KLM Royal Dutch Airlines N.V.

FAIS Project Report

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I. Management Summary

KLM is a globally recognized airline and the oldest established carrier in the world. It has formed a partnership with Air France, the second-largest player in the European market. KLM's targets are to be customer-centric, innovative, efficient and sustainable. This report examines which investment opportunities could increase effectiveness and maximize customer satisfaction.

For each investment opportunity, the airline must account for financial and non-financial criteria that play a role. Financial criteria evaluated throughout this report include currency exchange, fuel prices, initial costs and net present value. Each of these factors affect the attractiveness of an investment based on costs associated and potential profit. Non-financial criteria include government regulations, competition and customer satisfaction. In this report, four investments in aircraft were identified: AIRBUS A350-900, BOEING 777-300, BOEING 787-9 and AIRBUS A380-800.

The organization was evaluated using a PESTEL analysis; politics, economics, social, technological, environmental and legal attributes are analysed. Politics is oriented towards taxes, tariffs and trade restrictions. Economics is focused on exchange rates and inflation. The social context targets the issues such as public relations and company image. The technology aspect considers innovation and technology integrated in aircraft and services. The environmental factor is focused on sustainability and pollution issues. Lastly, the legal aspect focuses on local laws such as consumer and safety laws.

A SWOT analysis was conducted identifying the organization's' strengths, opportunities, threats and weaknesses. KLM's strengths include its positive company image and strong market position. Opportunities were also identified to further improve strengths and increase profitability. One major opportunity is to invest in new aircraft as this could lower emission and improve customer satisfaction. These aircraft are evaluated by a Monte Carlo simulation and an analytical hierarchy process. One weakness identified is the transcontinental connections of KLM, as few competitors have a larger number of connections. Direct threats would be the limited supply of fuel and government pressure to reduce emissions. Future implementations of hybrid/fully electric engines pose as a threat to current airplanes as they could prove obsolete in the future.

To analyse KLM's assets and debt, several ratios are used. First of all, the current ratio has been below 1:1 for more than 5 years; significantly decreasing in the last couple of years. Competitors, such as Lufthansa, have an increasing positive current ratio. Secondly, the return on assets ratio, has increased significantly in the past 5 years, surpassing the break-even point and becoming profitable. As a matter of fact, KLM has shown to generate more profit than its competitor, Lufthansa. In terms of debt, KLM has a cost of debt of 2,3%, which is low in comparison with industry mean of 4,05%. The cost of equity of KLM is 1,29% and the cost of capital of 1.29%. This is also very low in comparison to competitors, as they average a cost of capital of 6,34%.

According to the Monte Carlo simulation, the Boeing 777 had the highest NPV, the A350 placing second by a small margin. The AHP concluded that the benefit obtained from the A350 was greater than the 777. We recommend the AIRBUS A350-900 as an investment opportunity for KLM.

1. Introduction: A major airline in turbulent times

KLM Royal Dutch Airlines was founded in 1919 and is the recognized flag carrier airline. In this turbulent time, with fluctuant oil- and consequently aviation fuel- prices and an increasing concurrence threat from other, low-cost airline operators, it is especially worthwhile to examine possible investment decisions for KLM to increase the profit for all its stakeholders.

In 2004, KLM has merged with the French national airline, Air France, to forming an Air France-KLM merger. The goal of this paper is, nevertheless, to examine possible investment decisions for KLM, as seen separately from Air France.

Within the paper, criteria were assigned weights to each of the four investments in order to effectively compare and contrast. Recommendations are based on the company's financial data which is used to run several simulations. The Monte Carlo simulation uses data such as net present value and costs to run scenarios and predict the possible outcomes of investment decisions.

The report starts by describing the airline, as well as analysing its external factors of influence. Mostly based on this a SWOT-analysis is drawn. Afterwards, some possible investment ideas are discussed. In the next sections, some company accountancy ratios are measured. Comparing these ratios with non-financial factors leads to development of an Analytical Hierarchy Model, to which managers could stick when taking investment decisions.

In the next chapter, the KLM's statement of financial position has been examined, with measurements of cost of equity, cost of debts and cost of capital. Then the stock market and especially KLM's shares position on this is taken into consideration.

In the third chapter, the developed data will be applied in order to test the advantages and disadvantages of investment decisions and to sort them in a descending order: the examining financial criteria will be assigned to appropriate investment possibilities. Afterwards, the Net Present Value will be examined specifically by mean of simulations (especially, those of Monte-Carlo) for each investment alternative. Finally, the Analytic Hierarchy Process will be used to find the best investment option, while a possible impact of a decision to implement this option on company's financial statements will be taken into consideration. An executive summary of the report can be found right after the introduction.

2. KLM Company Description

KLM is the main element of the KLM Group, which manages several other airlines, such as the aforementioned Air France. On a broader level, KLM has merged with Air France in 2004 to KLM-Air France group. KLM offers work to 35.000 employees, operating a fleet of 199 aircraft.
The core activities of KLM are: transportation of passengers, shipment of freight and maintenance operations on aircraft fleet. A smooth transfer of passengers and freight on KLM's main hub Schiphol Airport plays a huge role in fulfilling the first two core activities. In 2015, KLM has welcomed 28 million passengers on board of flights to 138 destinations. Furthermore, it has shipped more than 700.000 ton of freight. According to KLM's mission statement its goals are to provide reliable, innovative products for its customers, as well as perform safe, efficient and service-oriented operations. [1] KLM focuses on three main stakeholders: its customers, enhancing customer-oriented service; its employees, taking care of their health and personal development and its shareholders,

trying to maintain profitable growth for them. However, it focuses not only on growth of own profit, but also on economic and social development. Sustainability also plays a major role- KLM-Air France group was listed as most sustainable airline company on Dow Jones Sustainability Index for already 12 years in a row, while also being 7 times the most sustainable company in the overall transportation segment. [2] For KLM, it is important to ensure sustainable growth at Amsterdam's Schiphol Airport, as well as pay attention to the needs of people working in the airport or living nearby. In short, the goals of KLM could be painted in four key terms: customer-centric, innovative, efficient and sustainable.

2.1. PESTEL Analysis

Political:

One of the main factors, which had played a role in interconnections between KLM and the Dutch government was the fusion of KLM and Air France. In 2003, the Dutch government voted in favour of the fusion. Even 10 years later, the Dutch government keeps supporting this association, stating that the two airlines currently cannot exist without each other [3]

Another important factor for KLM, which has a political aspect is the possible extension of KLM's major hub- Amsterdam Airport Schiphol and/or a reallocation of some of its flights to a new-build Lelystad airport. This topic is very trending, because of the elections on 15 March 2017. The current reigning parties VVD and PvdA are supporters of expansion of Schiphol, as well as constructing of Lelystad airport. Also, most oppositional parties (except for some environmentalist parties) are supporters of an expansion of Schiphol, while most parties, including the leftist parties are also supporters of KLM as a state-owned company. Thus, from political point of view KLM enjoys full loyalty from the government [4].

Economical:

A major economical factor of importance for an airline is the oil price, which determines the aviation fuel price. After a vast decline in 2014-2016 from more than $100 per barrel towards $35 per barrel, the oil price has now stabilized on around $50 per barrel and will, according to experts' expectations not exceed the area between $40 and $70 per barrel [5]. Consequently, the fuel price will in the short-term perspective not fluctuate drastically.

Figure 1: Fuel price fluctuation

However, as the US$/EUR exchange rates are also of significant importance for the fuel prices, with increasing dollar resulting in higher fuel bills, a risk for KLM lies in the increase of dollar to euro exchange rate. The dollar has already a 7% increase after the election of new president Trump. According to some analysts, dollar will reach a parity with euro around the 2017-year's end [6]. Furthermore, Airbus aircraft producer has announced to increase the price for Airbus aircraft with 1,1%.
Finally, the expected fierce concurrence from low-cost airlines, as well as state-financed airlines from outside the EU will probably decrease the airline ticket prices, resulting in lower profits [7; pp. 27-28].

Social:

In social context, as the values of people in Western Europe are moving towards a higher focus on sustainability, the stress on corporate social responsibility and sustainability of KLM could possibly be a competitive advantage for KLM.
However, with respect to the possible opening of a dependence of Schiphol in Lelystad it should be said, that most inhabitants of the areas around the new potential airport are against the project, resulting in different actions, petitions and lobbying groups, trying to reallocate some flights scheduled for Lelystad airport [8].

Technological:

In 2015 KLM spent almost 500 million euro, investing in renewal of its fleet, including the purchase of a new Boeing 787-9. Furthermore, it financed the construction of a new Business Lounge in Schiphol airport. In the next years, KLM will invest in digital facilities, according to its annual report [7].
Also, according to the same annual report, KLM will work on more investments in gate techniques for a smooth flow of passengers through inter-continental gates on Schiphol airport, as well as in development of data-driven analyses. This will continue in later years as well.

Environmental:

The main environmental issues about air transportation are: CO2 emission and noise nuisance.
If talking about CO2-emission, KLM's goal is to reduce it by 20% for 2020 [7; p.26]. However, in order to decrease both parameters KLM will be required to invest in new, less-noisy and more environmental-friendly aircraft and bio-fuel.

Law:

A major threat for KLM lies here in the possible redistribution of traffic rights and time slots to non-European airlines for European airports of main interest. However, the Dutch government approved an air transport policy law, which stresses the high value of Amsterdam Schiphol Airport, as well as KLM for the country [7; p.28]

2.2. SWOT Analysis

Strengths	**Weaknesses**
- Customer satisfaction - Brand image - Service and product development - Innovative - Comfortable connections - Experience	- Employee costs and therefore firing of employees - Operational inefficiency - Fast grow (structure is not flexible enough)
Opportunities	**Threats**
- Reduction of CO_2 emission - Service improvement - Renewable energy development - Expand connections available - Social improvement	- Intensive competition - Airlines with lower service → cheaper - Terrorist attacks - Fuel price increase - Workers strikes

3. Investment Ideas

Based on our SWOT analysis and the opportunities we developed with it, KLM could invest in new aircraft. Since aircraft is the most important component for an airline, it is necessary to constantly improve it, also to stay competitive. The different investment options we chose for KLM are four different types of aircraft (Airbus A350-900, Airbus A380-800, Boeing 777-300 and Boeing 787-9) since that is how an airline generally generates their revenue. These have already different standards, so KLM could invest in several steps in these four aircraft. An investment idea is to make the aircraft more comfortable and also sustainable. This would coincide with our suggestions about reducing the {1} CO2 emission, improvement of service and possibly also the development of renewable energy Based on the fact that the long-distance flight aircraft, the Airbus A380-800 and the Boeing 777-300, have a higher need for comfort since the passengers have to stay longer in them, they should be upgraded at first and then the other two aircraft should be raised to the same level, but this decision should finally be based on the benefit of the investment which will be calculated later in the report.

4. Company Financials

4.1. Company Ratios

Statistics of KLM [7],[20]

- Revenue: 9,905 (mio. €), Increase of 2,7% compared to 2014
- Income from current operations: 384 (mio. €), as a % of operating revenue 3.9%
- Earnings on ordinary share: 1.14 €
- Equity: 396 (mio.€)

- Return on equity: 26.8%
- Cash flow from operating activities: 748 (mio.€)

Current ratio

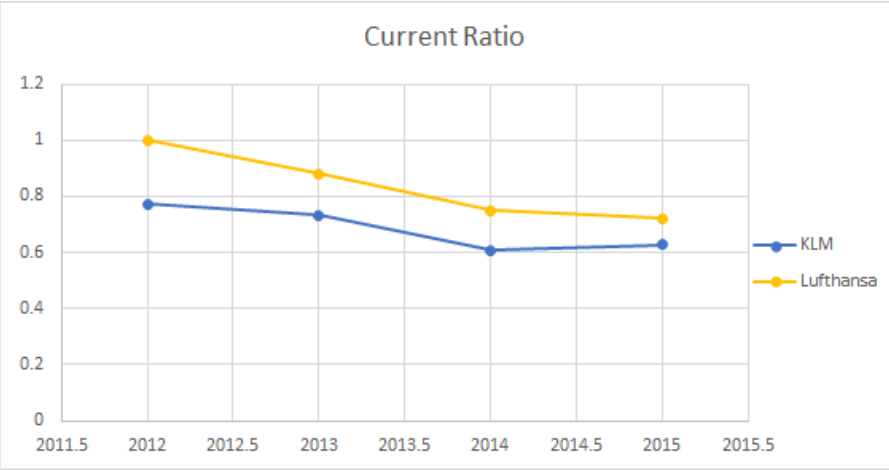

Figure 2: Current ratio KLM/ Lufthansa

(Current ratio KLM: 0.7712, 0.7312, 0.6067, 0.6288,)
(Current ratio Lufthansa 1.00, 0.88, 075, 0.72,)

The current ratio shows and measures a company's ability to pay short-term debts and other current liabilities by comparing current assets to current liabilities. The ratios show the ability of a company to stay debt free. A current ratio of one means that book value of current assets is exactly the same as book value of current liabilities. As we can see in the graph above both, KLM and Lufthansa have a current ratio below 1.00, which means that they have higher current liabilities than current assets. The performance of KLM has been declining compared to the 0.7712 ratio in 2012. Compared to Lufthansa they managed to increase their ratio in 2014 to 2015.

Return on asset, (ROA, also ROI)

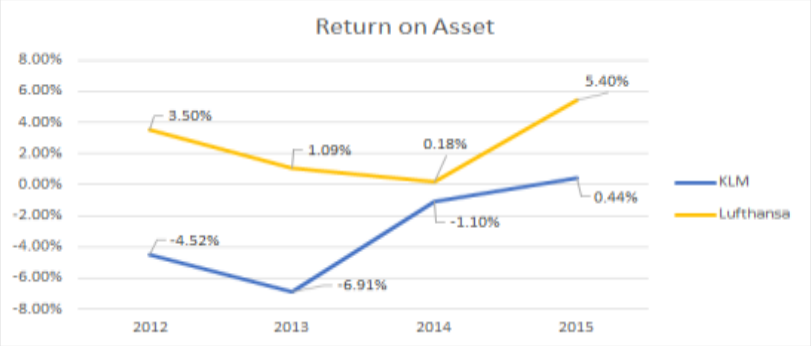

Figure 3: Return on investment KLM/ Lufthansa

The Return on assets (ROA), sometimes also called return on investment (ROI) is simplified an indicator of how profitable a company is relative to its total assets. It also gives an insight on how

efficient and well the management of a company is using its assets to generate income. Calculated by dividing a company's annual earnings by its total assets. As we can see KLM managed to improve their ROI significantly from 2013 to 2015 with a growth of over 7% while one of their main competitors only improved around 5%. The initial problem KLM was facing in 2012/2013 was the general weak market, higher competition in Europe by low budget airlines. They resolved those issues by cutting lots of jobs and placing their market segment more strategically.

$$= \frac{\text{Net Income}}{\text{Total Assets}}$$

Profit margin

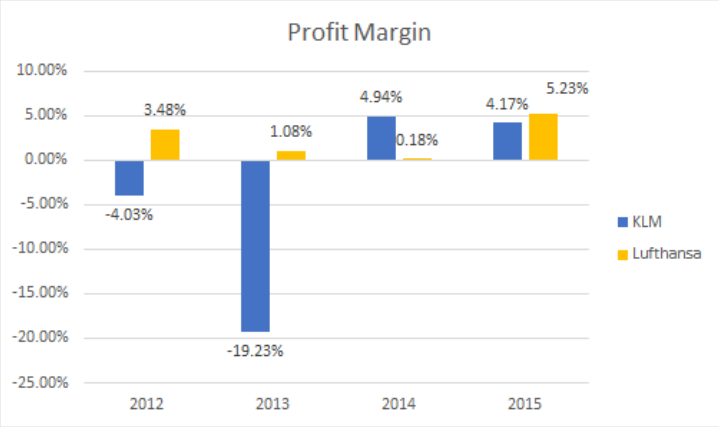

Figure 4. Profit margin KLM/ Lufthansa

Profit margin is part of the most important profitability ratios, calculated as net income divided by net sales/revenue. Profit margins are expressed as a percentage and measures, how much out of every euro a company actually keeps in earnings. A 4.17% profit margin, means the company has a net income of 0.041€ for each euro of total revenue earned. A significant feature is the -19.23% profit margin in 2013, since then KLM has recovered and managed to outscore Lufthansa in 2014 with an approximately 25% profit margin increase. The extremely negative profit margin in 2013 was caused by the same problems described earlier; the generally weak market, higher competition in Europe by low budget airlines. They resolved those issues by cutting lots of jobs and placing their market segment more strategically.

Profit Margin = Net Income / Net Sales (revenue)

4.2. Cost of capital

In order to make any investment a company needs capital. In order to receive this capital, the company needs to spend also a certain amount this is called cost of capital. To calculate the weighted average cost of capital for KLM we need to find out the cost of equity and cost of debt.

Cost of debt

The cost of debt is another important concept as it tells what return lenders require on a company's debt and gives investors an indicator how risky it is to invest in a certain company. Companies with a high risk tend to have a higher cost of debt. To calculate that we used the following formula:

$$R_{d\ (after\ tax)}=R_d\,(1-t_c)$$

R_d is the companies interest rate and t_c the effective tax rate the company has to pay. In our example the tax rate was 31.3% and interest rate was calculated by the interest expense of $258 million divided through the long-term debt of $7682 million [12] of the complete holding. We took just the long term-debt Accordingly, we got interest expense of 3.4%. The cost of debt was 2.3% which is lower compared to the average of 4.05% [E]for the air transport.

$$R_{d\ (after\ tax)} = R_d\,(1-t_c) = 0.0332(1-0.313) = 0.023 = 2.3\%$$

$$R_d = 258/7682 = 0.0332 = 3.32\ \%$$

Cost of equity

The cost of equity will be determined by Capital Asset Pricing Model (CAPM) for Air France-KLM. The Capital Asset Pricing Model shows the relationship between the expected return and the beta of the market portfolio. According to [13], the beta is 0.93. We have a Risk free rate of 0.51 % (treasury average over the last 10 years [14]⇔[15] 4.16%).We took the average rate because the current rate is negative(-2.3%) which would ruin our calculations. The negative rate could be explained by the low ECB-key interest rate (0,00%). The market return R_M is 1.35 % calculated by the opening market value on the 1st of march 2017 divided through the closing market value on the 2nd of January 2017. Compared to the average cost of equity 8.83% [16] in the air transport sector.

$$R_E = R_F + \beta_E * (R_M - R_F)$$

$$R_E = 0.51\ \% + 0.93 * (1.35\% - 0.51\ \%)$$

$$R_E = 1.29\ \%$$

Cost of Capital

After obtaining cost of equity and debt we need to find out the market Value of debt D and the market value of equity.

$$WACC = (1 - t)\ R_d\ (D / V) + R_E\ (E/V)$$

To measure the market value of equity we therefore took all outstanding shares times the average cost of the share of 2015. To measure the market value of debt we took the long-term debt. The firm is described as the sum of those. Based on that data we calculate:

E = $6.63(average cost of share 2015[17])*300219*10^6(outstanding shares [18])

D = $7682*10^6

V = Firm Value = D + E =$1998134 *10^6

WACC = (1-0.313) *0.0332*{($7682 * 10^6) /($1998134 *10^6)} + 0.0129*{(1990451.97*10^6)/($ 1998134 *10^6)} = 0.0129 = 1.29%

Based on the calculations we got a WACC of 1.29% which is compared to the average in this sector of the United States very low as the average is just 6.34% [16] This means that KLM/ Air France has a low cost of using capital to finance the company's operations.

To calculate the cost of capital we made the assumption that there is the same cost of capital for the

whole company KLM/Air France and KLM itself. This is accurate because the cost of capital is given in percent and we assume that both parts of the company will perform about the same. Further we had to compare it to the American Market as they had the best available data to compare to. As the aviation market is usually international we therefore think it is still a very good to compare to.

4.3. Stock Market

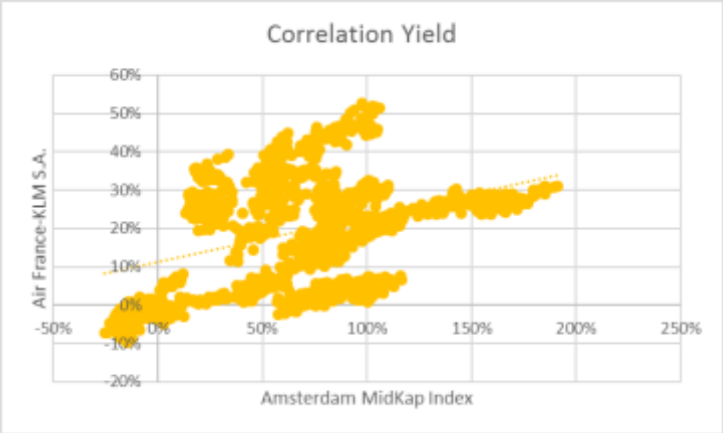

*Figure 5. SEQ Figure * ARABIC 5: Correlation Yield*

If someone wants to determine the extent of linear relationships between a company`s stock return and the stock market return, one has to find an appropriate benchmark Index to compare either the marked value or the performance, because every company/organisation operates in different peer groups, which means you have to find an Index where all kinds of organisations in that specific peer group are represented, to get a good indication of the market situation. During the research for this question, I found no appropriate index specifically for Air France-KLM S.A. and if one seemed quite well than no data was available.

Nevertheless, I took an Index namely the Amsterdam MidKap AMX which include medium-sized companies that trade on the Amsterdam Stock Exchange. The problem with this Index is that the share Air France-KLM S.A. is included, at least a weak correlation can be expected.

The linear relationship analysis was based data in an interval of five years each, given by the comdirect broker. After cleaning the data and match dates to get a better overview one has to calculate the yield for each investment product and run a correlation/regression analysis. (Every calculation can be found in the Appendix). We assumed one bought at the start price 07.03.2012 and sold it at the End price 5 years later. Fees and other costs which emerge buying an investment product are not included in the analysis, because they do not matter and may change the results.

The result of that analysis is that Air France-KLM S.A. and the Amsterdam MidKap (AMX) Index correlating with a coefficient of 0.353. The regression coefficient (multiple square) is 0.353, a weak positive relation. The R-square value is 0.124 which means that only 12.4% of the data fits the regression line or the model. As assumed the relationship is weak and positive.

The correlation coefficients for every price(START/END/TOP/DOWN) for Air France-KLM S.A and the Amsterdam MidKap Index (AMX) during a day where on average 0.352. Important to check because the analysed correlation could be an accident.

Assuming an investment of 100.000€ in each product and calculating the value of this investment for each day or comparing the yield for each day one can see the impact or symptoms of this correlation. In the beginning of April 2012 until the10th September of 2012 both “assets” had negative yields or losses (another indication of correlation).

Explanations for this phenomenon easily be found if one, as mentioned above, take a look in the included shares of the Index. There must be a correlation because the price of the share is a factor in

calculating the price for the Index, by definition. Another possible explanation would be that the KLM share and the other shares in the AMX Index are listed in the Netherlands because all ISIN- numbers start with" NL". So, influences on the Dutch market could be an explanation, a regression or even a small economy crisis.
Summing it up, the correlation is probably caused because the Air France-KLM S.A. share is included in the Amsterdam MidKap (AMX) Index [18] [19].

5. Financial and Non-Financial Analysis

5.1. Non-Financial Factors

Competition: The direct and indirect competitor's recent investments and decisions for regarding an opportunity.

An organization has several opportunities to measure competitor's performance and actions. Firstly and most commonly, through financial reports. Using annual reports, dividend policies, cash flow and ratios such as profitability and liquidity provide a business with useful details about the market they are competing in. Additionally, analyses on competitor's location(s), marketing efforts and their investments give a company insight as to what investments they should or should not make to stay relevant. Additionally, organizations can use media to gain information regarding competitive advantage(s) and operational/branding strategy and use it to their advantage. In this report, we focused on how many of each airplane competitors have actually purchased in aggregate. We excluded orders and only analysed delivered airplanes, as orders can be cancelled leading to error and bias in the calculations.

Government Regulation: The legislation and regulations surrounding the investment opportunity.

The most effective method of measuring these would be to consult with an expert in the field (i.e. a consultant, lawyer). It can be measured by outlining the activities performed or changed as a result of the investment and proceeding to determine any potential externalities and analyse the relative regulations. In this report, we focused on fuel economy, as a major restraint in terms of government regulation is often placed on ecological footprint and pollution.

Customer Satisfaction: The effect the investment will have on the consumer along with the impact on satisfaction from future goods and/or services.

To operationalize customer satisfaction, conducting analyses would be most applicable. Calculations and predicting outcomes through methods like surveys, strategic advertising, questionnaires and data collection from customer patterns/trends can measure the impact an investment will have on the customer base and helps determine whether an opportunity is viable or not. Customer satisfaction is rather complex to quantify, however in this report we focused on the year of the airplane. We assumed that the newer airplanes will contain more up-to-date technology integrated in seats, entertainment capabilities and overall atmosphere. These factors directly shape the experience of a customer and can be improved post-investment; for example, offering higher quality food, updating entertainment, implementing wifi-access.

5.2. Performing the AHP

In Appendix A1, we display the ratings allocated to each non-financial factor. In Appendix A2, the normalized weights are shown. The weights are as follows: Criteria 1 = Competition (19.3% weight), Criteria 2 = Government Regulation (72.3% weight), and Criteria 3 = Customer Satisfaction (8.3% weight). In order to determine accuracy and consistency of the weights and rankings used in this analysis, the Consistency Rate has been calculated as 9%. Since it is below the threshold of 10%, we can assume that the data is consistent. See Appendix A3 for details. Furthermore, we assigned rankings to each non-financial criteria for each investment opportunity. For example, we prefer the A350-900 over the A380-800 with a ratio of 7:1, because it is significantly more efficient in terms of fuel consumption. These rankings can be found in Appendix A4-A6. The outcome of the AHP is shown in the table below; proving that the A350-900 is the most benefit-yielding investment, not taking price into account.

Table 1: Criteria Weights

Investment					
Government Regulation		**Customer Satisfaction**		**Competition**	
72.4%		**8.3%**		**19.3%**	
AIRBUS 350-900	39.0%	AIRBUS 350-900	4.9%	AIRBUS 350-900	0.9%
AIRBUS 380-800	4.0%	AIRBUS 380-800	0.5%	AIRBUS 380-800	6.1%
BOEING 787-9	21.3%	BOEING 787-9	1.9%	BOEING 787-9	6.5%
BOEING 777-300	8.0%	BOEING 777-300	1.1%	BOEING 777-300	5.9%

5.3. Financial Factors

Before any investment can be done, a company needs to think about the financial factors. This is hence important as the company needs to get funding and also that they are able to know how much they can earn from a certain investment.

Initial Cost

The initial cost is one of the most important factors especially if an investment is as expensive as buying an airplane. Here the Monte Carlo simulation does not really help to provide the best solution but a comparison of the market is essential to find the best price and conditions. Also if it seems as a minor factor for the simulation it is necessary to determine a price or initial cost to find out the Net Present Value.

Revenue/ Cost

Next to the initial cost it is important for a company to know how much revenue they can earn with their new investment and how much the running cost are. Here a Monte Carlo simulation helps to give a good estimate of the occurring costs and expected revenues. The cost we are looking on in our project are the fuel cost and the revenue is generate via the ticket price.

Net Present Value/ NPV

The NPV shows the company if an investment is profitable over a certain period or not. Also a company can see when adjusting the period how long their commitment in an investment needs to last to generate profit. Therefore, the NPV is the most important financial factor.

5.4. Monte Carlo Simulation

To estimate which investment will deliver the biggest NPV for KLM we used the Monte Carlo simulation. In order to have a comparable model we used cost per seat * full seats *flights per year to estimate the generate revenue and kerosene price * fuel consumption *range * number of flights to estimate the costs.

For the tickets we assumed that business class tickets cost 1800$ with and standard deviation of 200$ and economy class tickets cost 700$ with and standard deviation of 100$.

The number of seats within the airplane that are business class was assumed to be 30% of the total seats of the plane. Further we need to guess the range each airplane is flying. Here we assumed that the new aircrafts would mainly be used in long distance flights. Therefore, the range in the Monte Carlo could be described as the maximum range times 0.7 with a standard deviation of 0.1 of the maximum range. Also depending on the weather the aircrafts will use more or less fuel so we used a normal distribution with a mean fuel consumption of the airplanes and a standard deviation of 0.02. But not just the kerosene consumption can vary but also kerosene price. As most countries try to keep the kerosene price low in order to prevent from fracking we used a range from the lowest to the highest price from the last two years to estimate the kerosene price. We thought that airlines try to keep the utilisation of an aircraft extremely high in order to gain profit and therefore we thought around 80% of the days of the year an airplane is flying at least once a day. But as it could also be way more and as maintenance can also take quite some time we took a reasonable high standard deviation of 30. Another point that needs to be mentioned is that Airplanes are expensive long term Investments therefore the assumed 5 years for the Monte Carlo Simulation are not fitting. Also we could not find any appropriate depreciation method for Airplanes. Due to that we calculated the NPV value with and without the initial cost to have a better impression of the investment.

6. Evaluation of the Investments

The different investments for KLM are: Airbus A350-900, Airbus A380-800, Boeing 787 9, Boeing 777 300, where Airbus A350-900 and Boeing 787 9 can be seen as investments focusing on short-distance flights and Airbus A380-800 and Boeing 777 300 represent the investment for long-distance flights.

The financial criterions we selected are: initial cost, NPV and fuel cost. Based on these criterions, also non-financial (Government Regulation, Customer Satisfaction, Competition) and AHP and Monte Carlo output ({3}- {6}) the ranking of the four different investments are the following:

AHP non-financial		Monte Carlo	
1.	AIRBUS A350-900	1.	BOEING 777-300
2.	BOEING 787-9	2.	AIRBUS A350-900
3.	BOEING 777-300	3.	AIRBUS A380-800
4.	AIRBUS A380-800	4.	BOEING 787-9

The Airbus 350-900 is the winner for the AHP, so it would be most beneficial for KLM based on the non-financial criterions to invest in this project. For the Monte Carlo the Boing 777-300 is the best investment since it has the highest NPV and considering both methods the more respectable in matter of financial criteria. Comparing these two options we would advise KLM to go with the Boing 777-300, the best option of the Monte Carlo, or even to consider both options the Airbus A350-900 and the Boing 777-300, since both are the best option for each simulation and the Airbus A350-900 is ranking

second best in the Monte Carlo simulation.

An aircraft is a non-current asset since the aircraft will not be sold within a year and will be used several years before a trade-off. So, the total assets will raise by the amount of the investment cost (by €315 million; BOEING 777-300). If KLM pays the investment in cash, the cash at bank will decrease by €315 million, through which the value of current assets will decrease and the total assets will be the same as before the investment. In this case, the total equity and liabilities will not change. KLM could also lend the money for the investment, which would come up as a liability and the total equity and liabilities will raise, while the total assets will increase, too, so that the balance sheet is balanced again. In the Income statement, a successfully implemented investment project creates value to KLM, will increase the income. This would also increase the net income in the profit and loss statement. In any case, this are just assumptions we made, because the investment is also influenced by non-financial criteria we cannot calculate and we also not included a depreciation in our calculations, because we just could have advised a depreciation rate since we do not know how the investment would influence the useful life of the aircraft and therefore the depreciation rate.

7. Conclusion

Based on the Analytical Hierarchy Process, the A350-900 has been evaluated to be the most fuel-efficient and cost effective investment of the four analysed. This was calculated through assigning rankings to three non-financial criteria; government regulation, customer satisfaction and competition. Each investment is then evaluated in terms of these rankings to calculate benefit as a percentage. The results from the AHP showed that the amount of 'benefit' received from each investment are as follows; Airbus 350-900: 44.8%, Boeing 787-9: 29.7%, Boeing 777-300: 15%, and Airbus 380-800: 10.6%.

The Monte Carlo simulation took three financial criteria into account; net present value, fuel costs and initial costs. As a result, the Boeing 777-300 has been calculated to be best investment of the four. The Airbus 350-900 placed second, by a small margin.

In conclusion, if KLM were to invest in one of the four airplanes, we recommend the Airbus A350-900. This investment it is the cost-effective, highest benefit-yielding and most environmentally friendly option from the opportunities analysed in this report.

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III. Reflection on decision making

When it comes to a decision-making process, for example in a project development process, one has to be aware of several cognitive biases. In general, a bias occurs when executives depend on data collected or given by humans. Decisions based on biased evaluations could lead to enormous damage, but if executives are aware of these biases and try to avoid them, these decisions can lead to great success.

In the article "The big Idea" published in "Harvard Business Review" on June 2011, several biases were introduced based on these findings the decisions and results made in the KLM-report will be reflected.

The first bias is the "Self-interest Bias", it describes errors which occur when self-interest or other motivations drive recommenders. On the one hand, one could argue that our group is biased because we are highly motivated to get a good grade. On the other hand, a good grade is based on a good report not necessarily on a practical or applicable results.

The second bias is the "Affect Heuristic" bias, it describes a cognitive process in which people tend to minimize risks and exaggerate benefits. In the report, especially in the Non-Financial Factor & AHP section, these kinds of biases or errors might occur, because it is hard to estimate factors where no data is available or can be set.

The third bias is the "Confirmation Bias" a bias which occurs when not all facts are evaluated in an objective and rational way. We had a very limited amount of time to finish our project and we are no specialists yet. For example, the investment idea of buying new aircrafts has a Confirmation Bias, it was not possible to look at all types of planes or find every weak spot of the selected ones. One need to have a lot of experience and knowledge to evaluate these complex machines properly.

The fourth bias is the "Availability Bias", a bias with referring to the availability of information or data. In order to, face this bias we used publicly available information from databases without own interest the comdirect broker for example, we used for stock information, is not allowed to manipulate values of investment products by law.

The fifth bias is the "Halo Effect" bias, refers to Phil Rosenzweig`s book "The Halo Effect", it occurs when we see something simpler and more emotionally coherent as it really is. KLM is a huge organisation and its leaders are professionals and made KLM to what it is today, because of that we assumed the management has their business under control and the capabilities to invest in new aircrafts.

The last and maybe greatest bias is the "Anchoring Bias", it is based on the used data and where it came from. In the Monte-Carlo analysis we used assumptions to estimate the NPV, we estimated relevant factors for the Monte-Carlo such as Flights per year or the distribution of business and economy class seats. Estimating such important information may lead to biased investment decision or even a wrong one.

Summing it up, one can say that the report is relatively biased. We just pointed the biggest biases, because of the limited amount of words, but there are more (e.g. "Saliency Bias","Overconfidence Bias", "Competitors Neglect Bias").

IV. Appendix

{1} Further Investment Ideas:

KLM should reduce their CO_2 emission and develop renewable energy ideas, because this is a major theme in all business sectors. Regarding that KLM is an airline and airlines have the image that they have a high CO_2 emission, KLM should invest in this project to stay competitive or get a competitive advantage. By investing in renewable energy development, KLM would gain another competitive advantage and contrast from other airlines.

Also, if the prices for a flight with KLM will raise on this account, people are willing to pay more if it is more environmentally friendly than a cheaper flight.

To exploit new customers, and bind customers in general, KLM should invest in connections. They have a large range of connections and also of small airports, but if they expand this range, they expand their range of connections other airlines do not have and therefore reach more customers. Nevertheless, they must prove whether a connection is profitable or not. If a connection is not profitable, KLM could offer an option to show alternative connections through which customers still can reach their final destination.

The reason for investing in service improvement is that KLM have to confirm and expand their competitive advantage consistently. Otherwise other firms can more easily close up to KLM.

Social improvement can be a profitable investment since social responsibility is just the same major theme as CO_2 emission and renewable energy. By investing in social improvement the image of the company gets better and this will result in more customers and higher profit most of the time.

{2}

Appendix A

A1 - AHP Criteria Ranking

	C1	C2	C3
C1	1.00	0.20	3.00
C2	5.00	1.00	7.00
C3	0.33	0.14	1.00
SUM	6.33	1.34	11.00

A2 - AHP Normalized Weights

Normalized	C1	C2	C3	Weight
C1	0.15789474	0.14893617	0.27272727	0.19318606
C2	0.78947368	0.74468085	0.63636364	0.72350606
C3	0.05263158	0.10638298	0.09090909	0.08330788

A3 - Consistency Ratio

Lambda MAX	3.111463701
Criteria	3
CI	0.05278977853
RI	0.58
CR	0.09101685954

A4 - Rankings for Government Regulation

GOV. REGULATION		HIGHER = BETTER		
	A350-900	A380-800	787-9	777-300
A350-900	**1.00**	7.00	3.00	5.00
A380-800	0.14	**1.00**	0.20	0.33
787-9	0.33	5.00	**1.00**	5.00
777-300	0.20	3.00	0.20	**1.00**
SUM	1.68	16.00	4.40	11.33

A5 - Rankings for Competition

COMPETITION		HIGHER = BETTER		
	A350-900	A380-800	787-9	777-300
A350-900	**1.00**	0.20	0.14	0.33
A380-800	5.00	**1.00**	0.25	4.00
787-9	7.00	4.00	**1.00**	0.17
777-300	3.00	0.25	6.00	**1.00**
SUM	16.00	5.45	7.39	5.50

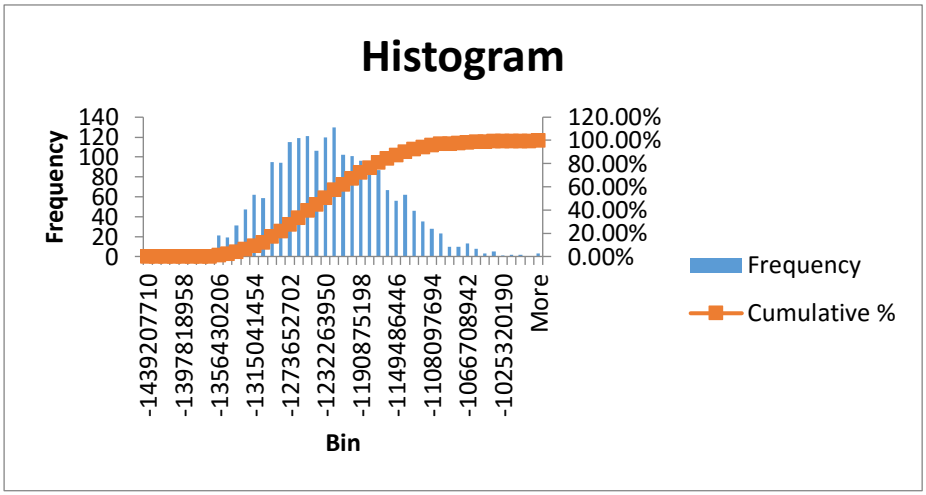
A6 - Rankings for Customer Satisfaction

CUSTOMER SATISFACTION		HIGHER = BETTER		
	A350-900	A380-800	787-9	777-300
A350-900	**1.00**	7.00	5.00	4.00
A380-800	0.14	**1.00**	0.20	0.33
787-9	0.25	5.00	**1.00**	2.00
777-300	0.20	3.00	0.50	**1.00**
SUM	1.59	16.00	6.70	7.33

A7 - Cost-Benefit Analysis

	BENEFIT	COST (Millions of USD)	COST(EUR)
AIRBUS 350-900	44.8%	287.7	269.2872
AIRBUS 380-800	10.6%	403.9	378.0504
BOEING 787-9	29.7%	243.6	228.0096
BOEING 777-300	15.0%	315	294.84

{3} AIRBUS A350-900



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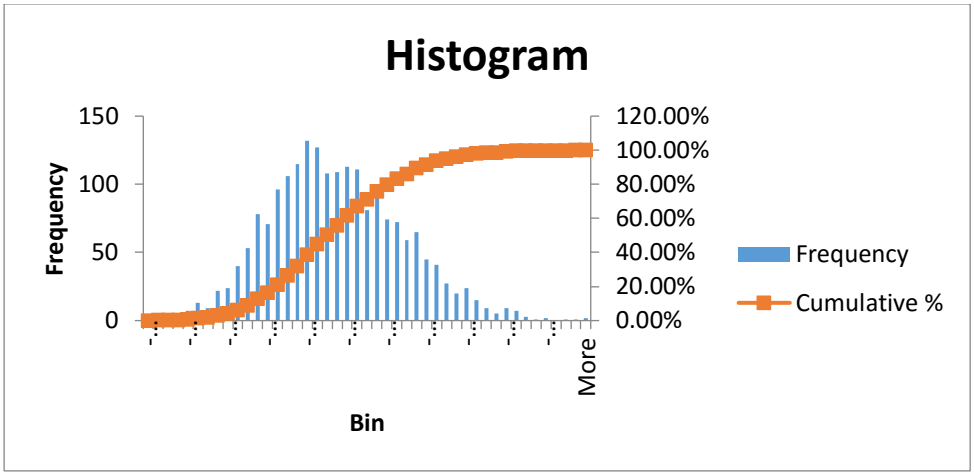

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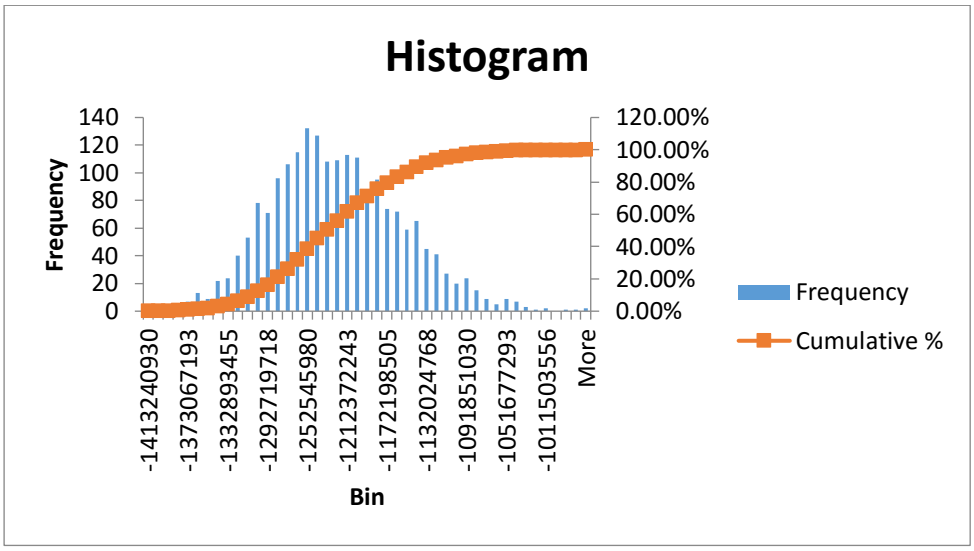

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