases: the research phase and the development phase. (IAS 38, p. 52) Only the development phase can be recognized on the balance sheet. The requirements of IASB's conceptual framework is that all the following terms have to be fulfilled (IAS 38, p. 57):

First, it must be technically feasible to complete the asset for future usage or to sell it. Also, the intention for the development of the asset is to complete, use or sell it. Moreover, the standard requires that there is a probable feasible future economic benefit for the asset and that the company has sufficient technical, financial and other resources required to complete the asset. Last, the company must be able to calculate the expenditure attribute to the intangible asset during its development in a reliable way. (IAS 38, p. 57, a-f)

What is shown above is if the asset is to be used only internally it must demonstrate usability (IAS 38, p. 57, d). When assessing whether an internally generated intangible asset qualifies for capitalization of internally generated intangible assets the precautionary principle<sup>4</sup> is applied. The recognition of expenditure will only begin when the conditions are met.

The company can also demonstrate future economic benefits by providing evidence that there is a market for the asset. These future economic benefits are based on the recoverable amount. To meet the requirements of completing, using and obtaining the future economic benefits of the developed product, a company must show a business plan or alternatively a loan-offer (IAS 38, p. 61).

There are additional requirements that must be met in order to enable firms to recognize development costs. The company is required to be able to reliably calculate the costs directly attributed to the development of the intangible asset to allow recognition. These directly attributable costs are costs for materials and services, wages and employee benefits, costs of interest on loans, fees to register a legal right and the amortization of patents and licenses that are used to internally generate the intangible asset. The cost of internally generated intangible asset is thus the sum of the expenditure incurred (IAS 38, p. 66). One should not, however, capitalize on the expenditure that had already been expensed (IAS 38, p. 71).

## **2.2 ASC 985-20 - Software accounting in the U.S.**

In 1974, FASB released a new standard that for the first time described accounting practices for R&D activities. FAS 2 *Accounting for research and development costs*, states that all R&D costs shall be charged to expense when they incur (FAS 2, p. 12). In “Basis for conclusion” FAS 2, there are two main reasons for doing so. Firstly, the board believes that it is hard to reap the future benefits of research and development costs, as there is a high uncertainty factor involved. “.on average less than 2 percent of new product ideas and less than 15 percent of product development projects were commercially successful”. (FAS 2, p. 39) Secondly, the board was of the opinion that it is hard to estimate a direct correlation between R&D expenses and future benefits as well as the quantity of the revenue. (FAS 2, p. 41) Hence, all R&D costs shall be expensed. This way of treating accounting choice can be seen as extremely conservative method as well as precautionary.

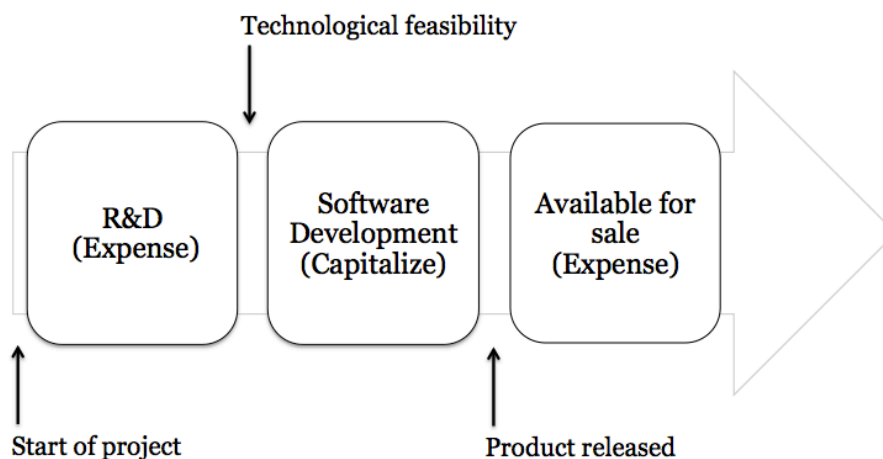
At the end of 1985, a new standard FAS 86 *Accounting for the Costs of Computer Software to Be Sold, Leased, or Otherwise Marketed* was announced. The standard deviated significantly from FAS 2 as it allows capitalizing development costs in some cases. The motive for this was that Accounting Standards Executive Committee (AcSEC) and SEC indicated that users interpreted FAS 2 differently. Because of this they requested a

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<sup>4</sup> The precautionary principle can be described as avoiding unnecessary risk-taking. In accounting it implies for example that companies evaluate the assets low and debts high. (Marton, 2013 & Smith, 2006)

clarification of accounting for internally generated computer software. (FAS 86, p. 1) Moreover, in 2009 FASB replaced all former US GAAP standards and instead established a new improved single authoritative codification called FASB Accounting Standards Codification (ASC). (Williams et al., 2013) This lead to that FAS 86 *Accounting for the Costs of Computer Software to Be Sold, Leased, or Otherwise Marketed* changed into ASC 985-20 *Cost of software to be sold, leased or marketed*. However, ASC 985 is the main standard for software accounting. There are also ASC 350-40 *Internal use software* and ASC 985-605 *Software revenue recognition* concerning accounting for software.

In ASC 985-20 technological feasibility is an important term, as this is the turning point when a product can be capitalized or not. According to the standard, technological feasibility can be achieved when the company has performed certain activities. As a minimum, one of two actions has to be completed, either the company should have finished a detailed program design or if that is not possible, the company should at least have completed a product design and a working model. A company must ensure in their detailed program design that it has available the necessary skills, hardware and software technology to produce the product, its consistency with the product design by tracing and documentation, and must identify the high-risk development issues regarding the computer software and all the issues that may be encountered in the production of the software. However, if the process of creating a software program does not include a detailed program design, an enterprise must complete a program design and a working model. Additionally it must substitute the completeness of the working model and its consistency by testing it. (ACS 985-20-25-2, a-b) What is not to be capitalized is the computer system that improves an enterprise’s administrative or selling procedures are not considered R&D costs (ASC 985-20-25-5).



**Figure 1 Stages for accounting development costs for software.**

Costs for computer software to be sold, leased, or otherwise marketed, that incur before technological feasibility has been established, shall be expensed while all, cost subsequent technological feasibility, shall be capitalized (see picture above). In other words, in the beginning of a project all cost shall be

charged to expense until the company can prove technological feasibility. Only after that point can the development costs be capitalized. Furthermore, in 985-20-25-6 it is stated that when the product is available for sale the capitalization should end. Also, maintenance cost and customer support cost shall be expensed when they occur.

Furthermore, ASC 350-40 provides guidance for internal-use software, both purchased and internally developed. This kind of software is characterized by the fact that that is acquired, internally developed or modified solely to meet the entity's internal requirements. However, it is also characterized by not having a substantive plan to market externally. What makes this standard different from ASC 985-20 is that software that is used in the production of a product or the provision for a service, but not acquired by the customer, should be accounted for under the guidance of this standard. The stages of when to start capitalize development cost for software are when the preliminary project staged is complete, the same as in ACS 985-20 (ASC 350-40-25-2). However, the accounting treatment largely depends on the nature of the cost incurred when internal-use software is concerned. The costs during the application development, as well as conversion of old data by the new system should be capitalized (ASC 350-40-25-3). As follows, the company should cease to capitalize the software no later than when it is complete and ready for its intended use. After that, maintenance costs should be expensed as they occur (ASC 350-40-25-6). If the development of the internal use software is no longer likely to be completed, the software should be valued at its fair value, zero, since there is no use for the software.

## **2.3 Similarities**

There are many similarities between IAS 38 and ASC 985-20. First and foremost, both accounting standards encourage "fair value accounting" which is incorporated when capitalizing development costs. Secondly, internally used software can be recognized on the balance sheet whichever standard is followed. Furthermore, both standards only allow capitalization of development costs and not research costs. Probably the most important similarity is that the two standards express their ways of recognizing development costs in different ways, but the fundamental ideas are basically the same.

# **3. Development of hypotheses**

## **3.1 Difference in capitalization**

### **3.1.1 Harmonization**

As the markets around the globe are rapidly connecting, the world is moving towards a more global economy. As a result the need for global accounting standards are increasing fast. Due to IFRS and US GAAPs differences, discussions have been during many years to harmonize and converge the two accounting systems into one global accounting system. (Fosbre et al., 2009) A reason for this discussion could be that in the repercussions of the multiple accounting scandals in 2002, the U.S. legislated a new accounting reform, The Sarbanes Oxley Act. To be able to prevent scandals in the future, the US Congress stated in this Act that they support harmonization of international accounting standards. (Soxlaw, 2006)

As a result of this, IASB and FASB have throughout more than a decade worked together to achieve harmonization. In 2002, they signed the Norwalk Agreement as a start for the convergence project. (FASB, 2002) As of today, harmonization has still not been reached, which indicates that it is a difficult and strenuous process.

### **3.1.2 Rules-based and principles-based**

Furthermore, there are multiple differences between standards created by IASB and FASB. The most noteworthy is that IFRS is principles-based while US GAAP is a rules-based regulation. According to Wüstemann and Wüstemann (2010) rules-based standards are difficult to evade as the purpose is described closely. On the other hand, a principles-based system, contains fewer guidelines and as a result demands more professional judgments. Furthermore, Agoglia et al. (2011) state that those that prepares financial statement are more likely to capitalize lease under principles-based standards than when applying a rules-based standard. Even though the leasing standards are similar, the propensity for capitalization varies. This implies that there is a distinct difference between the two types of accounting regulations that will affect how prepares report financial statements' depending on which regulation the company follows. Moreover, the authors also examined the effect of audit committees. To be able to perform the test, researchers manipulated the standards so they would clearly distinguish between them. The result showed that when a strong audit committee was present in a rules-based setting, financial statements prepares were more likely to capitalize than with a weak audit committee. However, with a principles-based setting the audit committee did not have a noteworthy effect.

### **3.1.3 Enforcements influence**

According to Ball (2006) major influences that can affect the outcome of the accounting are exogenous factors, in other words enforcers like analysts, auditors, boards, block shareholders, courts, politicians, rating agencies,

regulators and the press. These prominent factors crucially influence financial statements preparers' incentives which in turn shape the practices of financial reporting. Furthermore, the author states that these elements remain local, which leads to uneven IFRS enforcement and different accounting practices around the globe.

As of today, nearly 100 countries have adopted IFRS around the globe. Ball (2006) believes that just by adopting IFRS will not lead to uniformity because of an uneven implementation and local enforcement setters. Instead, he states that it can mislead investors to believe in more uniformity than it actually is. International differences that might exist will instead be hidden under the uniform set of standards, IFRS. According to Ball (2006) the only way to actually accrediting IFRS with "high-quality" accounting and uniformity is to implement a worldwide enforcement mechanism. This mechanism should have the power to penalize countries that use IFRS as a brand-name when not following a certain practice.

### **3.1.4 Foreign private issuers**

Furthermore, Plumlee and Plumlee (2008) examined a sample of 100 foreign private issuers (FPIs) that was from March 4, 2008, allowed not to provide reconciliation to US GAAP. The authors identified two major areas where the FPIs report differently. Firstly, they identified the category of pensions/other post-retirement benefits and secondly the category related to goodwill/other intangibles. These reporting's are of interest for investors, academics and other actors that observe and use the financial information. This indicates that there is a difference in companies accounting choice between US GAAP and other accounting regulation, such as IFRS.

In this study we examine the difference in the propensity of capitalization of development cost for software between the two regions, EU and U.S. The standards, IAS 38 and ASC 985-20, concerning development cost have more similarities than differences. However, we still believe that we can find a difference in the propensity capitalized. In this study we will not research enforcement (e.g. audit committee and regulators) further but instead focus on the incentives behind the accounting decisions for the companies.

### **3.1.2 Hypothesis**

To be able to perform this study we have developed hypotheses. These are based on earlier research, which we would like to build upon and contribute to. We use a deductive method as theory is expounded and hypotheses are developed. This leads to our first hypothesis:

*H.: There is a difference in the propensity of capitalization of development cost for software between IFRS and US GAAP.*



## **3.2 Incentives influence**

### **3.2.1 Life-cycle**

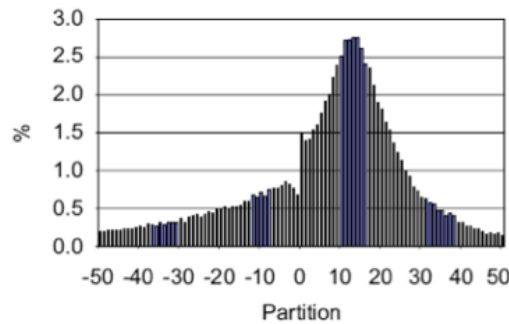
Oswald and Zarowin (2007) found in their study that companies in their early life-cycle tend to capitalize more than mature companies. Due to their findings, we believe that the same result will be found when comparing EU companies that apply IFRS and U.S. companies that apply US GAAP concerning software. This because of the need of capital in the early period of a company's life-cycle, where companies with higher amounts of assets more easily collect and borrow capital from banks and investors than those without. At the same time, more mature companies tend to expense more of the development costs due to lower their profit (to obtain lower tax) and the lower need of capital. Consequently, we believe that these factors do have an impact on the capitalization frequency, no matter when standard is applied. For the variable life-cycle it is the maturity of the company that needs to be measured. To do this we will use age as a proxy for the companies' maturity and life-cycle, as Oswald and Zarowin (2007) did in their article. This leads to the following hypothesis.

*H<sub>2A</sub>: There is a negative correlation between companies in the beginning of the life-cycle and capitalization of development costs.*

### **3.2.2 Target-beating**

Both Hayn (1995) and Burgstahler and Dichev (1997) identify a "kink" in the earnings, where management avoids the negative numbers, as it is preferable for firms to have small positive numbers, zero or under. The market reacts strongly to negative numbers and for this managers try to avoid it. This is called the "target-beating theory", where managers have incentives to beat targets. Moreover, they found that if incentives for target-beating exist, firms capitalize more. Since studies show that the most important item in the financial reports, according to analysts, investors, senior executives, and boards of directors, is earning. That is why it is the most important item concerning target-beating (Degorg et al. 1999).

There are studies that prove an increasing pressure on management to beat-targets (Burgstahler and Dichev, 1997). Management tends to carry out repairs and maintenance in order to meet earnings' expectations (Perry and Grinaker, 1994). When companies' pre-management is facing a small loss, management tends to boost earnings to present small profit instead. As a result, more companies present a small profit than a small loss, which leads to a "kink" in the earnings' normal distribution curve when comparing companies. In figure 2, the "kink" shows that there are fewer companies than expected which have an annual small loss. This indicates that the companies try to beat the targets. Further, the authors provide evidence that companies with small profit tend to more discretionary accruals than small profit firms. This provides evidence that after removing earnings' distribution, the "kink" should decline.



**Figure 2 Histogram displaying the "kink". (Source Jacob and Jorgenson, 2007)**

With regard to target-beating and development costs, studies have found that firms may use R&D expenditures to beat targets. Osma and Young (2009) found in their study that companies who failed to meet earnings target one year, increased the probability to cut R&D expenditure for the next year. Their study also shows that the pressure to report positive earnings' levels tends to increase managements cuts in R&D in order to meet targets. Furthermore, the authors also found that short-term target-beating influences UK firms, where long-term value creation is sacrificed by short-term goals. However, their study shows that high R&D intensity firms are less likely to cut their R&D expenditures. This is so in case of short-term earnings pressure when these investments will provide future value and yield revenue. As a result, we would like to study the relationship between target-beating and how it differs with respect to IFRS and US GAAP, concerning companies' accounting practices for development costs in the software industry, by using target-beating as a variable. We believe it would be relevant for the hypothesis as also Cazavan-Jeny et al. (2011) found that French companies capitalized more when target-beating is involved. Consequently, we would like to see if the theory is consistent in our case. We expect that company's capitalization of R&D expenditures will be positively associated with target-beating. Which leads to the following hypothesis.

*H<sub>2B</sub>: There is a positive correlation between companies who target beats and capitalize development costs.*

### **3.2.3 Company size**

Aboody and Levs' (1998) study which found that larger firms tend to spend more on basic research, maintenance and upgrades of their software. Since it was not, and is still not, permitted to capitalize these three stages of the software development when using the prevailing standard No. 86 (today called ASC 985-20), the result is that large companies expense more than small firms. Accordingly, small-size firms tend to capitalize more than large firms since they spend less on these three stages. Also, Cazavan-Jeny et al. (2011) studied companies in France and the managers' decision to capitalize or expense R&D. The authors found that companies that capitalize R&D usually invest less in R&D and are also the firms that are smaller and more leveraged than companies that do not capitalize their R&D expenditures.

Equally, Oswald (2008) in his study examines how both size and profitability are associated with the amount of capitalization of development costs. He examines how “Expensers” report more positive earnings, and are also older than “Capitalizers”. Consequently, there are reasons to believe that the firms’ size is correlated to the amount of capitalized development costs, where small firms capitalize more than large firms.

To measure the size of the company total assets will be used as a proxy. The size of the company can be measured in various ways, which have been extensively discussed in earlier literature. Erlingsson et al. (2012) states that total assets, net sales, and number of employees are commonly used measures for firm’s size. Other researchers confirm these findings and beyond these three proxies supplement with an additional, the value of equity (Huff et al., 1999). For example, the seminal work of Gibrat (1931) showed that measuring firm size by the number of employees indicates a right skewed distribution. As the software industry is more knowledge-based rather than manufacturing-based, the proxy total asset is more appropriate than for example number of employees. Hence, we believe that companies’ size has a negative correlation to the frequency of capitalization. From this the following hypothesis can be developed.

*H<sub>2c</sub>: There is a negative correlation between larger companies and capitalization of development costs.*

### **3.2.4 Turnover**

Oswalds and Zarowins’ (2007) study shows how early life-cycle firms capitalizes more R&D costs than mature companies. Since the mature companies normally have a greater turnover than early life-cycle firms, we believe there is a parallel not just to the firms’ development stage, but also to their turnover size. Moreover, studies show that those companies who invest more in R&D tend to expense more than others (Cazavan-Jeny et al., 2011). With this in mind, larger companies have more financial strength to invest in R&D, and accordingly greater turnover. Thus, when companies have a greater turnover, they expense more development costs and vice versa. This is a result of the willingness to keep the profit low to lower the company’s income taxes. Additionally the company has enough financial strength to expense the development costs rather than capitalize them. Therefore, we believe that there is a negative connection between turnover and capitalizing development costs for software. Which leads to the following hypothesis.

*H<sub>2d</sub>: There is a negative correlation between turnover and capitalize development costs.*

Above mentioned hypotheses (2A-2D) will be tested together to examine whether or not there are correlations between different reasons and the proportion capitalized development costs in the software industry.

# 4. Research design

## 4.1 Choice of method

This thesis examines whether there is a difference between IFRS and US GAAP, concerning software accounting. To execute this research thoroughly, the study is conducted with a quantitative approach. Furthermore, this study examines data from companies in the software industry during the financial year 2012. For this study, the data has been collected from the database Datastream.

## 4.2 Statistical tests

To execute this quantitative study a statistical approach has been used and therefore statistical tests are executed to try to answer the hypotheses that have been developed. To test the hypotheses multiple regression analyses are executed in Stata.

### 4.2.1 First hypothesis

The first hypothesis is tested in two ways. First and foremost, a probit regression has been performed, which is a parametric test. This type of regression is suitable as the dependent variable is binary (capitalize or not). A probit regression's purpose is to estimate the probability that an observation will end up in one category. In this case, the observations will fall into four "corners" as both variables are binary. To interpret and analyze the coefficient of the probit regression the command "margins" has been used in Stata. The marginal effect of the independent variables is interpreted, which is how much the conditional probability of the outcome variable changes the value of a variable. This by holding all the other regressors constant. (Aldrich, J. H. and Nelson, F. D., 1984)

Secondly, a chi-square test is used to verify if it leads to the same results as in the probit regression and test the first hypothesis. This is opposite to a probit regression a non-parametric test, which indicates in which categories the observations fall into. Both these methods are suitable as the dependent and the independent variables are binary. Also, the tests are useful as the model is nonlinear. (Corthinas, C. and Black, K., 2012)

### 4.2.2 Second hypothesis

For the second hypothesis a probit regression has been executed. The dependent variable is binary in the probit regression. The same variable is used in the first hypothesis, that is to say whether the company capitalizes or not.

Also, a multiple linear regression is conducted to ensure same results. A multiple linear regression is suitable as there are more than one explanatory variable. In the multiple linear regressions the dependent variable shows the proportion capitalized in relation to R&D outlays.

### **4.3 Data collection**

The data presented and used in this thesis was gathered through the database Datastream. Only companies that are listed on a stock exchange in the United States are incorporated in this study. Further, the sample is reduced to companies that produce software and computer services. This creates our sample for the U.S. Following, the same procedure are done on listed software companies in EU to produce a similar sized sample. All countries in the EU are included except from Croatia, which in 2012 was not a member of the EU. Below in appendix 1, the sample companies are presented. Before data was gathered the sample companies were filtered for which accounting regulation they followed.

When data was gathered in Datastream it was salient that some of the variables had a great amount of “error” in the data. To be able to guarantee that the data was correct and that in fact “error” could be set to zero or “missing value” we verified a random sample by comparing the result to the companies’ annual reports. This indicated that the data was presented correctly and “error” did in fact mean that the company had not that type of variable and it could be set to zero for the variables Capitalize (WC18299), Expense (WC01201) and Total assets (WC02999). Furthermore, we transformed all the monetary variables to Euro.

### **4.4 Potential problems**

Problems that may arise when collecting data have primarily to do with demarcation of companies that are software companies. There may also be difficulties regarding the capitalization on explicitly software development compared to other development costs. In US GAAP the development costs for software that can be capitalized are more distinct. However, IFRS are not as specific about which development costs can be recognized on the balance sheet. This can make it difficult to differentiate which of the development projects costs are capitalized rather than expensed. Further on, this means that the results can vary depending on how detailed the various income statement and balance sheets are. Furthermore, in the case of the situation not all companies report explicitly about which parts of their development costs are related to the development of software, since this study only focuses on those companies that do.

### **4.5 Sample size**

At first, the total sample obtained from Datastream was 554 software companies in the EU respectively 797 in the U.S. This study only covers companies that have either capitalized or expensed development costs or both. Companies that did not have any development outlays<sup>5</sup> have been excluded. Therefore, the sample diminished to 209 software companies in the

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<sup>5</sup> In this thesis we define R&D outlays as both R&D expense as well as R&D assets.

EU and 281 in the U.S. The list of sample companies used in this thesis can be found in Appendix 1.

## 4.6 Variables

Independent variables	Name	Description
WC18272	Company Founded	Date when company was founded
WC01001	Net Sales/Revenues	Gross sales and other operating revenue less discounts, returns & allowances
WC02999	Total assets	Represent the total assets of the company
EPS	EPS	Earnings per share
EPS1FD12	Forecasted EPS	IBES (Institutional Brokers Estimate System)
WC01751	Net income	Net income (also used to calculate EPS)
INC1FD12	Forecasted Net Income	IBES (Institutional Brokers Estimate System)

Dependent variables	Name	Description
WC18299	Capitalization of computer software	Represent the capitalized costs of computer software under development. This item is updated when computer software is included within other intangible assets, not within property, plant & equipment.
WC01201	Expense of R&D	Contains expense of software costs

In this section the different variables used in this thesis are presented. In the section “Development of hypotheses” the variables are well presented and motivated from a literature angle, but here they will be explained further and how they are defined in Datastream.

As a starting point the two variables “WC01201 *Expense of research and development cost*”, and “WC18299 *Capitalization of computer software*” have been used. The variable “WC01201 *Expense of research and development cost*” contains expense of software cost according to the description in Datastream and as the software industry has been examined the major part are assumed to consists of this type of expense. These two are compared with each other to be able to see in general if there is a difference between how much is capitalized, the result are presented in section 5.1. The sample consists of software companies that capitalize or expense their R&D or both. Therefore, companies that had not capitalized or expensed any R&D outlays are eliminated.

For the first hypothesis a probit regression and chi-square test is executed, which consist of two variables, one dependent and one independent. The dependent variable used is “WC18299 *Capitalization of computer software*”

while the independent variable is if the companies use US GAAP as an accounting standard.

Moreover, the second hypotheses consist of four different parts, hypothesis 2A-2D which is tested in different ways. In this study five different independent variables have been chosen to examine if it affects the company's decision to capitalize. These are:

- *Life-cycle* - To measure life-cycle age is used as a proxy. This is calculated by using the variable WC18272 *Company founded*, 2012 is used as the base year.
- *Turnover* - The variable WCo1001 *Net Sales/Revenues* is gathered to represent turnover.
- *Size* - The company's size is measured using the proxy WCo7230 *Total Assets*.
- *US GAAP* - This is a binary variable. The companies are denoted 1 if they use US GAAP otherwise 0 when using IFRS.
- *Target-beating* - This binary variable is measured in two different ways. Target beating 1 (TB1) is measured by using the variable EPS and EPS1FD12 *Forecasted EPS* while target-beating 2 (TB2) is measured by using WCo1751 *Net Income* and INC1FD12 *Forecasted Net Income*. Furthermore, the forecasted measures are created by Institutional Brokers Estimate System (IBES), which have been gathered through Datastream.

#### **4.6.1 Target beating measure**

To measure target-beating it is transformed to a binary variable, 1 if the company target beats and 0 otherwise. This is done by comparing the company's expected EPS with the real EPS and if the real EPS beats the target with 10 percent or less they are classified as a target-beating company (TB1).

Another method of measuring target-beating used in this thesis is by comparing the expected earnings with the real earnings, to see if the difference is equal to or greater than the amount of development cost for software. If so, the company is classified as a target-beating company, since they can manipulate the result to meet the targets. This variable is called TB2.

Both methods are suitable as they have been used previously by other researchers (e.g. Cazavan-Jeny et al., 2011 and Osma & Young, 2009). As target-beating can be measured in multiple ways the second hypothesis are tested in two different ways in consideration of the two different measures that have been chosen for target-beating.

#### **4.6.2 Controlling for outliers**

By observing the variable total assets it can be seen that it contains extreme values. If not corrected for, these outliers can distort estimates of the

regression coefficients. To correct for outliers in this case the natural logarithm has been used, as a result the variable is normal distributed. This is a common way of treating extreme values in the variable total assets. (Ahmed & Falk, 2006. Erlingsson et al., 2012. Hamberg et al., 2011)

Furthermore, the second variable turnover is similarly corrected for outliers. Instead of using the natural logarithm the variable is “winsorized” at one percent. Likewise, the variable age is winsorized at the one percent level as it is a continuous variable. (Hamberg et al., 2011)



# 5. Empirical findings and analysis

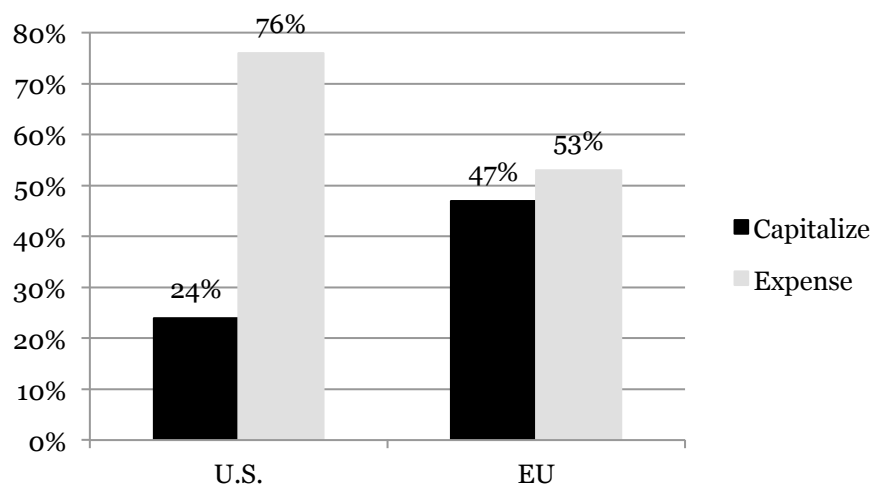
## 5.1 Comparison between USA and EU

Following hypothesis is investigated to see if the propensity of development costs for software between EU and the U.S. differ. First the amount capitalized and expensed development costs are displayed in a general view. After that, the first hypothesis is tested by performing multiple statistical tests.

*H.: There is a difference in the propensity of capitalization of development cost for software between IFRS and US GAAP.*

Below, the graph shows the propensity of capitalization and expense of software costs. The sample consists of companies in EU and U.S. that either capitalize or expense software costs.

**Graph 1 Comparison EU and U.S.**



As shown above, companies in EU, which follow IFRS, capitalize to a further extent than in the U.S. In EU 47 percent capitalize to some extent while in the U.S. only 24 percent do so. However, 53 percent of those who account software costs expense their costs in EU, while 76 percent are expensed in the U.S.

This indicates that EU companies capitalize their development costs for software to a further extent than U.S. companies.

## 5.2 Propensity of capitalization

To be able to examine our first hypothesis and confirm what is visually observed in the graph, statistical tests have been performed and are presented below. The first hypothesis is tested in two different ways. First with a parametric test, which is done with a probit regression that is suitable as the dependent variable is binary. Secondly, with a chi-square test which is a non-parametric test.

$$\text{Capitalize (binary)} = \text{US GAAP (binary)}$$

### 5.2.1 Probit regression

Below, the result from the probit regression is displayed.

**Table 1 Probit regression**

EQUATION	VARIABLES	Regression 1
capitalizebinary	usgaap	-0.809*** (0.000)
	Observations	490

pval in paratheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The table above shows that it is statistically proven that the null hypothesis can be rejected, as the p-value is less than the alfa level 1 percent. As a result the alternative hypotheses is true. There is a difference in the propensity of capitalization of development cost in the software industry between IFRS and US GAAP.

To be able to analyze and interpret the coefficient of the probit regression the marginal effects is computed in Stata at the x-value 0 and 1. Two observations are tested as the variables are binary. The following results are obtained.

**Table 2 Margins table**

	Margins (dy/dx)	P-val
US GAAP = 0	-0.311906	0.0000***
US GAAP = 1	-0.2776898	0.0000***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The regression shows significant result, which is aligned with above showed results. The marginal effect is around -0.3, which implies that US GAAP firms have with 30% less probability capitalized rather than expensed their software costs.

### 5.2.2 Chi-square test

To secure the reliability in the above mentioned probit regression, a chi-square test is performed. This is a non-parametric test on the same hypothesis.

**Table 3 Cross-table**

		Capitalize		
		0	1	Total
US GAAP	0	83	126	209
	1	199	82	281
Total		282	208	490

**Table 4 Chi-Square test**

	Value	P-val
Pearson Chi-Square	47,469***	0.000***
N of Valid Cases	490	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5 Phi Chi-square test**

	Value	P-val
Phi	-0.311***	0.000***
N of Valid Cases	490	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

A chi-square test indicates if there is a relation between the variables, rather than how strong it is. As presented above, the p-value is less than the alpha level 1%. Because of this the null hypothesis can be rejected and the alternative hypothesis can be accepted. Consequently, there is a difference in the propensity capitalized development costs in the software industry between the regions.

Furthermore, as it is a 2-by-2 table Phi can also be interpreted. The value presented in table 5 shows the size of the effect that the variable US GAAP have on whether the company capitalize or not. This results in -0.311, which is a moderate negative effect on capitalization. It is statistical significant as the p-value is less than the alpha level 1%.

The results from the chi-square test is aligned with earlier results, that there is a difference in the propensity capitalized development costs between IFRS and US GAAP. Therefore, the null hypothesis can be rejected. This secures our earlier findings and increases its trustworthiness.

As Agoglia et al. (2011) has shown earlier, the propensity of capitalization of leasing for rules-based standards is lower compared to principles-based standards. In his study, leasing was interpreted as these are very similar standards between IFRS and US GAAP. In this study capitalization of software development costs is compared with regards the two standards. Since the accounting regulations for software costs are also very similar with respect to the two standards the same results, aligned with Agoglia et al. (2011), are shown here. This means that even though the two standards in very similar ways regulate accounting for development costs for software, listed firms in the EU are more likely to capitalize than firms in the U.S.

### **5.3 Incentives influence on capitalization**

As the first hypothesis is true, the null hypothesis can be rejected and as a result there is a difference in the propensity for capitalization of development costs between the two regions. This thesis will continue by examining what could be the reasons for the difference. The main focus will be on five different reasons that will be analyzed in two ways. First with a probit regression and secondly with a multiple linear regression to see if there is a correlation. Following hypotheses will be tested:

*H<sub>2A</sub>: There is a negative correlation between companies in the beginning of the life-cycle and capitalization of development costs.*

*H<sub>2B</sub>: There is a positive correlation between companies who target beats and capitalize development costs.*

*H<sub>2C</sub>: There is a negative correlation between larger companies and capitalization of development costs.*

*H<sub>2D</sub>: There is a negative correlation between turnover and capitalize development costs.*

The fifth and last variable that will be incorporated in the following tests is if the company use US GAAP or not.

#### **5.3.1 Separate and correlation table**

First the five variables are tested separately. This to see if they were significant when no other variables were included in the regression. When the variables are tested separately it becomes clear how they affect the capitalization of software costs and correlate to each other, which can be seen in the correlation table below. Also, table 7 shows how much capitalization of development costs in the software industry increases or decreases with one more unit of each variable.



**Table 6 Correlation table**

	Proportioncap	wlage	wturnover	logtotalassetcap	usgaap	TB1	TB2
Proportioncap	1.0000						
wlage	0.0694	1.0000					
wturnover	0.0602	0.1467	1.0000				
logtotalassetcap	0.1371	0.1883	0.4836	1.0000			
usgaap	-0.3512	-0.1451	0.0793	-0.3568	1.0000		
TB1	-0.0721	0.0554	-0.0271	-0.0047	-0.0862	1.0000	
TB2	-0.0412	-0.1541	-0.0466	-0.0349	-0.0215	-0.0866	1.0000

The correlation table above indicates how the variables correlates with each other. Noteworthy is a clear correlation between turnover and total assets. This is not surprising as both in some ways represent the size of the company. A minor correlation can be observed between US GAAP and total asset. However, it is not sufficiently strong to explain a significant value in US GAAP.

**Table 7 Separate regression**

VARIABLES	(1) Age	(2) Turnover	(3) Total Assets	(4) US GAAP	(5) TB1	(6) TB2
wlage	0.002 (0.149)	-	-	-	-	-
wturnover	-	0.000 (0.221)	-	-	-	-
Logtotalassetcap	-	-	0.026*** (0.002)	-	-	-
USGAAP	-	-	-	-0.273*** (0.000)	-	-
TB1	-	-	-	-	-0.129 (0.289)	-
TB2	-	-	-	-	-	-0.057 (0.533)
Observations	434	416	490	490	218	232
R-squared	0.005	0.004	0.019	0.123	0.005	0.002

pval in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In the table above each variable was tested separately in relation to the proportion capitalized. When *Age* was tested it showed a p-value of 0.149, which displays that this variable is not significant at any of 0.01, 0.05 or 0.1 alfa level. The coefficient is 0.002 which means that for every one year's increase in the companies age, the capitalization increases by 0.002. The coefficient is positive, which is opposite of what was expected.

The second variable turnover showed a p-value of 0.221 which indicates that this variable is not significant at any of the alfa levels. The coefficient for turnover is 0.000, which indicates that turnover does not affect capitalization of development costs. We believed it would show a negative correlation but here it showed no such results.

The third variable total assets have a p-value of 0.085, which indicates that this variable is statistically significant at 10 percent alfa level. The variable has a positive coefficient of 0.012. However, in the beginning the correlation was hypothesized to be negative. This result provides evidence of the opposite.

The US GAAP variable is a binary variable. The variable is significant at alfa level 1 percent. The coefficient is negative which indicates that the proportion capitalized is greater when using IFRS than US GAAP. This is aligned with the results found in hypothesis one, where the coefficient is also negative and also with our expected theory.

Lastly, both the target-beating variables have no significance since the p-value vastly overshoots the significance level of 10 percent. They are not statistically significant in the regressions when they are tested on their own.

### **5.3.2 Probit regression**

$$\text{Capitalize (binary)} = \text{Size (total assets)} + \text{Turnover} + \text{Maturity (company founded)} + \text{US GAAP (binary)} + \text{Target-beating (binary)}$$

In the following section three probit regressions have been conducted. The results have been summarized in table 8 that can be found below. In all three regressions “*Capitalize*” have been used as the dependent variable whereas the independent variables differ among the regressions. Capitalization of development costs is measured as a binary variable, 1 if the company capitalizes 0 otherwise.

**Table 8 Probit regression**

EQUATION	VARIABLES	Regression 1	Regression 2	Regression 3
Capitalizebinary	w1age	0.001 (0.893)	-0.003 (0.667)	0.005 (0.449)
	w1turnover	0.000 (0.306)	0.000 (0.545)	0.000* (0.075)
	Logtotalassetcap	-0.186 (0.266)	0.001 (0.994)	-0.086 (0.138)
	USGAAP	-0.777*** (0.000)	-0.808*** (0.000)	-0.950*** (0.000)
	TB1	-0.688* (0.087)		
	TB2		0.147 (0.609)	
	Observations		210	222

pval in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In the first regression, as seen above, it is only two of the variables that show significant results; US GAAP and TB1. The coefficient for both of the variables indicates a negative slope. The other variable has a p-value that is high above the alpha level of 10 percent.

In the second regression the hypotheses was tested with TB2. In this probit regression only US GAAP was significant and has a p-value that is less than the alpha level 1%. This is aligned with the results obtained in the first hypothesis. In contrast to the first regression target-beating is no longer significant.

Furthermore, in the third regression the variables were tested without the target-beating variable as it indicates different results in the two first regression. Also, this was done to increase the number of observations for the last regression. Similar to the first two regressions US GAAP shows significant results. In all three regressions US GAAP indicates strong significant results with a p-value less than the alpha level of 1%.

To be able to interpret the probability of a change in the independent variables the marginal effect of the variables was established in Stata. The results for every variable are presented on the next page.



**Table 8 Margins**

VARIABLES	Regression 1	Regression 2	Regression 3
Wiage	0.000	-0.001	0.002
Witurnover	0.000	0.000	0.000
logtotalassets	-0.067	0.001	-0.030
usgaap	-0.286 <sup>1</sup>	-0.305 <sup>1</sup>	-0.353 <sup>1</sup>
	-0.281 <sup>2</sup>	-0,285 <sup>2</sup>	-0,316 <sup>2</sup>
tb1	-0.250 <sup>1</sup>		
	-0.214 <sup>2</sup>		
tb2		0.055 <sup>1</sup>	
		0.054 <sup>2</sup>	
Observations	210	222	374

$x=0^1, x=1^2$

In the table above, the marginal effects on each of the variables are presented. Noticeable, is that the marginal effect for US GAAP is almost the same throughout the three regressions, around -0.3. This indicates that when the company starts to follow US GAAP it leads to a 30 percent decreased probability that the company capitalize rather than expense their development costs for software.

For the variable TB1 the marginal effect has a value of -0.286. This means that when companies target beats there is a 28.6 percent decreased probability that the company capitalize.

Furthermore, for the other variables the marginal effect is zero or close to zero, which indicates that, there is no probability that it will affect the capitalization.

### 5.3.2.1 Number of observations

The number of observation increased between the first and second regression from 210 to 222. This is due to that variable TB 2 contains more samples in relation to TB 1. Since target-beating excluded many samples because of difficulties in measuring, regression 3 obtained the biggest sample (374).

### 5.3.3 Multiple Linear Regression

$$\text{Proportion capitalized} = \text{Size (total assets)} + \text{Turnover} + \text{Maturity (company founded)} + \text{Target-beating (binary)} + \text{US GAAP (binary)}$$

In the following section three multiple linear regressions were conducted. The results have been summarized in table 9 that can be found below. In all three regressions “Capitalize” has been used as the dependent variable whereas the independent variables differ among the regressions. The capitalization of development costs is measured as a proportion of the R&D outlays. This is done by dividing capitalization of development costs with R&D outlays. By this, the relation to total R&D outlays is presented instead of the amount capitalized. The analysis of each regression can be seen below.

**Table 9 Multiple linear regression**

VARIABLES	Regression 1	Regression 2	Regression 3
w1Age	-0.000 (0.973)	-0.001 (0.575)	0.001 (0.596)
w1turnover	-0.000 (0.982)	0.000 (0.982)	0.000 (0.123)
LogTotalAssetsCap	0.045 (0.368)	0.038 (0.498)	-0.002 (0.899)
USGAAP	-0.282*** (0.000)	-0.287*** (0.000)	-0.292*** (0.000)
TB1	-0.184 (0.117)		
TB2		-0.074 (0.405)	
Observations	210	222	374
R-squared	0.110	0.105	0.146

pval in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

As shown in the table above, four of the five variables in regression one have a high p-value, which does not make them significant at any alfa level. Only the US GAAP variable is significant, which is aligned with both earlier results and literature. This verifies our earlier results that US GAAP influences how companies account for their development costs.

In the second regression all the variables are tested with target-beating number two. Similar to the first regression, only the variable US GAAP is significant. Likewise, the other variables are not significant at any alfa level.

In the third regression neither of the two target-beating variables were included, only the variables Age, Turnover, Total assets and US GAAP. The two target-beating variables had no significant effect on the proportion of

capitalization for software costs, since their p-value vastly overshoot the significant level. Due to this they were excluded from regression three to interpret the effect capitalization of development costs in the software industry without target-beating. Since not many companies are classified as target-beating companies it is a complex variable to measure. Also, when assessing which companies that are target-beating companies it resulted in a low outcome. This could be a reason as to why the target-beating variable is not significant at any level in our model. Other researchers (Osma & Young, 2009. and Cazavan-Jeny et al., 2011) have examined a much greater sample when studying target-beating while this study is focused on a much smaller area. We believe that to obtain a statistical significant measure for target-beating the sample has to be of much greater size than used in this study.

### **5.3.3.1 Number of observations**

The number of observations increased from 207 to 209 between regression 1 and 2. This is due to the fact that variable TB 2 contains more samples in relation to TB 1. Since target-beating excluded many samples because of difficulties in measuring, regression three obtained the biggest sample (353) compared to the other regressions. This was 72.04 percent of the total sample companies.

### **5.3.3.2 R-square**

The value of R-square shows how well the regression can explain the variation in capitalization. In this case, the R-square in the first regression is 11.6 percent, which indicates a low explanatory power. However, this is not an important measure in our case, as this study is not trying to find the perfect model. In the second regression table 9 shows that even in this regression R-square is still low, 11.3 percent. Furthermore, the R-square value for regression three was 16.2 percent. This indicates that the explanation power for the regression is quite low, even compared to regression one and two. The number of observations in the last regression is greater which can be an explanation to the increased explanatory power in R-square.

### **5.3.4 US GAAP significance**

As the results indicate, only US GAAP is significant in all three regressions in both the probit and multiple linear (total of six regressions). This makes us believe that incentives are not a major influencing factor for capitalized development costs for software. Instead we believe that there are other influencing factors that affect the capitalization of development costs in the software industry.

Furthermore, the variable US GAAP shows a strongly negative significant coefficient, which is what was hypothesized in the beginning. That is to say, companies in the EU are more likely to capitalize than companies in the U.S. Possible reasons for this result will be discussed below.

The two different standards in the EU and U.S. have been discussed earlier. As mentioned they have many similarities and we do not believe the differences in capitalization is due to the shaping of the standards. Instead the differences must be due to other circumstances.

Why only the variable US GAAP is significant may be due to many reasons. It is essential to mention that in this study almost all American companies use US GAAP as an accounting standard, even though US GAAP can be used in other markets as well. Likewise, the majority of companies that used IFRS in this study are in EU. Because the standards are very similar, this makes the study more focused on the markets rather than the standards. In Balls (2006) study, only one market was investigated which is different from this thesis. Consequently, it enhances the possibility that affecting factors, such as enforcement, is significant and influences the accounting choice for software development costs. Since the monitoring authority structure between the two markets that this thesis investigates is different, the accounting standard is probably not the critical factor. The enforcement factors are seemingly of greater relevance than the slight expression differences between the two standards.

#### **5.3.4.1 Differences between regions**

As mentioned, US GAAP is the only variable that shows significant results. The variable US GAAP represents not only the followed standard but also U.S. as a country. This means that one reason for the difference in capitalization of development costs in the software industry are due to the differences between the markets. For instance, this could be cultural difference between the two markets EU and U.S.

Moreover, other significant differences between the two regions that can affect the capitalization of development costs in software are owner structure and corporate governance. Earlier research (Enriques and Volpin, 2007) has shown that the owner structure in continental Europe (France, Germany, Italy) traditionally differs from the U.S. The two most noteworthy differences are that firstly European companies have fewer and more controlling shareholders than in the U.S. This by more family owned companies and more concentrated owner structure. Secondly, the self-dealing regulation has traditionally been stricter in the U.S., which is when value is transferred from firms where the controlling shareholder owns a fraction of the cash-flow rights. These factors influence the corporate governance, since there are interest conflicts between shareholders and management. This in turn may influence the capitalization of development costs for software, since there are different parties to satisfy when accounting for development costs. (Enriques and Volpin, 2007)

Furthermore, Enriques and Volpin (2007) found that on average, family-controlled U.S. firms are better managed than widely held ones. This is verified by Barontini and Caprio (2005) who investigated the same question in European firms. Family-owned firms used assets more efficiently, which indicates a greater value of the assets than used inefficiently. Since more companies in EU are family-owned and/or with fewer owners, they may capitalize more assets since they use them more efficiently.

This study provides evidence that EU companies capitalize more than U.S. companies, which is aligned with Agoglia et al.'s (2011) earlier findings. The coefficients are negative, which indicates that more firms capitalize when using IFRS. Another explanation for this result could be that Microsoft, which

expenses the majority of their R&D outlays, could be a trend setter for smaller firms and actors in the software industry. By this, they set the norm for other companies in the U.S. to follow.

### **5.3.5 Enforcement**

Moreover, as Ball (2006) indicated enforcement can be of great importance for firms' accounting choice. In the U.S. there is one controlling authority, SEC, which controls the whole market whereas in the EU there are different authorities in every country. As U.S. has one controlling mechanism it is more regulated and therefore more controlled. For IFRS where the controlling organ is on national level it is hard to obtain the same level of control and standard in every country. We believe this could be a main influencing factor on how firms account development costs in the software industry.

Furthermore, the markets are similar in size as well as the number of observations between the two markets. More, this study only examine one sector; the software and computer services. This means that the incentives investigated could still have an influence in other sectors. Besides, separately they might affect other sectors but when tested together there is no such evidence.

### **5.3.6 Other incentives**

This thesis focused on the incentives that in our opinion would lead to most influence on the capitalization choice. As this thesis could not provide evidence that these incentives were significant, there are other factors that influence the capitalizations choice instead. Other incentives that may affect the accounting choice are management earnings, solidity, bonus systems, leverage and principal agent theory, which may affect the capitalization for development costs in software.

### **5.3.7 Not significant variables**

There are several non significant variables in the regressions. For example, the variable age is not significant in any of the regressions. This result is not aligned with Oswald and Zarowin's (2007) earlier findings. However, their study only investigate one market whereas this thesis examines two different markets, EU and U.S. Furthermore, Oswald and Zarowin (2007) examined multiple sectors whereas this study only focus on one, the software and computer services sector. Incentives could vary among the countries and sectors depending on which accounting outcome is most suitable.

Turnover is likewise not a significant variable. This might be because that many investors have a positive approach for expensing development costs rather than capitalizing. As a result, there could be a risk that important investments are missed without external financing if the company capitalizes their development costs.

Furthermore, in contrast to Cazavan-Jeny et al.'s (2011) study the size of the company is not a significant variable in this study. However, in four of six regressions does the coefficient for age indicate a negative slope, which is what we hypothesized in the beginning and aligned with earlier research (Aboody & Lev, 1998 and Cazavan-Jeny et al., 2011 and Oswald, 2008). That is to say,

smaller companies tend to capitalize development costs for software to a further extent than larger companies. A reason for this could be that larger companies spend more on research and maintenance, which is not allowed to capitalize.

The variable target-beating shows significant result in one of four regressions. We do not believe this provides sufficient evidence that target-beating effect the capitalization of development costs for software. However, this study has a limited amount of observations where only a few target-beating companies are found. This could be a reason for not providing significant results.

## 6. Conclusion

The purpose of this study is to examine if there are any differences in the propensity for capitalization of development costs for software with respect to IFRS and US GAAP. Also, the study analyzes the question whether there are any reasons for accounting way. We have done this by observing companies' financial accounting from 2012 in the software industry in EU and U.S.

The hypotheses that this study intend to answer are the following:

*H<sub>1</sub>: There is a difference in the propensity of capitalization of development cost for software between IFRS and US GAAP.*

*H<sub>2</sub>: The difference is due to incentives, such as target-beating, turnover, company size and/or life-cycle.*

The statistical tests of the first hypothesis provided evidence that there is a difference in the propensity for capitalization of development costs for software between EU and U.S. Both the probit regression and the chi-square test provide evidence that the null hypothesis can be rejected. This is aligned with earlier research and their results. Thereby, this study enhances the credibility that there is a difference in the propensity for capitalization for development costs for software between the two standards. That is to say, EU companies capitalize development costs for software to a further extent than U.S. companies.

Furthermore, the statistical tests of the second hypothesis provide evidence that neither of the variables age, turnover or size affects the amount capitalized development costs throughout all the regressions. This result is not aligned with any of the earlier researchers results mentioned. However, earlier research has only tested one market, whereas this study tested two markets with two accounting standards. This makes the incentives less significant and enforcement and the difference between the markets more crucial.

The target-beating variable showed significant results in one of four regressions, which were not expected at all as many researchers have found evidence for this theory earlier. Though, the insufficient evidence may be due to the limited sample used in this thesis. To obtain a statistical significant result the sample size would probably have had to be extended further. However, when target-beating is tested, none of the other variables do affect capitalization more than without the target-beating variables.

This study has shown that these are probably not the only factors that affect capitalization of development costs. Only one variable do affect capitalization of development costs in software in all six regressions in this thesis, this is US GAAP. This indicates that other factors, such as enforcement, corporate governance and/or owner structure, possibly influence the accounting choices for software development costs when comparing two or more markets.

## 7. Further research

Due to our findings, we believe that other factors affect the capitalization for development costs for software. Since many studies have shown that enforcement has influenced the accounting choice, we now have reasons to believe that it has a major effect on accounting choice for development costs as well. Therefore we believe it is of great interest for further research. Other incentives, for example management earnings, solidity, bonus systems, leverage and principal agent theory could also be of interest to study further.

Other interesting subjects for further research concern the question how the differences between the two accounting systems have changed over the years. Since IASB and FASB are in the process of harmonizing the two regulations, the differences would have to decrease over the years.

Also, it would be of interest to study the differences in the EU countries. Even though EU uses the same accounting standard, IFRS, the local enforcements and incentives may influence the accounting choice between the countries. Further, the different countries have reached different development stages in the software industry, which also influences the accounting for software development. Another interesting angle, could be to do the same study but in a different sector.



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## Appendix 1

### Sample companies EU

ACANDO 'B'  
ACCESS INTELLIGENCE  
ACTUAL EXPERIENCE  
ADDNODE 'B'  
AFFECTO  
ALLOCATE SOFTWARE  
ALTEC HOLDINGS  
ALTRAN TECHNOLOGIES  
ANITE  
ARCONTECH GROUP  
ARRIA NLG  
ARTILIUM  
ASSECO POLAND  
ATOSS SOFTWARE  
ATREM  
AUGUSTA TCHG.  
AUSY  
AVANQUEST SOFTWARE  
AVEVA GROUP  
B3 SYSTEM  
BANGO  
BASWARE  
BECHTLE  
BLINKX  
BOND INTL.SOFTWARE  
BRADY  
BULL  
BYTE COMPUTER  
CAMELEON SOFTWARE  
CASTLETON TECHNOLOGY  
CEGEDIM  
CENIT  
CLOUDBUY  
COHERIS ATIX  
COMP SAFE SUPPORT  
COMPTA  
COMPTEL  
COMPUCON COMPUTER APPS.  
COMPUGROUP MEDICAL  
COMPUTACENTER  
COR&FJA  
CORERO NETWORK SECURITY

CRANEWARE  
CYBERCOM GROUP EUROPE  
CYCOS  
DALET  
DASSAULT SYSTEMES  
DELCAM (OTC)  
DEVOTEAM  
DIGIA  
DOCDATA  
DOTDIGITAL GROUP  
DRS DATA  
EARTHPORT  
EASY SOFTWARE  
EASYVISTA  
ECKOH  
ECONOCOM GROUP  
EG SOLUTIONS  
ELECTRONIC DATA PROC.  
ELEKTROBIT  
EMIS GROUP  
ENEA  
ENTERSOFT  
EPSILON NET  
ESCHER GROUP HOLDINGS  
ESI GROUP  
ESKER  
EXACT HOLDING  
F-SECURE  
FABASOFT  
FIDESSA GROUP  
FIRST DERIVATIVES  
FORBIDDEN TECHS.  
FORTHNET  
GB GROUP  
GEMALTO  
GENERIX  
GEONG INTERNATIONAL  
GFI INFORMATIQUE  
GFT TECHNOLOGIES  
GLOBAL GRAPHICS (BRU)  
GLOBO  
GROUP BUSINESS SOFTWARE  
HELLAS ONLINE  
I A R SYSTEMS GROUP  
I FAO  
IBS

IDEAGEN  
 IDEAL GROUP CR  
 IDOX  
 IGE + XAO  
 ILIAD  
 ILYDA CR  
 IMAGINATIK  
 INDIGOVISION GROUP  
 INDL.& FINL.SYS.'B'  
 INDRA SISTEMAS  
 INFOTEL  
 INNELEC MULTIMEDIA  
 INNOFACTOR  
 INNOVATION GROUP  
 INSTEM  
 INTERCEDE GROUP  
 INTERNETQ  
 INTERSHOP COMMS.  
 INVENSYS (OTC)  
 IOMART GROUP  
 IS SOLUTIONS  
 ISRA VISION  
 IVU TRAFFIC TECHS.  
 IXONOS  
 KALIBRATE TECHNOLOGIES  
 KEYWARE TECHS.  
 KOFAX  
 LECTRA  
 LOGISMOS INFO.SYSTEMS  
 LOMBARD RISK MANAGEMENT  
 MAGIX  
 MEDASYS  
 MEVIS MEDICAL SOLUTIONS  
 MICRO FOCUS INTL.  
 MICROGEN  
 MICROPOLE  
 MLS MULTIMEDIA  
 MOPOWERED GROUP  
 N RUNS  
 NASSTAR  
 NCC GROUP  
 NEDSENSE ENTERPRISES  
 NEMETSCHKE  
 NET  
 NETALOGUE TECHNOLOGIES  
 NETCALL  
 NEXUS  
 NOEMALIFE  
 OCTO TECHNOLOGY  
 OMG  
 ORDINA  
 P & I PSNL.& INFORMATIK  
 PARITY GROUP  
 PERF.TECHS.IT SOLUTIONS  
 PHARMAGEST INTERACTIVE  
 PHOENIX IT GROUP  
 PILAT MEDIA GLOBAL DEAD - 03/04/14  
 PIRONET NDH  
 PIXELPARK  
 PLENUM  
 PROACTIS HOLDINGS  
 PROFILE SYS.&.SOFTWARE  
 PSI  
 PUBLISHING TECHNOLOGY  
 QPR SOFTWARE  
 QSC  
 QUEST HOLDINGS CR  
 QUINDELL  
 QUMAK  
 QUOTIUM TECHNO  
 READSOFT 'B'  
 REALTECH  
 REALTIME TECHNOLOGY  
 REDITUS  
 REPLY  
 RIB SOFTWARE  
 RIGHTSTER GROUP  
 RM  
 SAGE GROUP  
 SANDERSON GROUP  
 SAP  
 SCISYS  
 SDL  
 SERVELEC GROUP  
 SERVICE POWER TECH.  
 SIMCORP  
 SIMPLE  
 SINNERSCHRADER  
 SNP SCHNNEUR.& PTN.  
 SOFTING  
 SOFTRONIC 'B'  
 SOFTWARE

SOLTEQ  
SOLUCOM  
SOPHEON  
SOPRA GROUP SUSP - 07/04/14  
SQLI  
SQS SFTW.QUALITY SYS.  
SSH COMMUNICATIONS  
STARCOM  
STATPRO GROUP  
STILO INTERNATIONAL  
SWORD GROUP  
SYGNITY SA  
SYSTAR UP  
TAS TGA.AVANZATA SISTEMI  
TECNOTREE  
TELES  
TIETO OYJ  
TISCALI  
TRAC SIS  
TRAINERS HOUSE  
TRIAD GROUP  
TXT E-SOLUTION  
UBISENSE GROUP  
ULTRASIS  
UNIT 4  
UNITED INTERNET  
UPDATE SOFTWARE  
USU SOFTWARE  
VELTI (OTC)  
VIDAVO HEALTH TELEMATICS  
VISION IT GROUP (D)  
WANDISCO  
WINCOR NIXDORF  
XING  
ZETADISPLAY  
ZETES INDUSTRIES  
ZOO DIGITAL GROUP

## Sample companies USA

ACCELERIZE NEW MEDIA  
ACCELRY  
ACI WORLDWIDE  
ACORN ENERGY  
ACTUATE  
ADOBE SYSTEMS  
ADVANCED VISUAL SYSTEMS  
ADVENT SOFTWARE  
AKAMAI TECHS.  
ALLOT COMMUNICATIONS  
ALPHAPOINT TECHNOLOGY  
ALSP.HLTHCR.SLTN.  
AMDOCS  
AMER.SOFTWARE CL.A  
ANSYS  
AOL  
ARI NETWORK SERVICES  
ASPEN TECHNOLOGY  
ASTEA INTL.  
ATHENAHEALTH  
AUDIENCE  
AUTHENTIDATE HOLDING  
AUTODESK  
AVG TECHNOLOGIES  
AXION INTERNATIONAL HDG.  
BARRACUDA NETWORKS  
BENEFITFOCUS  
BLACKBAUD  
BLUCORA  
BOINGO WIRELESS  
BOTTOMLINE TECHS.  
BRIDGELINE DIGITAL  
BRIGHTCOVE  
BROADCAST INTERNATIONAL  
BROADSOFT  
BROADVISION  
BSQUARE  
CA  
CADENCE DESIGN SYS.  
CALIX NETWORKS  
CALLIDUS SOFTWARE  
CARBONITE  
CDW  
CERNER  
CHANNELADVISOR  
CHECK POINT SFTW.TECHS.  
CHINA INFORMATION TECH.  
CICERO  
CIMATRON  
CIMETRIX  
CINEDIGM CLASS A  
CITRIX SYS.  
CLICKSOFTWARE TECHS.  
CMP.PROGRAMS & SYS.  
COMM.INTELLIGENCE  
COMMVault SYSTEMS  
COMPUTER SCIS.  
COMPUTER SVS.  
COMPUWARE  
COMVERSE  
CONCUR TECHS.  
COPSYNC  
CORNERSTONE ONDEMAND  
COROWARE  
COUNTERPATH  
COVER-ALL TECHNOLOGIES  
COVISINT  
CREXENDO  
CSG SYS.INTL.  
CSP  
CTI GROUP HDG.  
CVENT  
CYAN  
CYNK TECHNOLOGY  
CYREN  
DAEGIS  
DATALINK  
DATATRAK INTL.  
DATAWATCH  
DEALERTRACK TECHNOLOGIES  
DELTATHREE  
DEMANDWARE  
DESTINY MEDIA TECH.  
DIGIMARC  
DIGITAL RIVER  
DYNAVOX 'A'  
E-FUTURE INFO.TECH.  
E2OPEN  
EBIX  
EGAIN  
ELLIE MAE  
ENDURANCE INTL.GP.HDG.  
ENVESTNET



EPIQ SYS.  
 EVOLVING SYSTEMS  
 EXA  
 EXPLORE ANYWHERE HLDG.  
 FAB UNIVERSAL  
 FACEBOOK CLASS A  
 FAIR ISAAC  
 FALCONSTOR SFTW.  
 FIREEYE  
 FLEETMATICS GROUP  
 FORLINK SFTW.  
 FORTINET  
 GARTNER 'A'  
 GBS ENTERPRISES  
 GIGAMON  
 GLOBALSCAPE  
 GOGO  
 GOOGLE 'A'  
 GSE SYSTEMS  
 GUIDANCE SOFTWARE  
 GUIDEWIRE SOFTWARE  
 HOPTO  
 IAC/INTERACTIVECORP  
 ICEWEB  
 ICG GROUP  
 IGLUE  
 IMAGEWARE SYS.  
 IMMEDIATEK  
 IMMERSION  
 INFOBLOX  
 INFORMATICA  
 INKSURE TECHS.  
 INTACT.INTELLIGENCE GP.  
 INTELLIGENT SYSTEMS  
 INTERNAP NETWORK SVS.  
 INTERNATIONAL BUS.MCHS.  
 INTERNATIONAL LOTTERY & TOTALIZATO  
 INTERXION HOLDING  
 INTRALINKS HOLDINGS  
 INTRUSION  
 INTUIT  
 IPASS  
 J2 GLOBAL  
 JIVE SOFTWARE  
 KEYW HOLDING  
 LABSTYLE INNOVATIONS  
 LEIDOS HOLDINGS  
 LIMELIGHT NETWORKS  
 LIVE MICROSYSTEMS  
 LIVEPERSON  
 LOGMEIN  
 LOOKSMART  
 MAM SOFTWARE GROUP  
 MANHATTAN ASSOCS.  
 MARIN SOFTWARE  
 MARKETO  
 MAVENIR SYSTEMS  
 MEDASSETS  
 MEDBOX  
 MEDIDATA SOLUTIONS  
 MEETME  
 MENTOR GRAPHICS  
 MER TELEMAGEMENT SLTN.  
 MERGE HEALTHCARE  
 MICROSOFT  
 MICROSTRATEGY  
 MILLENNIAL MEDIA  
 MINDSPRING ENTREP. (BER)  
 MITEK SYS.  
 MOBILESMITH  
 MOBILITY HOLDINGS  
 MODEL N  
 MONOTYPE IMAG.HDG.  
 NET MEDICAL SOLUTIONS  
 NETSCOUT SYS.  
 NETSUITE  
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TYLER TECHS.  
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VERINT SYS.  
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