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# **The Value Relevance of Intangible Assets and Goodwill**

Evidence from the airline industry

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**ABSTRACT:**

Recently the significance of identifiable intangible assets and goodwill is increasing. The subject itself is very topical. In this thesis, I study if there is value relevance of reported identifiable intangible assets and goodwill in the airline industry. As well as this, I also investigate if changes in accounting standards affect the value relevance of reporting intangible assets. Lastly, I also investigate if the value relevance of reported intangible assets differs in crisis and non-crisis periods.

The airline industry itself is interesting as traveling needs have been increasing up until the latest pandemic that started in 2020, COVID-19. The pandemic has impacted the airline industry heavily but since reporting data of companies are not ready at this time of performing the analysis of this thesis, 2020 is not in the scope of the research. Also, the increasing sustainability requirements impact how airlines plan their next moves. There have been several changes in accounting standards and crisis periods during the past years.

There have been previous studies of value relevance but not specifically with evidence from the airline industry worldwide. Previous studies have found that there is value relevance in reported identifiable intangible assets and goodwill. As well as this, researchers have examined the effect of changes in accounting standards and conclude that changes in accounting standards do not impact the value relevance of intangibles.

The sample used in this thesis consists of 36 airline companies. The time scope of the research is from 1999 to 2019 with a total of 518 firm-year observations. In line with previous findings, the results of this thesis produce evidence that in the airline industry goodwill is value relevant. Interestingly the results proved that identifiable intangible assets are not value relevant in the airline industry which differs from previous findings. The results also reflect that changes in accounting standards and crisis periods affected value relevance.

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**KEYWORDS:** value relevance, intangible assets, goodwill, business value, financial statements, international financial accounting standards, financial analysis, immaterial investments

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**TIIVISTELMÄ:**

Aineettomien hyödykkeiden ja liikearvon merkitys korostuu jatkuvasti. Tutkielman aihe on tämän takia ajankohtainen. Tässä tutkielmassa tutkitaan raportoitujen aineettomien hyödykkeiden ja liikearvon arvon merkitsevyyttä (value relevance). Lisäksi tutkielmassa tutkitaan, että onko kirjanpitostandardien muutoksilla vaikutusta aineettomien hyödykkeiden ja liikearvon arvon merkitsevyyteen (value relevance). Viimeisenä tutkin vielä, onko erilaisilla kriiseillä vaikutusta aineettomien hyödykkeiden ja liikearvon arvon merkitsevyyteen (value relevance).

Lentoyhtiöala itsessään on mielenkiintoinen, sillä vuoteen 2020 asti matkailun suosio oli pitkään ollut nousussa. Asiat ovat kuitenkin muuttuneet vuonna 2020, jolloin COVID-19 pandemia vaikutti merkittävästi lentoyhtiöiden toimintaan. Vuoden 2020 tilinpäätökset eivät ole valmiita tutkielman kirjoitusvaiheessa, joten pandemian vaikutusta ei tutkita tässä tutkielmassa. On mielenkiintoista nähdä, kuinka ala kehittyy tulevaisuudessa, sillä kestävä kehityksen vaatimukset ovat entistä merkittävämpiä. Viimeisten vuosien aikana on tapahtunut paljon muutoksia kirjanpitostandardeissa, ja on ollut useita lentoyhtiöihin vaikuttaneita kriisejä.

Aiemmassa tutkimuksessa on tutkittu raportoitujen aineettomien hyödykkeiden ja liikearvon arvon merkitsevyyttä (value relevance), muttei erityisesti lentoyhtiöalasta. Aiemmassa tutkimuksessa on todettu, että raportoitujen aineettomien hyödykkeiden ja liikearvon välillä on arvon merkitsevyyttä (value relevance). Tämän lisäksi aiemmat tutkimukset ovat tutkineet onko kirjanpitostandardien muutoksilla vaikutusta aineettomien hyödykkeiden ja liikearvon arvon merkitsevyyteen (value relevance). Tutkimukset ovat tulleet siihen johtopäätökseen, että kirjanpitostandardien muutoksilla ei ole vaikutusta arvon merkitsevyyteen (value relevance).

Tämän tutkielman tutkimuskausi on vuodet 1999–2019. Tutkimuksessa on käytetty 36:n lentoyhtiön tilinpäätöstietoja. Yhteensä havaintoja kertyi 518. Tutkimuksen tuloksista selviää, että raportoidun liikearvon välillä on arvon merkitsevyyttä (value relevance). Poiketen aiemmista tutkimuksista, raportoidun aineettoman hyödykkeiden välillä ei löytynyt arvon merkitsevyyttä (value relevance). Lisäksi tutkimuksessa selviää, että kirjanpitostandardien muutoksilla on vaikutusta arvon merkitsevyyteen (value relevance). Tutkimuksen lopuksi selviää myös, että erilaisilla kriiseillä on vaikutusta arvon merkitsevyyteen (value relevance). Eli tutkimuksen hypoteesit saivat vahvistusta.

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**AVAINSANAT:** value relevance, aineettomat hyödykkeet, goodwill, liikearvo, tilinpäätös, kansainvälinen tilinpäätöskäytäntö, tilinpäätösanalyysi, aineettomat investoinnit

## Contents

1	Introduction	7
1.1	Background of the thesis	7
1.2	Purpose of the thesis and research problem	10
1.3	Limitations	10
1.4	Structure of the thesis	11
2	Contextualizing the research topic	13
2.1	Airline industry	13
2.2	Intangible assets in the airline industry	17
2.3	Goodwill in the airline industry	19
3	Theoretical background	20
3.1	Value relevance of reported intangible assets	20
3.2	Effects of changes in IFRS and IAS on the value relevance of intangible assets and goodwill	22
3.2.1	IFRS 3 – business combinations	24
3.2.2	IAS 36 – impairment of assets	25
3.2.3	IAS 38 – intangible assets	26
3.3	The effect of crisis periods on the value relevance of intangible assets and goodwill	27
3.4	Summary and positioning of the thesis	28
4	Data and methodology	30
4.1	Methodology	30
4.1.1	Regression model	30
4.1.2	Variables	37
4.2	Sample	40
5	Results and analysis	42
5.1	Descriptive statistics	42
5.2	Results of the regression analysis	43
5.3	Summary of results	45

6	Conclusions	47
	References	49
	Appendix. Companies in the scope of the thesis	56

## Tables

Table 1. Damodaran WACC rates (Damodaran, 2021).	37
Table 2. Variable definitions.	38
Table 3. Summary of dummy variables.	39
Table 4. Sample data.	41
Table 5. Summary statistics.	42
Table 6. Results for the regression model.	44

## Abbreviations

<b>AOE</b>	<b>Abnormal operating earnings</b>
<b>BVE</b>	<b>Book value of equity</b>
<b>EBIT</b>	<b>Earnings before interest and taxes</b>
<b>FA</b>	<b>Financial assets</b>
<b>FL</b>	<b>Financial liabilities</b>
<b>GW</b>	<b>Goodwill</b>
<b>IAS</b>	<b>International Accounting Standards</b>
<b>ID</b>	<b>Identifiable intangible assets</b>
<b>IFRS</b>	<b>International Financial Reporting Standards</b>
<b>INT</b>	<b>Total intangible assets</b>
<b>MVE</b>	<b>Market value of equity</b>
<b>NFA</b>	<b>Net financial assets</b>
<b>NOA</b>	<b>Net operating assets</b>
<b>OA</b>	<b>Operating assets</b>
<b>OE</b>	<b>Operating earnings</b>
<b>OL</b>	<b>Operating liabilities</b>
<b>R&amp;D</b>	<b>Research and development</b>
<b>SAF</b>	<b>Sustainable Aviation Fuel</b>
<b>TA</b>	<b>Total assets</b>
<b>US GAAP</b>	<b>United States' Generally Accepted Accounting Principles</b>
<b>WACC</b>	<b>Weighted Average Cost of Capital</b>

# **1 Introduction**

The subject of the thesis is related to the value relevance of reported identifiable intangible assets and goodwill in the airline industry. The thesis focuses mostly on major airlines that have had significant operations during the past twenty years. There has been an upward trend in the share of identifiable intangible assets and goodwill in this industry, thus it is an interesting and up-to-date topic to research their value relevance.

Value relevance is the ability of reported financial statements to define and summarize the value of a company (Kargin, 2013). In this case, the relationship between market capitalization and reported variables, such as identifiable intangible assets and goodwill are investigated.

## **1.1 Background of the thesis**

The increasing importance of identifiable intangible assets and goodwill makes the topic of this thesis appealing to study. Previous studies have examined the value relevance of reported intangible assets in various markets in general. After reading the article from Dahmash et al. (2009) I found it interesting to investigate the research question of whether there is value relevance in reported identifiable intangible assets and goodwill within the airline industry, especially since the share of these is significant in the industry.

Value relevance provides evidence that accounting amounts are reflected in share prices and thus provide proof that companies' market capitalization is assessed correctly. Another interesting fact is that intangible assets are classified as difficult to value, which makes the study compelling (Dahmash et al., 2009).

I wrote my bachelor's thesis about aircraft manufacturers Airbus and Boeing, and during that research, I understood how interesting the topic is. I am also interested in the aviation industry in general. Also from my research, I learned that research and

development (R&D) costs play a huge role in the industry. These costs are not directly visible in airlines' balance sheets as these costs are accounted by aircraft manufacturers. Airlines have other types of intangible assets which are for example software-related. I also learned that airlines play a significant role in the direction of development of aircraft manufacturers such as Airbus and Boeing.

Focus from expensing R&D in profit and loss statements is being moved towards their capitalization in balance sheets in recent days. Therefore, it is important to highlight the significance of intangible assets (Dahmash et al., 2009). Identifiable intangible assets and goodwill play a major role in airlines' balance sheets. In this industry the share of reported identifiable intangible assets and goodwill is significant and that is why it is important to pay attention to their value relevance. Also, in previous years airlines tended to lease their aircraft without owning them which led to variations in their balance sheet.

I chose this topic about intangible assets and goodwill because of the increasing role it takes in the knowledge-based economy nowadays. Intangible assets are also worth studying as they are mostly non-physical, such as research and development, databases, patents, and trademarks.

Many investors and researchers these days are interested in market capitalization and reported intangible assets meaning that investigating the value relevance between both is an up-to-date topic. Companies tend to constantly grow in market capitalization and at the same time acquire or generate more intangible assets.

All publicly listed companies have to comply with certain accounting and reporting standards. International Financial Reporting Standards (IFRS) set the guidelines for companies on reporting identifiable intangible assets and goodwill. I will also have a look at whether the changes in IFRS have had an impact during the years on reported identifiable intangible assets and goodwill in the airline industry.

Reporting of intangibles and goodwill can also be guided by either local reporting standards, United States Generally Accepted Accounting Principles (US GAAP), or IFRS.

When comparing US GAAP and IFRS the main differences between the two are that US GAAP is more rule-based and IFRS is more principle-based (Majaski, 2020). For example, there are differences in how different accounting standards expense and capitalize intangible assets. In the United States internally generated intangible assets are expensed immediately but acquired intangible assets are capitalized. While under IFRS, for example, the development costs in research and development should be capitalized if certain conditions are met (Lev, 2019).

All in all, there are differences in how different accounting standards guide to report identifiable intangible assets and goodwill, therefore I will focus on one set of standards – IFRS - and select companies that follow this accounting standard.

According to Lev (2018), during the past years, there has been a trend for increasing intangible assets and decreasing tangible assets. Lev (2018) also states that from around the beginning of the 21st-century intangible investments have played a more significant role than tangible investments. Especially in developed markets, there has been a surge in intangible investments. These investments have led to modified strategies and business models. At the same time, Lev (2018) notes that accounting and reporting standards might not be up to date with the changes happening within intangible assets. Most of these value-creating intangible assets are expensed immediately while in reality, they should be assets (Lev, 2019).

This topic is also interesting as recently it has been thought that financial statements might not correctly refer to companies' actual performance and valuation. There are also mixed feelings about reporting in general as there exists a point of view that current accounting measures and standards do not provide useful or reliable information (Lev, 2018).

## 1.2 Purpose of the thesis and research problem

The purpose of this thesis is to investigate the value relevance of reported identifiable intangible assets and goodwill. I also pay attention to the effects of changing accounting standards and whether they impacted the value relevance of reported identifiable intangible assets and goodwill. I will focus on three standards in this thesis. IFRS 3 is about business combinations, IAS 36 is about the impairment of assets and IAS 38 is about intangible assets. Both IFRS 3 and IAS 36 impact goodwill while IAS 38 impacts other intangible assets except goodwill. As well as this, I pay attention to the effects of different crisis periods that have impacted the airline industry.

The research question for this thesis is:

*“Is reporting of identifiable intangible assets and goodwill value relevant and does value relevance of these assets change during crisis periods or due to changes in accounting standards?”*

The answer to the research question is approached using selected theories presented in chapters two and four as well as knowledge from previous studies from chapter three.

## 1.3 Limitations

The thesis is limited to various limitations in the aviation industry. The first limitation is related to accounting standards as different accounting standards are not harmonized. Companies mainly use US GAAP, IFRS, or local standards as their accounting standards. The selected accounting standard for the thesis is IFRS thus leaving out all companies that report under US GAAP or local standards.

The next limitation is related to the available amount of data. Data from public companies were taken into account in the thesis. Companies that provided data for less

than 8 years were left out of the research. Another limitation was that the selected companies had to still be active, thus leaving out all companies that have stopped activities or have merged into other airlines. The selected time scope for the thesis is from the years 1999–2019. Data from 2020 is not completed at this time of performing the analysis of the thesis. That is why one more limitation of the thesis is that it does not take into account the crisis associated with COVID-19.

#### **1.4 Structure of the thesis**

The structure of this thesis follows the structure of six chapters. The introduction in chapter one gives a glance at the thesis and the following chapters provide more depth of the topic. Chapter one also describes the purpose of the thesis and the limitations of the research. Chapter two is devoted to the aviation industry in more depth. The chapter also introduces important definitions for the thesis such as identifiable intangible assets and goodwill.

Chapter three provides the basis for the thesis based on previous research. This chapter gives a theoretical background for the hypotheses of the research. The chapter is split into different sections. The first section relates to previous research that investigates value relevance in reported identifiable intangible assets and goodwill in general. The second section focuses on previous research that investigates if changes in accounting standards have impacted value relevance in reported identifiable intangible assets and goodwill. The third section provides more information on accounting standards such as IFRS and IAS as well as the background of crisis periods is detailed. At the end of the chapter, I summarize the theoretical part.

Hypotheses of the thesis are introduced in chapter three that provides detailed information related to corresponding hypotheses. In this thesis, there are a total of three hypotheses.

Chapter four presents the thesis methodology and sample. This chapter describes the models and selected variables for the thesis. The criteria for the data are opened in more depth there and the sample data is presented. This chapter also includes selected crisis periods and changes in IFRS that affect the thesis data for the selected time period. Chapter five opens up the findings of the thesis. Findings are presented with summary statistics and regression analysis. To conclude this chapter also testing of the hypotheses is conducted. Chapter six concludes the thesis with final words and analysis. The thesis is finally concluded with suggestions for future research.

## **2 Contextualizing the research topic**

This chapter of the thesis will provide a better understanding of the aviation industry in general. This chapter also provides background for the possible changes that are to take place in the airline industry. The basics of intangible assets including goodwill are introduced. Here I also present examples of intangible assets typical for airlines. This chapter provides a strong basis for the thesis.

### **2.1 Airline industry**

The airline industry plays a significant role in the transportation system. Airlines are part of the essential mode of travel for businesses and people going on holidays worldwide. With continuous research and development by aircraft manufacturers, such as Airbus and Boeing, airlines can fly with more fuel-efficient aircraft meaning lower costs and higher profits. The industry is highly competitive and thus airlines try to differentiate from each other as well as possible. With various measures, companies try to gain a competitive advantage and growth in the market. At the same time, the industry is very sensitive to different crises, such as financial crises or pandemics.

Market trends and challenges also affect the performance of a company both in positive and negative ways. Anyhow the industry is expected to double over the next fifteen years (Neste, 2021). Thus, the industry is rapidly changing, and different factors impact the changes.

Knowledge of competition is important in the market, especially in such a competitive environment. It is important to know what your competitors offer and how you could exceed your competition. In the airline industry not only is the aircraft important but also the services and processes. Service is a large concept as it consists of different steps to satisfy the needs of the customer. Great service is one method for airlines to differentiate from each other. As happy customers pleased with the service are more

likely to use the same airline again and due to this loyalty be categorized as a non-identifiable intangible asset. Most airlines have their own customer loyalty programs exactly for this reason, to keep their customers loyal and engaged.

Strategic alliances are used to share various information with another company. There are several airline alliances where the aim is to provide flexible traveling for customers despite the airline in the same alliance. The most common are Oneworld, Star Alliance, and SkyTeam. In some cases, it might be more beneficial to establish a venture with another company. This means creating a new company together with the other company which allows the use of both companies' assets (Surbhi, 2017).

In the industry also exists low-cost airlines and they are most commonly not part of any airline alliance. These airlines usually tend to compete with low prices and not with the brand and services that most major airlines have which are also most commonly part of different airline alliances.

Customer expectations especially from passengers are rising constantly and new solutions and designs are needed to fulfill these needs and expectations. With growing travel rates, it means that more aircraft are needed thus also aircraft manufacturers need to keep up with the pace. Current passengers require quiet cabins that are at the same time modern and comfortable. Interior design is important as it can help reduce the effects of jetlag. The ambiance is controlled with LED lights which are supposedly designed to make the customer feel more relaxed. As well as this since we live in a digitalized world, it means that passengers want to stay connected during flights and good Wi-Fi connectivity should be offered.

The aviation industry is changing, and new trends are leading the future of the industry. Flight times are getting longer and longer, and aircraft manufacturers must produce such products that can consume less while flying a further distance. Thus, there is high demand for wide-body aircraft by airlines. In the future flights could be even 20 hours

long which means that aircraft must be durable and fuel-efficient. Aircraft being able to fly longer means that it is easier for a consumer to travel from one side of the globe to another, directly without any transits. Both Airbus and Boeing are in the same market for offering long-range aircraft to airlines (Hänninen, 2018).

Demand for intercontinental travel is constantly growing and thus the market demand for these flights is rising. With longer direct flights there is likely to be more passengers that are willing to pay higher prices to travel in business class and this is also a point that airlines should consider within their aircraft cabins and services (Whitley, 2018).

Globalization also impacts aviation as for example aviation in Africa is seen as a potential grower. These are all factors that affect the need for Airbus and Boeing to innovate different solutions.

Increasing fuel prices mean that airlines seek better fuel consumption aircraft. Airlines also must keep in mind the environmental concerns and thus better efficiency from aircraft is important. Aircraft cabins must meet the rising expectations from passengers which means that cabins must be successfully designed to provide comfort with services by good ambiance from design.

In modern-day sustainability plays an important role. End consumers are more concerned about the environment than ever and this causes the travel industry to adapt to changes.

The significance of innovation in aviation is increasingly growing. The trends up until now have been that the population travels more and more which leads to increasing demand for aircraft. As well as this, the increasing significance of sustainability causes airlines to demand higher fuel efficiency from manufacturers. The two major players in aviation that offer high-quality and reliable aircraft are Airbus and Boeing. They both manufacture aircraft used by major airlines worldwide.

Current advantages of innovation in aviation are mostly more sustainable aircraft with more safety and comfort features. In the challenging market of aviation, it is important to either be the first to offer new technology or then to be able to follow fast. Thus, airlines tend to have modern fleets and try to benefit from that fact. Innovation allows cost competitiveness and differentiation.

With new trends there comes new challenges. The price of oil will be one of the challenges and thus hybrid and electric aircraft are currently being developed. Especially with increasing environmental concerns, it is important to constantly find new solutions on improving efficiency and the possible use of recycling. Airlines want old aircraft recycled and new aircraft that are produced sustainably (IATA, 2018).

Hybrid and electric aircraft are an important innovation that enables new markets and applications. Hybrid and electric aircraft are still under development but will play an important role in the future. Airbus has partnered up with Rolls-Royce and Siemens in pursue of a hybrid aircraft. The aircraft is called the E-Fan X (Airbus, 2017). Boeing is also working on a hybrid aircraft and estimates flights to take place within five years (Johnsson, 2017).

Also, with technology and a connected world, aircraft must keep up to the same pace. Thus, Airbus also focuses its innovation on connected aircraft and data analytics. This way the repairs of aircraft can be sped up by collecting real-time data of the aircraft's performance before the real need for servicing. This is obviously beneficial for airlines as aircraft could be maintained before bigger issues arise. Correct analysis of the data would help increase productivity as well as the profitability of airlines as services would require less time (Airbus, 2021).

As well as more efficient aircraft, Boeing focuses on operational efficiency, modernized air traffic management systems, and reduction of footprints. Biofuel and hybrid aircraft are important innovation factors requiring research and development sources (Boeing,

2021). As well as innovations of materials such as the new Microlattice allows better efficiency for future aircraft because it is lightweight (Boeing, 2015).

There is a solution that airlines can take action for themselves. Meaning that airlines can have an impact on sustainability without involving aircraft manufacturers. One important milestone is Sustainable Aviation Fuel (SAF). SAF is a good solution that does not require large changes from aircraft manufacturers or airlines. Currently, SAF is provided by Neste, which is a Finnish refinery company. The use of SAF can reduce emissions by 80% (Neste, 2021).

With the new sustainability trend, it can be assumed that airlines will work on various solutions. These solutions might come from research and development or acquisitions which result in increasing identifiable intangible assets or goodwill.

## **2.2 Intangible assets in the airline industry**

Intangible assets are non-physical and non-monetary assets. Airlines in general have large amounts of intangible assets and many airlines have the same type of intangible assets as the industry is specific. Airlines have specific intangible assets which are listed below. Like most assets, intangible assets can be internally generated or acquired. Intangible assets can be categorized into two different categories, identifiable intangible assets and unidentifiable intangible assets (Corporate Finance Institute, 2021).

Identifiable intangible assets are such that can be if necessary, sold onwards and separated from other assets. Examples of identifiable intangible assets are patents, trademarks, and other intellectual property (Corporate Finance Institute, 2021). While unidentifiable intangible assets are such as goodwill, market share, and customer relations (Dahmash et al., 2009).

Several specific intangible assets are most common to airlines. Most airlines have computer software as an intangible asset. This software is used for route planning and other software such as when consumers purchase airline tickets. Another intangible asset commonly found is connection fees and internally developed technology-based assets are also categorized as intangible assets.

A very important intangible asset for airlines is purchased and sellable landing and take-off rights as these are valuable especially at busy airports. Airlines that manage to acquire good slots can gain a certain competitive advantage. International route rights are also crucial for airlines' operations and these are important for long-haul flights. For example, Finnair has a great competitive advantage for flights to Asia due to the privilege to fly the shorter route over Russia while other airlines have to fly around Russia meaning longer flight times.

Airlines also tend to have their own customer loyalty programs which can be very valuable assets. These customer relationships are precious and loyal customers bring a lot of revenue to these airlines. With these programs, customers are committed to traveling with a certain airline or airline alliance. Within these programs, customers earn status levels and points that can be used for upgrading travel classes or even redeeming free flights. This is thus an asset that is very important in airlines' balance sheets.

Trademarks and licenses are also very common intangible assets. These are probably the most common intangible assets in the aviation industry as well as other industries also. Airlines with high-quality trademarks are likely to gain automatic trust from new customers and previous customers are likely to stay loyal.

Another intangible asset making a rise in the aviation industry is CO<sub>2</sub> emission certificates and emission allowances. This is an intangible asset that I suspect will play a significant role in the future as sustainability increases its topicality. Airlines have set high

sustainability targets in the near future and with fewer emissions, there can be changes in intangible assets related to emission certificates and emission allowances.

There are also several other intangible assets that airlines tend to have such as deferred engine development costs, contract-based intangible, and much more. These are all essential assets to these companies and in some cases provide a significant competitive advantage.

Accounting standards related to intangible assets is IAS 38 and it is exhibited in more depth later in section 3.2.3.

### **2.3 Goodwill in the airline industry**

Goodwill is a long-term intangible asset. Goodwill arises typically with a major acquisition of a company by another. Goodwill is the excess of price over the fair value of identifiable net assets (Corporate Finance Institute, 2021). Most airlines have goodwill and all the airlines from our sample in this thesis reflect goodwill in their financial statements. Airlines tend to acquire subsidiaries when expanding operations.

In other words, goodwill is the premium paid during an acquisition and it is not a separately identifiable intangible asset. Goodwill itself cannot be internally generated as it comes from acquisitions. Goodwill can contain various identifiable intangible assets such as brand, customer relationships, and other intellectual property. The difference between goodwill and other intangible assets is that goodwill has indefinite life compared to other intangible assets which have definite lives. On the other hand, goodwill is tested for impairment annually (Hargrave, 2021a).

Accounting standards related to goodwill are IFRS 3 and IAS 36, both standards are exhibited in more depth later in section 3.2.1 and 3.2.2, respectively.

### **3 Theoretical background**

In this chapter, I summarize findings from previous research. In the first section, I focus on findings related to value relevance in reported intangible assets, and the first hypothesis of the thesis is introduced. In the second section, the focus is on findings on how changes in IAS and IFRS impact value relevance. I also describe the changes that have happened in IFRS and IAS. Here the second hypothesis of the thesis is introduced. In the third section, I generally go through crisis periods that have affected the airline industry. Finally, the last section summarizes theoretical findings.

#### **3.1 Value relevance of reported intangible assets**

Dahmash et al. (2009) provide evidence that accounting for intangible assets and goodwill in the Australian market is value relevant under Australian GAAP. At the same time, the findings also reflect that the reporting of both are biased as goodwill tends to be reported more conservatively while identifiable intangible assets are reported more aggressively.

There have also been several other experiments in the Australian market about value relevance and most experiments have concluded that value relevance is significant (Dahmash et al., 2009).

There were also differences in how goodwill could be amortized or impaired. In the United States companies were allowed to amortize goodwill over 40 years. In the United Kingdom companies were allowed to test for impairment and goodwill had an indefinite life. In Australia, companies were allowed to amortize goodwill over 20 years. These differences due to different accounting standards of course lead to differences in how companies report their intangible assets. Different reporting standards affect companies' book and market values also affecting the value relevance and reliability of reported intangible assets (Dahmash et al., 2009). This is also one reason why in this

thesis I focus on companies that follow the same accounting standards, which in this case is IFRS.

Under IAS systematic amortization for goodwill is not required but impairment testing is required annually. It is also important to note that IAS does not recognize internally generated goodwill (Dahmash et al., 2009).

Value relevance provides evidence on how accounting standards affect amounts seen in share prices (Dahmash et al., 2009). Value relevance of financial statements is to confirm expectations of a company's value. Therefore, value relevance is examined by the relationship between market value and reported values. This also confirms the fact that equity valuation is not the main purpose of financial statements (Dahmash et al., 2009).

Identifiable intangible assets are such as patents, brand names, and trademarks (Dahmash et al., 2009). Accounting for intangible assets is seen to be difficult. The questions that arise when discussing about reporting of intangible assets are as follows. The first issue is whether intangible assets should be capitalized instead of expensed in financial statements. Then the next issue is whether this should apply to both internally generated and acquired intangible assets. Following these questions, the next issue is related to amortization and impairment testing. The last issue comes to whether intangible assets should be revalued or not. Some intangible assets decline in value while some incline (Dahmash et al., 2009).

After reading prior research findings, it can be assumed that reporting intangible assets is value relevant in companies from the airline industry. Another conclusion from prior research findings is that goodwill is valued and reported in a more conservative way than identifiable intangible assets (Dahmash et al., 2009). As from Dahmash et al. (2009), the conclusion was that identifiable intangible assets and goodwill are value relevant in the reporting of Australian companies. Thus, the following hypothesis can be constructed:

**H1: The reporting of identifiable intangible assets and goodwill in financial statements of airline companies is value relevant.**

### **3.2 Effects of changes in IFRS and IAS on the value relevance of intangible assets and goodwill**

Another research from Ji & Lu (2014) studies evidence before and after adopting IFRS in Australia. Interestingly it was found that intangible assets remained value relevant before and after adopting IFRS but with a slight decrease. There was an additional finding that value relevance is higher for companies that provide more information on intangible assets. The findings also noticed that there is a difference in the value relevance of reported identifiable intangible assets and goodwill in different types of companies (Ji & Lu, 2014).

On the other hand, there have also been other findings that there is value relevance of reported intangible assets. Value relevance in the Portuguese market has been studied by (need reference). In 2005 when changes to IAS 38 and IFRS 3 took place, they changed the requirement to report certain intangible assets and removed the need to amortize goodwill. During that same year, Portuguese companies adopted IFRS. In Oliveira et al. (2010) findings of value relevance of reported intangible assets had no changes while value relevance of reported goodwill increased. To conclude, reporting of identifiable intangible assets and goodwill is value relevant. At the same time, the change from Portuguese GAAP to IFRS did not have a significant impact on value relevance. The change of not amortizing goodwill but instead performing impairment testing was seen as a positive factor concerning reported goodwill and value relevance (Oliveira et al., 2010).

Baboukardos & Rimmel (2014) found that companies that do not fully comply with IFRS are not likely to have value relevance of reported purchased goodwill. While companies that apply IFRS despite an unfavorable environment tend to have value relevance of

goodwill. Another point was that IFRS has been criticized for purchased goodwill and the use of fair value accounting (Baboukardos & Rimmel, 2014).

Shah et al. (2013) investigated the impact of IAS 38 when it was implemented in 2005. Their result was that there was no impact in value relevance at the time IFRS was implemented. Their study mainly focused on the changes IAS 38 brought to R&D expenditure. Their findings suggest that there are no significant changes in value relevance before implementing IFRS and after (Shah et al., 2013).

The purpose of IFRS is to provide consistency, transparency, and comparability. Giuliani and Brännström (2011) have examined if there is consistency in reporting of goodwill for companies that have implemented IFRS during the past year. The findings were from companies in the Italian and Swedish markets. The findings concluded that despite the implementation of IFRS, goodwill remains somewhat unclear (Giuliani & Brännström, 2011).

Like mentioned before, goodwill is hard to define but IFRS tries to tackle the issue by requiring qualitative descriptions of factors in goodwill. Goodwill has significant impacts on financial statements depending on whether it is amortized, or impairment tested. Luckily IFRS requires goodwill to be impairment tested at a minimum annually, making it more consistent between companies and countries reporting. Interestingly there are several ways of looking at goodwill. One way of looking at goodwill is that it is the leftovers because all intangible assets are not identified correctly. Another way of looking at goodwill is just a residual. Yet another way to look at goodwill is that is the sum of potential identifiable intangible assets while still being unrecognized (Giuliani & Brännström, 2011).

Airlines apply mainly three different types of accounting standards to account for intangible assets. Most companies have already transitioned to use IFRS accounting

standards while some are in the process of transferring to use IFRS instead of local standards. Most airlines in the United States use US GAAP.

Accounting standards aim to standardize reporting and accounting by companies. Different rules and regulations help accomplish this goal by making sure that reporting is complete, transparent, and consistent. Accounting standards provide general methods and topics that help make accounting comparable (Fernando, 2020).

IFRS has multiple rules and standards, I will be going through only a selected few that are related to the topic of this thesis below. There are IFRS 3 – business combinations, IAS 36 – impairment of assets, and IAS 38 – intangible assets.

### **3.2.1 IFRS 3 – business combinations**

IFRS 3 sets standards for acquisitions. It sets standards for acquired intangible assets and liabilities as well as for goodwill. The development of IFRS 3 started in 2001 but it was issued in 2004. IFRS 3 was released and replaced IAS 22 (IAS Plus, 2021a).

IFRS 3 has had many changes during the years. Meaning that all future business combinations were to follow IFRS 3. Identifiable intangible assets could be measured at fair value. Amortization of goodwill was not allowed anymore and instead goodwill was supposed to be tested for impairment annually (IAS Plus, 2004).

The first change to IFRS 3 happened in 2008 and became effective after 2009. There were several changes. One change was that goodwill could now be recognized fully and another was that intangible assets have to be recognized and measured (IAS Plus, 2008a).

There were changes to IFRS 3 in 2010 and 2013 but the changes did not impact intangible assets (IAS Plus, 2021a). The next change was released in 2017 but became effective

starting from 2019. The change clarified joint operations and that remeasurements had to be done when obtaining control of such joint operations (IAS Plus, 2017).

There have been two more changes to IFRS 3, one published in 2018 effective from 2020 onwards, and one published in 2020 effective from 2022 onwards. These changes are not in the scope of this research as the inspected data is up to 2019 (IAS Plus, 2021a).

### **3.2.2 IAS 36 – impairment of assets**

IAS 36 was implemented already in 1998. The purpose of IAS 36 is to ensure that intangible assets and goodwill are not carrying excess amounts compared to what should be determined under annual impairment testing (IAS Plus, 2021b).

In 2004 there was the next change which applied to goodwill and intangible assets that were acquired in business combinations. The change became effective immediately for companies that had their first annual period beginning that year after March 2004. The change was related to the same change as IFRS 3 which was the requirement that goodwill should be tested annually for impairment (IAS Plus, 2004).

The next change happened in 2008 and became effective after 2009. That did not impact intangible assets (IAS Plus, 2008b). The next change in 2009 became effective after 2010, and the change was related to the unit of accounting for goodwill impairment testing (IAS Plus, 2009).

The latest change to IAS 36 was released in 2013 and became effective from annual periods starting in 2014. The change required disclosure of the recoverable amount of an asset such as goodwill (IAS Plus, 2013a).

### 3.2.3 IAS 38 – intangible assets

IAS 38 was issued in 1998 (IAS Plus, 2021c). Under IFRS accounting standards IAS 38 is used to set criteria for recognizing and measuring intangible assets. IAS 38 is applied to all intangible assets except for goodwill which is under IFRS 3 (IFRS 2021).

IAS 38 is the outline for accounting requirements of intangible assets. It provides criteria for recognizing and measuring intangible assets. One criterion related to IAS 38 is that the intangible asset must be a non-monetary and non-physical asset that is identifiable. At the same time goodwill can be affected by IAS 38 if it is internally generated but since it is not an identifiable resource it is not categorized as an asset (IFRS 2021).

During 2004 there was a change in IAS 38 that affected recognized intangible assets. The change in 2004 became effective immediately in 2004. This change became also effective in IFRS 3 and IAS 36 as mentioned before, and the change was the requirement for annual testing impairment of goodwill (IAS Plus, 2004).

In 2008 the change in IAS 38 consisted of a change in advertising and promotional activities as well as unit of production method of amortization. The change became effective for periods after 2009 (IAS Plus, 2008b).

In 2009 the changes were due to revised IFRS 3 and amendment to measuring the fair value of an intangible asset from an acquired business combination. The change became effective from July 2009 (IAS Plus, 2009).

In 2013 the change was to revaluation method in proportional restatement of accumulated amortization that clarified the adjustment of the gross carrying amount to be consistent with the carrying amount when an intangible asset is revalued. The change became effective in 2014 (IAS Plus, 2013b).

In 2014 more changes to IAS 38 were introduced to become effective in 2016. The change introduced that the revenue-based amortization method is inappropriate unless certain circumstances are met. The assumption could be left unused if an intangible asset is shown as a measure of revenue, and there is a high correlation between the revenue generated from the intangible asset and consumption of that intangible asset can be shown (IAS Plus, 2014).

In the study by Dahmash et al. (2009), there was a discussion that there are likely changes in how identifiable intangible assets and goodwill are reported hence companies have changed to report according to IFRS. From this the following hypothesis is formulated:

**H2: Changes in accounting standards affect the value relevance of reporting identifiable intangible assets and goodwill.**

### **3.3 The effect of crisis periods on the value relevance of intangible assets and goodwill**

During the years 1999-2019, there have been several crisis periods that have influenced the whole financial market and especially the aviation industry both in positive and negative manners.

The first possible crisis period that might have had an impact on the aviation industry is the Dot-com bubble which occurred during 2000-2002. As McCullough (2018) stated, during 1998-1999 some companies were able to sell unsold airline tickets for a cheaper price. Airlines would have their excess inventory sold, thus demand for air travel was high.

On 11 September 2001, there was a devastating incident in New York, United States of America. During this time happened the September 11 (911) attacks. These had a

significant impact on the safety of air travel. The attacks impacted demand for air travel at least in the U.S. dramatically as many people tried to avoid traveling after the incident. People did not want to travel during leisure and businesses restricted business travel (Ito & Lee, 2005).

The next crisis was the financial crisis during 2007-2008. The crisis impacted global financial markets significantly. Banks were going bankrupt and the market, in general, was in a mess. Even the financial markets were in freefalls (Singh, 2021).

Lastly, the recent COVID-19 situation during 2020 and 2021 has played a significant impact on the aviation industry. People are afraid of the virus and thus the travel industry is on a complete pause. Since this is very recent and financial data for 2020 is not yet published, the impact cannot be taken into account in this research.

This then leads to the next point where crisis periods tend to have an impact on reporting intangible assets in the aviation industry. Thus, the following hypothesis is formulated:

**H3: The value relevance of reported identifiable intangible assets and goodwill differs in crisis and non-crisis periods.**

It is important to note that this hypothesis is based on crisis periods that have impacted worldwide. As there might have been smaller crises that might have impacted only a certain market, and these are not taken into account in the scope of the thesis.

### **3.4 Summary and positioning of the thesis**

To summarize the theory of the thesis it can be stated that airlines tend to have intangible assets. The industry is constantly changing which also emphasizes the significance of reported intangible assets. The increasing importance of sustainability might cause airlines to make acquisitions or research & development leading to higher

values of identifiable intangible assets and goodwill. This is what the first hypothesis is formulated from.

Next, it should also be noted that previous research has examined value relevance but not specifically in the airline industry. Previous research also has not studied if crisis periods have had an impact on the value relevance of reported intangible assets and goodwill in the airline industry. It can be assumed from previous research that value relevance is significant.

Lastly, there have been several changes in accounting standards during the years of which many have impacted how intangible assets are reported. This is what makes the second hypothesis interesting. Interestingly also during the twenty-year period, there have been several crises. As earlier research has not investigated if crisis periods impact value relevance it is interesting to find out in the next sections if crisis periods have any impact on value relevance. This is what the third hypothesis is based on.

Next up is data and methodology where knowledge from previous sections and previous research is used to test the hypotheses.

## 4 Data and methodology

In this chapter of the thesis, I describe the methodology and sample used in the examination of the value relevance of identifiable intangible assets and goodwill. All in all, this chapter provides the selected sample data followed by the methodology used to derive variables, then comes variables and models on how the research hypotheses are tested empirically. The next chapter results and analysis provides summary statistics derived from the data.

### 4.1 Methodology

In this section, the aim is to provide the model specification. I also describe all specified variables included in the main regression.

#### 4.1.1 Regression model

Dahmash et al. (2009) uses the valuation model to analyze companies' value while using accounting information and provide relevance of reported values. Table 2. presented later is useful for understanding the variables and their calculations. The basic model below is based on the study by Dahmash et al. (2009) and is as follows:

$$MVE_t = BVE_t + \delta_1 NOA_t + \delta_2 AOE_t \quad (1)$$

Where:

$MVE_t$  is the market value of a company, at time t

$BVE_t$  is the current book value of equity, at time t

$NOA_t$  is net operating assets, at time t

$AOE_t$  is abnormal operating earnings, at time t

The coefficients  $\delta_1$  and  $\delta_2$  are for the required rate of return for the company

Identifiable intangible assets and goodwill are both part of net operating assets and book value of equity. Dahmash et al. (2009) states that to take this into account current book value of equity is formulated as follows:

$$BVE_t = (NOA - INT)_t + GW_t + ID_t + NFA_t \quad (2)$$

Where:

$INT_t$  is total intangible assets, at time t

$GW_t$  is goodwill, at time t

$ID_t$  is identifiable intangible assets, at time t

$NFA_t$  is net financial assets, at time t

Dahmash et al. (2009) mentions that after combining both Equations 1 and 2, the following equation is formulated:

$$MVE_t = \alpha_1 + \alpha_2(NOA - INT)_t + \alpha_3GW_t + \alpha_4ID_t + \alpha_5NFA_t + \alpha_6AOE_t + \varepsilon_t \quad (3)$$

Where:

$\alpha_1$  is a constant

$\alpha_2$  to  $\alpha_6$  are estimated regression coefficients

$\varepsilon_t$  is an error term

Equation 3 is used throughout the thesis to run the models. Table 2. summarizes how the variables are calculated with some variables being able to be used directly from the Thomson Reuters Datastream.

Now the specification of all the variables included in the main regression model is described.

The fourth equation is related to market value of equity. Market value of equity measures the value of a company (Chen, 2020). Chen (2020) states that market value of equity can be calculated using the following method:

$$\text{Market value of equity} = \text{market price of stock} \times \text{number of shares outstanding} \quad (4)$$

Where:

*Market price of stock* is the price at which a stock can be purchased or sold at a given time.

*Number of shares outstanding* is the number of shares of the company that are held by shareholders.

*Market value of equity* is also known as market capitalization. Market capitalization is the total market value of a particular company's outstanding shares (Chen, 2020). In this thesis market capitalization is used directly from the Thomson Reuters Datastream.

Kennon (2020) states that current book value of equity illustrates the equity available to be distributed among shareholders if all assets were to be sold and all liabilities to be paid off. Kennon (2020) also describes that the general concept of book value of equity is total assets minus total liabilities as follows:

$$\text{Book value of equity} = \text{total assets} - \text{total liabilities} \quad (5)$$

Where:

*Total assets* represent the total amount of assets.

*Total liabilities* represent the total amount of debts and obligations.

*Book value of equity* is more commonly known by the term of shareholder's equity. In this thesis, common shareholder's equity is used directly from the Datastream.

Bragg (2020a) states that net operating assets are assets that are directly linked to a companies' operation minus the liabilities linked to a companies' operation. Bragg (2020a) also describes that the calculation process for net operating assets is the following:

$$\text{Net operating assets} = \text{operating assets} - \text{operating liabilities} \quad (6)$$

Where:

*Operating assets* (equation 7) and *operating liabilities* (equation 9) are calculated separately. These equations are presented below.

Bragg (2020b) states that operating assets are assets related to the main activity of the company. Some intangible assets such as technology licenses are considered as operating assets if they are crucial for manufacturing. According to Bragg (2020b) operating assets are calculated as follows:

$$\text{Operating assets} = \text{total assets} - \text{financial assets} \quad (7)$$

Where:

*Total assets* include all assets a company has. These include cash and cash equivalents, goodwill, accounts receivable, inventory, property, plant, and equipment (PPE), intangible assets, and other assets in possession of a company (Bragg, 2020c).

In this thesis, total assets come directly from the Datastream and *financial assets* are calculated using the equation presented next (equation 8).

Financial assets are such as cash and cash equivalents, and various investments (Chen, 2021). Financial assets are calculated like operating assets. Financial assets can be calculated as total assets minus operating assets (Chen, 2021). Either financial assets or operating assets have to be calculated first in order to get the other. In this thesis financial assets are calculated as follows:

$$\text{Financial assets} = \text{cash and cash equivalents} + \text{short-term investments} + \text{other investments} \quad (8)$$

Where:

*Cash and cash equivalents* are defined as the value of assets that can be converted to cash immediately (Tuovila, 2020a).

*Short-term investments* are such investments that can be easily converted to cash (Segal, 2020).

*Other investments* mean all other investments a company may have.

Cash and cash equivalents, short-term investments, and other investments are available directly from the Datastream.

Operating liabilities are liabilities related to the main activity of the company. Operating liabilities are such as accounts payable, accrued payroll, and income taxes payable. In this thesis operating liabilities is calculated using the following equation:

$$\text{Operating liabilities} = \text{accounts payable} + \text{accrued payroll} \quad (9)$$

Where:

*Accounts payable* is the outstanding amount due to vendors or suppliers (Tuovila, 2021).

*Accrued payroll* is the outstanding amount due to employees and includes such as salaries and bonus compensations (Bragg, 2020d).

Accounts payable and accrued payroll are available from the Datastream.

Financial liabilities are obligations that are not yet paid to the counterparty. In this thesis financial liabilities are calculated as the following:

$$\text{Financial liabilities} = \text{long-term debt} + \text{short-term debt} \quad (10)$$

Where:

*Long-term debt* is considered as debt that is to be paid off in a period of time which is more than a year (Tuovila, 2020b).

*Short-term debt* is current liabilities that are to be paid off within a year (Ganti, 2020).

Long-term debt and short-term debt are both available directly from the Datastream.

Net financial assets can provide information on the current financial situation. Using the previously presented equation to calculate *financial assets* (equation 8) and *financial liabilities* (equation 10) we can calculate net financial assets as follows:

$$\text{Net financial assets} = \text{financial assets} - \text{financial liabilities} \quad (11)$$

According to Dahmash et al. (2009), intangible assets can be divided into two categories: identifiable intangible assets and unidentifiable intangible assets. Identifiable intangible assets are for example brand names and patents while unidentifiable intangible assets are assets like goodwill and good customer relations. Intangible assets can be purchased or internally generated (Dahmash et al., 2009). Intangible assets are calculated in this thesis as the following:

$$\text{Total intangible assets} = \text{goodwill} + \text{identifiable intangible assets} \quad (12)$$

Where:

*Goodwill* is an intangible asset that typically arises due to excess acquisition costs associated with the purchase of an acquired company (Hargrave, 2021a).

*Identifiable intangible assets* are assets that are not physical. Intangible assets include brand recognition, intellectual property, and goodwill (Kenton, 2020). Intellectual property is such as trademarks, patents, copyrights, franchises, trade secrets (Kenton, 2020). Also, licenses such as software licenses are intangible assets (Kenton, 2020).

In this thesis goodwill and identifiable intangible assets are used directly from the Datastream.

According to Dahmash et al. (2009), abnormal operating earnings are calculated as actual operating earnings minus expected operating earnings. Thus, abnormal operating earnings is calculated as the following:

$$\text{Abnormal operating earnings} = \text{operating earnings} - (r \times \text{net operating assets}) \quad (13)$$

Where:

*Operating earnings* are explained below (equation 14).

*r* is Weighted Average Cost of Capital (WACC), which is also explained below.

*Net operating assets* were explained earlier (equation 6).

Operating earnings are also commonly known as Earnings Before Interest and Taxes (EBIT). Earnings Before Interest and Taxes (EBIT) is commonly used to measure a company's profit. It contains all earnings except interest and taxes (Corporate Finance Institute, 2020). Operating earnings can be simply calculated as follows:

$$\text{Operating earnings} = \text{net income} + \text{interest} + \text{taxes} \quad (14)$$

Where:

*Net income* is revenue minus expenses minus interest and taxes (Kenton, 2021).

In this thesis Earnings Before Interest and Taxes (EBIT) are used directly from the Datastream.

Lastly, *r* is the Weighted Average Cost of Capital (WACC). According to Hargrave (2021b), WACC represents the cost of capital in a company's category being proportionately weighted. WACC calculation takes into account different sources of capital a company may have (Hargrave, 2021b). The Damodaran rates for WACC in the aviation industry for the years 1999-2019 are presented in Table 1. below. The rates are from the Damodaran database.

**Table 1.** Damodaran WACC rates (Damodaran, 2021).

<b>Year</b>	<b>Damodaran WACC rates</b>
<b>1999</b>	8,93 %
<b>2000</b>	8,36 %
<b>2001</b>	8,13 %
<b>2002</b>	8,64 %
<b>2003</b>	8,67 %
<b>2004</b>	8,40 %
<b>2005</b>	9,16 %
<b>2006</b>	9,50 %
<b>2007</b>	9,45 %
<b>2008</b>	7,23 %
<b>2009</b>	7,64 %
<b>2010</b>	7,33 %
<b>2011</b>	7,93 %
<b>2012</b>	5,81 %
<b>2013</b>	6,41 %
<b>2014</b>	5,28 %
<b>2015</b>	6,81 %
<b>2016</b>	6,06 %
<b>2017</b>	5,64 %
<b>2018</b>	6,10 %
<b>2019</b>	5,86 %

It is interesting to note from the table above that WACC has decreased during the years with the lowest being during recent years. It is also interesting to note that WACC was the highest during the selected time period during 2006, just before the financial crisis. All in all, WACC rates have remained between 5–10% during the selected time period.

#### **4.1.2 Variables**

In this section, the aim is to provide the variable specification and summary of dummy variables.

Table 2. below summarizes the variables used in this thesis for the model.

**Table 2.** Variable definitions.

<b>Variable</b>	<b>Description</b>	<b>Definition/calculation</b>
<b>MVE</b>	Market value of equity	= Market capitalization
<b>BVE</b>	Book value of equity	= Common shareholder's equity
<b>NOA</b>	Net operating assets	= Operating assets (OA) – operating liabilities (OL)
		OA = Total assets (TA) – financial assets (FA)
		OL = Accounts payable + accrued payroll
<b>INT</b>	Total intangible assets	= Goodwill (GW) + identifiable intangible assets (ID)
<b>GW</b>	Goodwill	= Goodwill
<b>ID</b>	Identifiable intangible assets	= Total intangible assets
<b>NFA</b>	Net financial assets	= Financial assets (FA) – Financial liabilities (FL)
		FA = Cash and cash equivalents + other investments + short-term investments
		FL = Long-term debt + short-term debt and current portion of long-term debt
<b>AOE</b>	Abnormal operating earnings	= Operating earnings (OE) – (r * NOA t-1)
		OE = Earnings before interest and taxes (EBIT)
		r = Damodaran WACC rates

Most of the data for these variables can be directly attained from the Thomson Reuters Datastream while some variables have to be calculated. All in all, this table provides a clear summary of what variables are required for the model to work and summarizes previously introduced calculations to calculate these variables.

The variables for changes in accounting standards and crisis periods are dummy variables in this model. These variables are used in the model as variables with values 1 if true and 0 if false.

During the selected time period there have been several changes in accounting standards. In 2004 several changes impacted IFRS3, IAS 36, and IAS 38. In the later years'

changes impacted two or fewer accounting standards. All in all, there is a total of six years that have had changes in IFRS and IAS.

The variables for the crisis periods are divided into different years. The first is the dot com bubble which affects the years 2000–2002. The next crisis period is September 11 attacks that occurred during 2001. The last crisis period is the financial crisis that affected the years 2007–2008. All in all, there is a total of five years that have been impacted by crisis periods.

Table 3. summarizes which years are affected by changes in accounting standards and crisis periods.

**Table 3.** Summary of dummy variables.

<b>Years</b>	<b>Change in IFRS and IAS</b>	<b>Crisis periods</b>
1999	No	No
2000	No	Yes (Dot-com bubble)
2001	No	Yes (Dot-com bubble & September 11 (911) attacks)
2002	No	Yes (Dot-com bubble)
2003	No	No
2004	Yes (IFRS 3, IAS 36, & IAS 38)	No
2005	No	No
2006	No	No
2007	No	Yes (Financial crisis)
2008	No	Yes (Financial crisis)
2009	Yes (IFRS 3 & IAS 38)	No
2010	Yes (IAS 36)	No
2011	No	No
2012	No	No
2013	No	No
2014	Yes (IAS 36 & IAS 38)	No
2015	No	No
2016	Yes (IAS 38)	No
2017	No	No
2018	No	No
2019	Yes (IFRS 3)	No

As can be noted from the table above, changes in IFRS and IAS occur during different time periods than crisis periods. Thus, running the model to investigate the effects from these is clearer to understand.

## 4.2 Sample

To construct the sample of the thesis, Dahmash et al. (2009) provides a clear background on the required data. In the thesis, the airline industry is selected. Data covers financials from public listed airlines worldwide. The selected accounting method for the thesis is International Financial Reporting Standard (IFRS). Thus, values are used from firms that follow IFRS. The data used in this thesis is in Euros. The currency conversion is directly from the Thomson Reuters Datastream. Data from twenty years is used. To investigate value relevance, I have gathered data from the years 1999–2019. This period has contained several changes in accounting standards as mentioned before but also contained several crisis periods affecting the aviation industry. The source of data for the thesis is taken from Thomson Reuters Datastream. With the exception of weighted average cost of capital (WACC) rates being from the Damodaran database. Variables are constructed using data from Thomson Reuters Datastream and Damodaran database.

The sample includes companies with an existing market value of equity, shareholder's equity, total intangible assets and separately goodwill, total assets, accounts payable, and accrued payroll. Additionally, companies also needed to have existing long-term and short-term debt, reported cash and cash equivalents, other and short-term investments, and earnings before interest and taxes (EBIT).

During this twenty-year examination period, the starting number of airlines from the Thomson Reuters Datastream is 176 airlines. Since all companies do not comply with IFRS, all companies that do not comply with IFRS are excluded, altogether 38 companies. As well as this, companies with less than eight years of data or companies that have stopped activities due to mergers or other reasons are also deducted from the research

scope. The number of companies with less than eight years of data and stopped activities was altogether 83. As this thesis focuses on identifiable intangible assets and goodwill, companies that have not reported any goodwill are also deducted, the number of these were 8 companies. The sample data for this thesis and deductions is illustrated in Table 4. below.

**Table 4.** Sample data.

	<b>Number of companies</b>
<b>Starting number of airlines 1999–2019</b>	176
<b>Less:</b>	
<b>Airlines applying US GAAP</b>	-12
<b>Airlines applying local standards</b>	-26
<b>Airlines with less than 8 years of data</b>	-7
<b>Airlines that have stopped activities</b>	-76
<b>Airlines that have not reported intangible assets</b>	-11
<b>Airlines that have not reported goodwill</b>	-8
<b>Final number of airlines</b>	36

Data is illustrated from a twenty-year period from 1999 to 2019. The final number of airlines is 36. The companies in the scope of this thesis are presented in Appendix 1. These airlines have operations for at least 8 years between 1999-2019, comply with IFRS, and have reported goodwill.

In the next section, I will go through the results attained from the model and analyze the results.

## 5 Results and analysis

In this chapter, I will run the previously introduced model and analyze the results attained. This chapter consists of summary statistics of the variables, analysis of the model results, and finally summary of the results where I take into account the hypotheses introduced during the thesis.

### 5.1 Descriptive statistics

After managing the data attained from Thomson Reuters Datastream the following summary statistics are constructed. Table 5. reports the summary statistics for the variables presented in Table 2. of the sample from 1999 to 2019. From the summary statistics table below it can be noted that market capitalization varies strongly within the airline industry. While the minimum market value of equity (MVE) being valued at 19 thousand and the maximum being valued at around 31 million, the mean MVE is slightly less than 3 million.

For more clarity values in mean, standard deviation, minimum, and maximum are presented in thousands. Observations are not presented in thousands.

**Table 5.** Summary statistics.

Variable (thousands)	Mean	Std. Dev.	Min	Max	Obs.
MVE	2 792	3 905	19	31 481	606
BVE	1 708	2 317	-3 090	11 952	641
NOA	5 247	6 754	1	37 581	641
INT	421	940	0	7 021	632
NOA – INT	4 886	6 326	-167	37 459	632
GW	160	381	0	2 735	530
ID	288	625	0	4 286	632
NFA	-1 606	3 244	-23 169	3 463	641
AOE	-34	452	-3 315	2 639	641

From the table above it is clear to notice that not all companies have reported total intangible assets (INT), goodwill (GW), and identifiable intangible assets (ID). Thus, the minimum values for these variables are zero. The mean of INT is 421 thousand which is around 15% when comparing to the mean of MVE. The maximum INT is around 7 million which is around 22% of the maximum MVE. Thus, it confirms the fact that airlines tend to have large amounts of intangible assets.

Also, from the table it can be noted that there is a strong standard deviation in net operating assets (NOA) which also seems to impact NOA – INT, as total intangible assets (INT) have a low standard deviation itself.

## **5.2 Results of the regression analysis**

In this thesis, an event has no significance on value relevance if the coefficient for that event in the regression model is significantly different from 1. If the coefficient for that event is not significantly different from 1 then value relevance is significant. In other words, if the coefficient for GW and/or ID are significantly greater than 0 then they are typically value relevant.

The estimated regression for Equation 3 is presented in Table 6. below. The first regression represents the basic model to test if reported identifiable intangible assets and goodwill are value relevant. The second regression represents the model to test if changes in accounting standards affect the value relevance of reported intangible assets. The third regression represents the model to test if crisis periods affect the value relevance of reported intangible assets. Also notable, is that the reported values for IFRS, Crisis, and the Constant are in thousands.

The sample from 1999 to 2019 contains 518 firm-year observations.

**Table 6.** Results for the regression model.

<b>Value relevance regressions</b>			
<b>Variables</b>	<b>Regression</b>		
	<b>1</b>	<b>2</b>	<b>3</b>
	<b>MVE</b>	<b>MVE</b>	<b>MVE</b>
<b>NOA-INT</b>	0.497***	0.496***	0.495***
	(0.0456)	(0.0457)	(0.0459)
<b>GW</b>	1.761**	1.742**	1.675**
	(0.786)	(0.788)	(0.789)
<b>ID</b>	-0.498	-0.483	-0.410
	(0.531)	(0.531)	(0.527)
<b>NFA</b>	0.194**	0.190**	0.178**
	(0.0808)	(0.0816)	(0.0825)
<b>AOE</b>	2.338***	2.341***	2.387***
	(0.318)	(0.320)	(0.322)
<b>IFRS</b>		-148.676	
		(228.378)	
<b>Crisis</b>			764.741**
			(379.674)
<b>Constant</b>	565.715***	610.216***	394.086***
	(111.043)	(140.536)	(105.014)
<b>R-squared</b>	0.596	0.596	0.602
<b>Observations</b>	<b>518</b>	<b>518</b>	<b>518</b>

T-statistics are reported in the parentheses

\* represent statistical significance at 10% level

\*\* represent statistical significance at 5% level

\*\*\* represent statistical significance at 1% level

Previous studies have shown that intangible assets are value relevant if goodwill (GW) and identifiable intangible assets (ID) are significantly greater than 0 (Dahmash et al., 2009). The regression results for the sample in the first column of Table 6. confirms previous research stating that intangible assets are value relevant. Value relevance of GW is statistically important at the 5% level for all three regressions. The results indicate that GW is value relevant as it is significantly greater than zero. ID on the other hand is negative and not significantly greater than zero, meaning that ID is not value relevant. It is worth noting that ID is not statistically significant. From this, it can be concluded that the market sees goodwill to be value relevant while identifiable intangible assets are not.

Lev (2019) had mentioned that the current accounting rules for intangible assets provides misleading information for investors, companies, and the economy in general. As seen from the results ID is less value relevant than GW. Since GW is greater than one it means that GW is generally conservatively valued. Since ID is not statistically significant it cannot be assumed that it is generally aggressively valued despite being significantly different from one.

The  $R^2$  of regressions 1, 2, and 3 are 0.596, 0.596, and 0.602, respectively. Regressions 1 and 2 have the same explanatory power while regression 3 has a higher explanatory power. The model has a high level of correlation.

In the regression NOA–INT is statistically important at the 1% level and NFA is statistically important at the 5% level. NOA–INT and NFA are significantly above zero but significantly below one in all three regressions. It can be concluded that in the airline industry the market believes that these values are reported aggressively meaning that they are believed to be overstated. While on the other hand AOE is significantly above zero and significantly above one in all three regressions. This means that the market believes that AOE tends to be under-valued. AOE is statistically important at the 1% level.

### **5.3 Summary of results**

In this section, I interpret the results from Table 6. to answer the hypotheses that were set for the thesis.

As Dahmash et al. (2009) mentioned in their research they found out that reported identifiable intangible assets and goodwill are value relevant. The first hypothesis can be answered using information from Table 6.

**H1: The reporting of identifiable intangible assets and goodwill in financial statements of airline companies is value relevant.**

This hypothesis is partially confirmed. It can be concluded that goodwill in financial statements of airline companies is value relevant while identifiable intangible assets are not value relevant.

As Ji & Lu (2014) mentioned in their research they found out that the value relevance of intangible assets decreases after changes in accounting standards. The results in my thesis confirm the same finding. The second hypothesis in the thesis can be answered.

**H2: Changes in accounting standards affect the value relevance of reporting identifiable intangible assets and goodwill.**

This hypothesis is confirmed. From the results, it can be stated that changes in accounting standards affected the value relevance of reporting intangible assets such as goodwill and identifiable intangible assets. The value relevance of goodwill decreased slightly compared to the pooled sample but remained significantly above zero. On the other hand, the value relevance of identifiable intangible assets increased as the value increased closer towards zero but remained below zero.

There was no earlier research related to value relevance during crisis periods. To answer the third and last hypothesis of this thesis.

**H3: The value relevance of reported identifiable intangible assets and goodwill differs in crisis and non-crisis periods.**

This hypothesis is also confirmed. Value relevance of reported intangible assets differs from crisis and non-crisis periods. As in the second hypothesis, goodwill decreased even further from the pooled sample. This means that the value relevance of goodwill decreased more but was still value relevant as the value remains significantly above zero. At the same time, identifiable intangible assets' value relevance increased while remaining below zero.

## 6 Conclusions

With the upward trend in the share of identifiable intangible assets and goodwill in the airline industry, it is an interesting and up-to-date topic to research their value relevance. The thesis examines if there is value relevance in reported identifiable intangible assets and goodwill within the airline industry especially since the share of these is significant in the industry. As well as this, the thesis also examines if there is any effect on the value relevance of reporting intangible assets when there are changes in accounting standards. Lastly, the thesis also examines if crisis periods have any impact on the value relevance of reported intangible assets.

Both Dahmash et al. (2009) and Ji & Lu (2014) concluded that intangible assets tend to be more value relevant in cases where the information of intangible assets is more reliable.

As hypothesized the results provide proof that goodwill is in fact value relevant in the airline industry while identifiable intangible assets are not. It can be concluded that goodwill is worth more as an asset than identifiable intangible assets. Goodwill is seen as being value relevant asset while identifiable intangible assets are not statistically significant the conclusion that they are seen as aggressively valued assets cannot be made.

It is interesting to note that the airline industry is going to go through big changes in the future with increased sustainability significance. This possibly impacts the share of identifiable intangible assets and goodwill of airlines. At the same time, this will increase the importance of the value relevance of reported intangible assets.

In the future, there are likely more changes in accounting standards as well as new crisis periods that might impact the airline industry. But currently, the value relevance of reported goodwill seems to be true while that of reported identifiable intangible assets is not. Time is to show where the next steps of reporting these values will go.

The limitations of this research provide great opportunities for further research on the topic. The thesis is limited to companies that report under IFRS as different accounting standards are not harmonized. The next limitation in this research is related to the amount of data. Currently, the limitation was for a certain time period, which in this thesis is 1999 to 2019. As well as this non-active companies are limited out of the research scope.

In my opinion, there could be limitless possibilities for further research as this research can be scoped into any category and field. The first possibility could be to individually investigate for example which changes in IFRS and IAS or which individual crisis periods have had the biggest impact on value relevance. As of now in this thesis changes in IFRS and IAS or impacts from crisis periods were investigated as a whole for the selected time period.

Another possible research topic would be to investigate the effect of IFRS 3 changes published in 2018 which became effective in 2020, and the change published in 2020 which will be effective in 2022. Also related to accounting standards, one possible research could be to investigate companies that report under US GAAP instead of IFRS which is the selected limitation in this thesis.

It could also be interesting to research non-active companies or companies that have been through a merger. Also, it is worth researching whether 2020 has any signs of impact. 2020 would have been an eventful year to include in the analysis as the impact of COVID-19 especially in the aviation industry would have been interesting to examine in the research.

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## Appendix. Companies in the scope of the thesis

<b>Numbering</b>	<b>Company name</b>
<b>1</b>	Aegean Airlines
<b>2</b>	Aeroflot – Russian Airlines
<b>3</b>	Air Arabia
<b>4</b>	Air Canada
<b>5</b>	Air China
<b>6</b>	Air France–KLM Group
<b>7</b>	Air Mauritius
<b>8</b>	Air New Zealand
<b>9</b>	Air Partner
<b>10</b>	AirAsia Group
<b>11</b>	Asiana Airlines
<b>12</b>	Avianca Holdings
<b>13</b>	China Eastern Airlines
<b>14</b>	China Southern Airlines
<b>15</b>	Chorus Aviation
<b>16</b>	Comair
<b>17</b>	Copa Holdings
<b>18</b>	Lufthansa Group
<b>19</b>	easyJet
<b>20</b>	Exchange Income
<b>21</b>	Finnair
<b>22</b>	Grupo Aeroméxico
<b>23</b>	International Airlines Group
<b>24</b>	Icelandair Group
<b>25</b>	Jazeera Airways
<b>26</b>	Jeju Air
<b>27</b>	Jet2
<b>28</b>	Korean Air
<b>29</b>	LATAM Airlines Group
<b>30</b>	Norwegian Air Shuttle
<b>31</b>	Qantas
<b>32</b>	Regional Express Holdings
<b>33</b>	Ryanair
<b>34</b>	SAS Group
<b>35</b>	Singapore Airlines
<b>36</b>	Turkish Airlines