St. Petersburg State University

Graduate School of Management

Master in Corporate Finance Program

**DRIVERS OF VALUE CREATION (ON THE EXAMPLE OF PULKOVO AIRPORT)**

Master’s Thesis by the 2nd year student

Concentration - Corporate Finance

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**ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ**

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 May 26, 2018

**АННОТАЦИЯ**

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| Автор | Воловик Мария Вячеславовна |
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| Описание цели, задач и основных результатов | Цель работы-оценить влияние финансовых и нефинансовых факторов на стоимость компании "Воздушные Ворота Северной Столицы" и разработать рекомендации для развития аэропорта в будущем с целью увеличения его стоимости.Задачи исследования: изучить теорию управления бизнесом на основе стоимости и его роль в компании; изучить виды показателей результатов деятельности; выбрать модель оценки компании; проанализировать сферу деятельности аэропорта и его стоимостные драйверы; провести финансовый анализ выбранной компании; оценить влияние финансовых и нефинансовых факторов на его стоимость; сделать выводы и сформулировать рекомендации.Результаты: изучена теория ценностно-ориентированного менеджмента, проведен отраслевой и финансовый анализ и выявлены возможные стоимостные драйверы, с помощью регрессионного анализа сформулированы и выделены значимые драйверы, даны рекомендации по их совершенствованию. |
| Ключевые слова | Ценностно-ориентированный менеджмент, показатели эффективности, драйверы стоимости, аэропорт  |

**ABSTRACT**

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| Faculty  | Graduate School of Management |
| Main field of study  | Corporate Finance |
| Year  | 2018 |
| Academic Advisor's Name  | Loukianova A.E. |
| Description of the goal, tasks and main results  | Research goal of the work - to assess the influence of financial and non-financial drivers on the value of “The Northern Capital Gateway” and develop recommendations for future decisions.Research objectives: find out what is value based management and its role in the company’s business; learn types of VBM measures; choose the model to value the company; analyze airport business and its value drivers; make financial analysis of “Northern Capital Gateway; assess the influence of financial and non-financial drivers on the value; make conclusions and formulate recommendations.Results: VBM theory was studied, industry and financial analysis were made and possible value drivers were identified, with the help of regression analysis these drivers were stated and significant one were highlighted, recommendations for their improvement were given. |
| Keywords | Value-based management, performance metrics, value drivers, airports |

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# **INTRODUCTION**

At some point of its development, every company meets with the necessity to value its business or part of its business. Aims for that can be quite diverse- selling the business, merges and acquisition deal, application for credit, issue of the share, liquidation etc. Moreover, all investors are as well interested in higher company’s value cause for them it means that they can get higher return on their investments. That is why it is essential to enhance firm’s value on any stage of development.

However, what is also important is that now companies start to assess the value of enterprise for internal purposes of the business. One of the most popular ideas currently is the use of the company’s value as a performance measurement. The concept, which puts the increase of the value on the top, is called Value-Based Management.

The implementation of Value-Based Management in the process of managing the firm generally lays in the understanding and accepting by the firm’s managers and employees the philosophy of value and its development. The building of such systems requires fulfillment of several steps- company’s financial analysis, choose of the performance metric which meets specifics of the company and industry and development of the system of value drivers. Only after this, it is possible to go for development of the strategy of the company, questions of finance and corporate management.

The value of the company is the main factor and criterion of efficiency of management decisions. The company value management involves a constant search for solutions, providing the most dynamic growth in their value.

From day to day, company’s management at different levels of organization make decisions that at the end somehow will affect the firm’s value. The problem is that managers forget about the existence of the link between made decisions and change in the value of the enterprise. However, without that link company is doomed to fail to improve the most important measure of success.

Maximization of the company’s value is one of the major strategic goal of firm’s development, which is widely spread all over the world. Every company that is aimed for success should set its long-term goal as a maximization of its value on the market, which is rather logical but quite complicated aim. Company should assess every factor that can somehow influence its value on the market- profitability of the business, cost of the assets, possible risks etc.

Every owner of the company is interested in the growth of the company either in order to sell it for more money or to go into the public and be able to compete on the market. Moreover, all investors are as well interested in higher company’s value cause for him it means that he can get higher return on his investment. That is why it is essential to enhance firm’s value on any stage of development.

For being able to archive the stated goal there should be created the strategy of development, which is individual for every company and depends on its business, size, assets, resources etc.

In the last twenty years’ managers faced with lots of challenges in adopting new ways that are designed in order to keep in touch with the changing environment and correcting flows in existing structures and tools.

In these cases, a useful instrument for every enterprise will be the application of Value Based Management conception, which represents an integrated control system used by managers in order to create net worth.

The subject of the work is the company’s value and drivers, which can lead to the increase of the value. The object of the study is airport Pulkovo that is currently called “Northern Capital Gateway”

The main research goal of the work is to find out the link of financial and non-financial drivers to the value of “The Northern Capital Gateway” and develop recommendations for future decisions.

The topicality of the work is confirmed by the fact the concept of VBM won the population among managers of the companies from the end of the 20th century. Such big and multinational companies as Coca-Cola, The Bank of America and IBM. A lot of scientific and business literature is devoted nowadays to the questions of Value Based Management.

This research work has possible managerial implementation which in concluded in the fact that the results are useful for the company for the realization of the value based management. Moreover, the research sets the further base for studying value-based management in airport sphere.

Research objectives:

* Find out what is value based management and its role in the company’s business;
* Learn types of VBM measures;
* Choose the model to value the company;
* Which drivers influence the value of the company;
* To analyze airport business and its value drivers;
* To make financial analysis of “Northern Capital Gateway;
* To assess the influence of financial and non-financial drivers on the value;
* Make conclusions and formulate recommendation;

Based on the relevant literature review, financial analysis and industry specifics the following hypothesis of drivers relation to dependent variable were stated by the research work:

1. Share of aviation revenue is positively related;
2. Leverage is negatively related;
3. ROIC is positively related;
4. ROA is positively related;
5. Passenger turnover growth is positively related.

The main part of the research work consists of three chapters. The first chapter is devoted to the theoretical background of the value-based management concept. The chapter describes the main definitions and metrics of VBM, as well as the stages of implementing a value-based management system. The comparison table of different VBM indicators is provided.

The second chapter of the work is devoted to the industry overview, identification of industry drivers as well as it concentrates on the strategic and financial analysis of Pulkovo airport. The results of financial analysis help to choose the VBM performance metric and identify factors that can be considered as drivers of creating value.

The final third chapter of this work describes the methodology of the carried analysis and states the used model and research tools. Further, the model is tested and significant variables are identified for the company’s value. Recommendations are given for the improvement of those factors.

The conclusion summarizes the conclusions of the relevant chapters, as well as the results obtained in the work.

The theoretical and methodological parts of the research work are based on the work of the authors dealing with issues of the theory of value-based management, as well as industry specifics. In preparing the final qualifying work, the works of both foreign and domestic authors were used, such as T. Copeland, T. Koller, A. Ameels, D . Volkov, P. Malighetti etc. In addition, the work used materials of specialized journals, which sanctify the problems of valuation and management of the value of companies and reveal the situation in airport market. In preparing the practical part of the work, Northern Capital Gateway's reports were used, as well as from authorized internet resources.

# **CHAPTER 1. OVERVIEW OF VALUE-BASED MANAGEMENT**

## **1.1. Theoretical background for VBM approach.**

Valuation can be considered as a heart of finance in all cases-from the market efficiency studying to questions related to governance of the firm and comparison of various rules for making decisions on investment in the budget of the capital.

Maximization of the company’s value is one of the major strategic goal of firm’s development, which is widely spread all over the world. Every company that is aimed for success should set its long-term goal as a maximization of its value on the market, which is rather logical but quite complicated aim. Company should assess every factor that can somehow influence its value on the market- profitability of the business, cost of the assets, possible risks etc.

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For being able to archive the stated goal there should be created the strategy of development, which is individual for every company and depends on its business, size, assets, resources etc.

Mostly the value of the company is determined by its growth, which includes expanding the amount of sales, opening new affiliates, improvement of equipment, assets growth and so on. That means that in day to day business managers of the company face situations when they have to make crucial decisions about doing investments or not. Every person in the company should understand that every investment decision must be aimed on creating and increasing the value of the company in long-term or short-term perspective.

From day to day company’s management at different levels of organization make decisions that at the end somehow will affect the firm’s value. The problem is that managers forget about the existence of the link between made decisions and change in the value of the enterprise. However, without that link company is doomed to fail to improve the most important measure of success.

In the last twenty years’ managers faced with lots of challenges in adopting new ways that are designed in order to keep in touch with the changing environment and correcting flows in existing structures and tools.

In these cases, a useful instrument for every enterprise will be the application of Value Based Management conception which represents an integrated control system used by managers in order to create net worth.

### **1. 1.1. VBM-definitions**

Interest in value-based management was driven by the growth of investments of institutional investors in the capital of large companies in the early 1990s, which entailed a natural need to create convenient and most reliable criteria for the financial performance of companies. Moreover, in the case of European companies, there was a significant deviation in the value of capital payments to shareholders compared to American companies. In addition to these factors, there were others, such as, for example, the growth of financial markets in the early 90-ies.20th century, which ended in the end with a sharp drop in the price of shares of Internet companies. (Mottis, Ponssard, 2009)

Basically Value Based Management takes its roots from the use of discounted cash flow model (DCF model) in valuation of the company which was especially captured by Modigliani-Miller way to assess firm’s value. VBM as a tool used widely by managers was developed later. The evolution of VBM can be divided into three parts:

1. 1980s. Companies started to use cost of capital as a performance measurement in value metrics in order to assess economic profit.
2. 1990s. Concept of Economic Value Added was developed by two consultants- Joel Stern and Bennett Stewart. EVA became one of the leading value based performance tools
3. 2000s. Theory of Competitive Value Management was published by Hermann Stern. Later he developed methodology of financial benchmarking and created Operating Alfa metric with Keating Coffey, which was used as a measure of operating outperformance.

Value Based Management concept was differently designated by many authors who were developing it but in general they all were driven by the same idea.

For example, Marsh described VBM as a framework that measures and manages the business in order to create long-term value for company’s shareholder. The reward of it is based on increase in price of the shares and growth of the dividends paid. (Marsh, 1999)

Bannister and Jesuthasan saw Value Based Management as a concept that is based on the understanding that maximization of the shareholders’ value is a key objective for all publicly traded companies because it gives the firm an organized and logical way to make improvements in the value for shareholders. (Bannister and Jesuthasan 1997)

Other two authors describe VBM as phenomenon that in put in the management philosophy based on running the firm according to Economic Value Creation principles. (Armitage and Fog, 1996)

All definitions above are describing the final output of the VBM. Nevertheless, there is also another group of authors that look at VBM as focus more on the mix of outcome and process.

KPMG company states that VBM is an approach that puts the value of company’s shareholders in the center of the business and its maximization rules strategy of the firm, its organizational structure and processes as well as it establishes the measures used to control performance. (Ameels, 2004)

Arnold said that objective of the company, its strategy, performance measures, processes and culture should be aimed at shareholders value maximization and VBM is an approach that put this objective in the center. (Arnold, 1998)

Ryals defined VBM definition as following- VBM is a new approach for managing that is concentrated only on real wealth creation and not just profit written on paper and a real wealth can be created only when firm is able to make returns that will compensate the total cost of investors and will provide an additional premium for taking risks. (Christopher and Ryals, 1999)

Even though there are many definitions of value based management in general we can define VBM as a managerial tool that targets to establish the link between day to day managerial decisions and company’s value in order to add the wealth of the shareholders and consistently increase the economic value.

Value Based Management helps to ensure the link between the decisions being taken and their influence on the value of the company by providing tree important things:

1. Management component.

VBM establishes a process that establishes link of daily management and strategic goals of the firm. VBM plays the role of a system that integrates resources and current issues towards the stated aims achievement (Ameels, 2012);

1. Wealth maximization.

The main purpose of VBM is to create as much value added as it is possible. So it concentrated on the best resources allocation in order to get best outcomes. VBM uses better measurement of company’s performance that overcomes the gaps in traditional accounting and performance management.

1. Approach.

VBM provides a philosophy that puts creating the company’s value into the heart of all operational decision- making;

The basic principle that lays under VBM is the model of discounted cash flows used to assess the value of the firm. In other words, the value can be created only when an enterprise invests money at the return that will be higher than the cost of capital invested. In his book Copeland suggests that VBM is focusing on better decision making by using it on all levels of organization and asks managers to use performance measure that are value based for providing the best solutions. (Copeland,2000)

Moreover, Todorovic in his work states that such performance oriented measures are helpful for managers because they can clearly see and understand how the value is created. At the same time, Kalicanin supports the idea of such measures by pointing out that they also provide additional motivation for managers in the process of selecting and implementing the options that increase the value of the firm. (Todorovic, 2012)

The process of wealth creation requires a good understanding of the market and industry perspectives and threats where the company competes. After the understanding is set it should be linked with the main drivers in the value chain that influence profitability and cash flows. That steps helps to set the strategy of decision making for the future thus providing the company with competitive advantages.

### **1.1.2. Role of VBM in the company**

 If the company is able to use VBM to the full, firm’s management procedure will fulfill decision-making at all levels of organization with relevant and full information and desire to value creation. (Koller, 2006) VBM will provide the manager with information on the base of which he can make a comparison of different strategies and assess them in terms of value creation. This incentive will appear due to specific financial targets that are set by managers of a higher levels and the process of reviewing the process between different managers of the firm. Moreover, manager’s KPI is also somehow based on his ability to create wealth for the company in short and long run.

 At the same time, at the head of the company, Value Based Management keeps the board of directors updated of the efficiency of the strategy and helps them to assess opportunities on mergers and acquisitions and diversification.

 The problem with which every manager faces is the proper allocation of scare resources. This problem is solved by the implementation of VBM that establishes common goals, standards, processes and language in order to coordinate actions and taken decisions. Moreover, VBM set a common view on revealing and prioritizing important issues and business opportunities, assessing the options, allocating different types of resources and behaving in accordance with corporate set of approaches to understand drivers on company’s value. (Smith, 2008)

 A company that wants to implement value based management will have to go through 6 steps. (Picture 1)

Picture 1.VBM process (Smith, 2008)

1. Identification of the objectives of the company

The first step for every company that wants to succeed on the market is to set clear and adequate objectives. In terms of VBM the main objective for the firm is clear-maximization of the wealth for company’s shareholders.

1. Strategy and organizational design development

Implementation of the strategy will be different on different levels of organization.

At the highest level of the company if we speak about VBA concept, the senior managers develop the strategy that aims the maximization of the overall wealth of the organization.

At the second level of the company, strategy is usually about searching for alternative strategies, their evaluation and making the choice for the one that brings the heist value. The strategy should show how competitive advantage that creates value will be achieved by the business unit. That can be only possible after making a broad analysis about the market, competitors, company’s strong and weak points, opportunities and possible threats.

1. Identification of value drivers

Deep understanding of the variables that measure performance and that in general are creating the wealth of the firm is the important part of value based management. That represent the main value drivers for the company. This is of a big importance because company itself can’t create value from nothing but it can act in the way that it can influence the thing that result in the increase of the company’s value- costs, infrastructure, product diversity, services, corporate culture etc. (Koller,2006)

What is also important here is that through these value drivers senior managers can learn how to organized the work of a lower managers and set a particular goals for them.

But in order to use value driver efficiently they have to be organized in such manner that employees can see which of them have the biggest impact on value and can allocate responsibility for managing these drivers to workers that understand how to influence them in a better way.

For the better use of drivers, it is useful to define them in the most detailed way so that it can be easily seen at which levels will can influence the final result.

1. Development of action plans, measurement selection and target setting

When the strategies are agreed, they should be converted into particular targets. These targets are the way for managers to show what they want to get at the end. If there will be no targets the company would not know whether it goes in the right direction or not.

 In VBA context setting the targets should follow several principles:

* Delegate targets to different organizational levels;
* Form targets based on the revealed main value drivers;
* Short-term and long-term targets should be bonded.

Action plan is a tool that transforms the strategy into several steps that company should take in order to reach the objective. That is especially related to short-term one. This plan specifies the action that the firm will do to accomplish the goals.

1. Performance evaluation

Performance assessment helps to track the course in reaching the set targets and motivate managers and employees of different departments to work harder. Key principles for performance evaluation are:

* Set different performance dimensions to different business units;
* Make a combination in the evaluation as of operating and as of financial efficiency;
* Connect productivity measures to business unit’s short and long-term tasks;
* Use performance measurements that include early warning signals
1. Increase shareholders value

VBM, at the end leads to encouragement of managers to create processes that maximize value for shareholders of the company and in general that also doesn’t go in to a conflict with firm’s stakeholders if VBM is also mixed with some socially responsible practices.

What is also important to mention is that value can be considered as one of the best performance measurements because it is the only measurement that needs to have full information about the company. To learn the value creation a manger should be able to implement a long-term strategic vision, be able to manage cash flow and balance sheet movements and understand how to compare cash flows from different periods of time. According to Copeland no any other performance measure requires full information about the company. (Copeland, 2000)

An essential point in VBM is that the value of the organization is dependent on the investment decisions taken by company’s managers. The wealth will be created if and only if the return on the made investments is more than cost of capital for investment project. From that side it is also important to understand what is investment strategy and how it influence the company’s business.

## **1.2. VBM performance metrics**

In the last years, there has been seen an increasing interest in value based performant metric for business approach towards goal achievement. The reason for that is that they are based on a specific metric-value. There are several performance metrics, which were developed by different companies: BCG, McKinsey &Co, Stern Steward&Co, LEC/Alcar Consulting Group etc.

The selection of a periodic indicator of the company's performance is an important stage of the value-based management evaluation module. On the basis of the chosen indicator, the second stage is carried out – the construction of the value creation driver system – by "opening" the indicator in the form of a tree of value creation factors.

Within the framework of value-based management, one or another criterion distinguishes a number of indicators, which companies can choose for themselves as a key periodic indicator of the effectiveness of performance.

### **1.2.1. Overview of performance metrics**

 In his work Volkov described and classified all VBM measures into three groups:

1) Based on the balance sheet measures;

2) Based on the cash flows;

3) Based on the market values. (Volkov, 2005)

VBM metric

Mixed base

Balance value

Cash base (cash flows)

Market value

TSR

MVA

RI on MV

NEI

SVA

CFROI

CVA

ReOI;EP

EVA

RE; EP

Residual Income

Picture 2. VBM metrics classification (Volkov, 2005)

1. Residual Income model supposes that the fundumental value of the company’s capital depends on four factors:
	1. Actual yield on the capital;
	2. Required yield on the capital;
	3. Stability of spread results;
	4. The value of invested capital.

In genaral that leads to the fact that the fundamental value will be based on two things: book value of the capital at the moment of valuation and discounted flow of residual earnings (the second is also named as market Value Added).

|  |  |  |
| --- | --- | --- |
|  | RI=$π\_{j}$-k\*$I\_{j-1}$ | (1) |

where π is balance profit; k-required yield on capital; $I\_{j-1}$-value of investments at the beginning of the year.(Volkov, 2005).

Depending on the company’s attitude towards investments, there are two types of residual income: operational or net.

1. EVA is a metric of economic profit, which is calculated by subtracting a cost for using total capital (equity, debt and hybrid forms of financing from NOPAT of a company. The principle of EVA states that the real profit of the organization does not appear after paying all debt cost but only after the shareholders also were rewarded with sufficient return on their capital invested. (Hundal,, 2015).

Eva is different from the other performance measures such as ROIC, EBITDA and EPS by the fact that it evaluates costs both from operating and financial activities of the company. Due to this EVA is considered the measurement that is mostly aligned with value creation for the shareholders.

(Salaga, 2015)

|  |  |  |
| --- | --- | --- |
|  | EVA=NOPAT –WACC\*CI | (2) |

where NOPAT-net operating profit after taxes, WACC-weighted average cost of capital, C-capital.

1. Market Value Added (MVA) is calculated as a difference between the market value on the date of calculation and the capital invested. If the value is positive, then the company created added value and if it is negative then the firm has ruined the value. Added value should be higher than the value that investors could have got if they invested money into the market portfolio with the adjustment for the leverage of the company relative to the market. (Chandrasegaran,2015)

|  |  |  |
| --- | --- | --- |
|  | MVA=V-C | (3) |

where V is the current value of the firm (debt+ equity), C-capital invested in the company.

1. Cash Flow Return on Investments (CFROI) presents an internal rate of return for already made investments. For its calculation several value are needed: cash flows, assets value, their useful life forecasted cash flows and residual value of assets. Mostly, CFROI looks like a modified version of IRR. If CFROI is higher than WACC that means that the company is creating new value. The general formula for CFROI looks like:

|  |  |  |
| --- | --- | --- |
|  | CFROI= $\frac{CF\_{adj}}{CI\_{adj}}$ | (4) |

where $CF\_{adj}$- cash flows adjusted on inflation, $CI\_{adj}$- cash investments adjusted on inflation.

 This formula gives only a general view on calculation of the CFROI. For more correct numbers we should use several parameters: gross investments, gross cash flows, useful time of assets, salvage value of assets. (Bartley, 1998)

1. Shareholder Value Added (SVA) is focused on the change of shareholder’s value which is associated with operational results of the business and investment decisions made during the period of assessment. To calculate SVA one should find first the residual value of the business and net cash flow, where NCF is the difference between EBI and Incremental Investments and residual value is considered to have no growth and is found as EBI divided on WACC. (Mahmoud,2012). Compared to EVA SVA may be more useful for managers because it helps them to see the dynamic of wealth creation. (Mills and Print,1995)

|  |  |  |
| --- | --- | --- |
|  | $SVA\_{n}$= PV $NCF\_{n}$+([PV $RV\_{n}$-PV $RV\_{n-1}$]) | (5) |

1. Cash Value Added (CVA) is showing residual cash flows, which were generated by investments into organization. There are two ways for calculating CVA but the one created by BCG is used wider.

|  |  |  |
| --- | --- | --- |
|  | $CVA\_{n}$=$CBI\_{n}-NA\_{0}-WACC$ | (6) |

where CBI is a cash flow before interest, NA-net assets (initial costs). CBI is the same as EBI but is uses economic depreciation instead of accounting one. Followers of this approach consider that MVA is CVA discounted on the WACC. (Volkov, 2005)

|  |  |  |
| --- | --- | --- |
|  | $CBA\_{n}$=$EBI\_{n}+Dep-ED\_{n}$ | (7) |

1. Total Shareholders Return (TSR) which represents the change in the value of capital of the organization in one year adding dividends. It is also seen as a return on the whole business.

TSR shows the whole return that a shareholder gets for the whole period of owning the stock if he always reinvests his dividends into a new shares of the company. TSR can show as a long term metric of all effects that the investor got during the period of owing the shares as a measurement of the company’s results during the stated period. (Ameels, 2002)

 All metrics above can be compared on the base of three parameters: if expectation on the future results are included; complexity of the metric; opportunity to form the system of drivers of a new value. (Table 1)

Table 1. Comparison table of performance metrics (Volkov, 2005)

|  |  |
| --- | --- |
| Metrics | Parameters |
| Included expectations | Level of complexity | Opportunity to create system of drivers |
| RE | Not included | Low | High. Drivers can easily be created for all organizational levels. |
| ReOI | Partly included in the expected capital structure and rate | Low | High. Drivers can easily be created for all organizational levels. |
| EVA | Partly included in the expected capital structure and rate | Medium | High. Drivers can easily be created for all organizational levels. |
| MVA | Included | Medium | Low. Metric shows only result on the corporate level. |
| CFROI | Included | Very high | Low. Difficult to make system of drivers. |
| SVA | Included | High | High. Drivers can easily be created for all organizational levels. |
| CVA | Partly included in economic depreciation  | Medium | High. Drivers can easily be created for all organizational levels. |
| TSR | Included | Low | Low. Metric shows only result on the corporate level. |

###  **1.2.2. Best VBM practices for aviation sphere**

 Airports long ago became one of the essential parts of our life. Passengers arrive by plane to the airport and then take ground transport for further moving or change the flight and vice versa. This simple definition could describe airport ten or more years ago. By now, the growth in demand for air transportation had led to the increasing complexity of the airports’ system. (Andersson, 2013)

Large airports today are playing important part in the development of the city where they are located and for airlines and industries that are dependent on the airport performance. That means that airports should be efficient and reliable. Moreover, nowadays airports provide a lot of additional services in order to increase customer’s satisfaction and provide comfortable environment for different kind of travelers- tourists, families, business people etc.

One of the main factors that can help the airport to succeed in meeting all the required standards and achieve even more is the use of performance metrics. Without them it is difficult to assess the current performance and discover the areas that need improvement.

Measuring performance on of the key tasks as for the individual airport as a whole, as for the broader levels of system. Government and managers of the company are in need of the information in order to be able to evaluate the efficiency of the business from operational and financial points to assess different investment strategies, to maintain the safety of the airport activity and to control the impact on environment. (Humphreys, 2002)

 Performance measures can be also used by managers in the airport to discover areas in which the airport is doing well and the one in which everything is not that great. Once performance is identified, manager can look closer to the underlying process and decide which actions should be taken in order to correct the situation. (Graham,2001)

 The survey carried out by Francis and Minchingston on the base of airports in UK and Eupope, showed that financial metrics of performance that are used in the airports reflect the metrics stated in classical literature. The findings also showed that some change in the use of financial measurements was perhaps driven by the commercialization of the airport business. (Humphreys, Francis and Fry, 2001).

 The survey revealed that airports use quite varied list of performance measures. It was clearly seen that such traditional measures as profitability and cash flow are mostly used one but at the same time also new measures appeared on the list such as SVA, EVA and balanced scorecard, which were considered by the majority of the airports studied. The increased use of SVA and EVA can be explained by the development of a commercial aspect of the airport business. (Graham,2001)

## **1.3. Drivers of value creation**

The value of any company is always dynamic but it is clear that for a firm the direction of its growth is essential. For knowing in which way and how much the value of the company will change in the future, it is necessary to know which factors (drivers) will be affecting it. In order for these factors be useful for management of the company, they should be divided into particular parts that can be controlled by managers on different levels.

The definition of value driver is seen as any variable that can influence the value of the company. Drivers are factors that can lead to creating or destroying of the value. (Kazlauskienė & Christauskas, 2008).

Classification of value drivers differs a bit from author to author. J. Ral and S. Kouen defined five factors of value while A. Rappaport. A. Black and some others highlighted seven drivers of value creation- sales growth, profit margin, taxes, working capital, capital expenditures and period for creating competitive advantage. R. Terner also added the 8th factor- return on capital. Other author identified drivers directly from the model used to calculate the value.

Moreover, all value drivers can be divided into several groups. A. Rapport stated three levels of drivers- operational, investment and financial while R. Scarlet also adds a group of intangible drivers. (Kazlauskienė & Christauskas, 2008)

Construction of a system of value drivers is carried out by serial decomposition of the key periodic performance indicator of the company through drivers of different levels. The resulting system represents a "tree" of value drivers, consisting of financial and operational levels, and allows to highlight elements that affect the value of the company both in the daily activities of the company, and in its investment decisions.

According to Copeland, the system of value drivers is an important managerial tool for the company for the following reasons:

* This system allows managers and employees to understand clearly what factors lead to the creation and increase of the value of their company;
* The factors of value creation show the priority directions of the company, allowing making decisions that deliberately increase the value of the company;
* The system of factors, brought to all levels of the organization, allows to create a common understanding of the priorities of the company's managers and employees. (Copeland, Koller, Murrin, 2002)

The problem faced by companies wishing to implement value-based management is that there is no universal algorithm for building a value-creation system of drivers.

According to M. Scott, the construction of a system of factors is preceded by a deep and comprehensive analysis of the company's activities, financial analysis of the firm and construction of a single cash flow of the company. Integrating all of the above with the approach of M. Scott, an approximate algorithm for constructing a system of value creation factors can be identified:

1. Analysis of the company's activity:

1.1. Industry analysis;

1.2. Description of the company's mission and strategic priorities;

1.3. Strategic analysis of the company

2. Financial analysis of the company (to identify the key performance indicators and the expected set of drivers of the company's value at the financial level);

3. Cash Flow construction- company’s revenue creation process and prediction of future cash flows.

All steps above help to identify core drivers that influence the value of the company and see the link between the factors and final results of the firm that can be described with the help of performance metrics.

What is also important is the calculation of the drivers influence on the company’s value. For that regression analysis will be made with use of Eviews program.

# **Summary of Chapter 1**

Value-based approach to company management became a quite a popular concept among companies looking for ways to improve the efficiency of their activities.

The introduction of the VBM concept in practice means the development of a value-based management system, which can be divided into four main modules: evaluation, strategy, finance and corporate governance. As part of this work, the main focus will be on the evaluation part. The main decisions taken in this block of the VBM system are: selection of performance metric and construction of the value driver management system. These decisions for the company-object of study of Northern Capital Gateway will be taken in the 2nd and 3rd chapters of this work.

The selection of a performance measurement for the company is an important stage of the value-based management evaluation module. Within the framework of value-based management, a number of indicators are distinguished, which companies can choose for themselves as a key periodic indicator of the effectiveness of performance by one or another criterion. All performance indicators can be divided into three groups:

1) Based on the balance sheet measures-RI, MVA, EVA;

2) Based on the cash flows-CFROI, SVA, CVA, EVA;

3) Based on the market values-TSR.

The selected indicator will be the key for finding the value drivers - the final stage of the evaluation module. Building a system of factors is carried out by a comprehensive analysis of the company and identification at certain stages of the value chain of those drivers that affect the value of the company. The system of factors of value creation contributes to the proper distribution of the company's priorities, as well as to the motivation of managers and employees to aspirate a common goal – increasing the value of the company.

Construction of a system of value drivers for the company "Northern Capital Gateway" will be implemented through literature review, industry and financial analysis of the company. Assessment of the relation of each factor to the dependent variable will be made using the statistical methods such as regression analysis. Within the framework of this work, two levels of value drivers will be allocated – financial and non-financial.

In chapter 2, the analysis of the industry in which the company operates as well as the company’s financial and strategic analysis will be made. This will reveal the specificity of "Northern Capital Gateway” caused by the industry, as well as highlight a number of drivers of the company's value at the financial level.

# **CHAPTER 2. ANALYSIS OF THE INDUSTRY AND THE COMPANY**

## **2.1. Industry overview**

Transport is one of the branches of human economic activity. Its task is to meet the needs of other industries and the population in transportation while ensuring safety and the most efficient use of resources.

The airport is a place where different activities and interests of the various partners. The airport plays a much larger role than just a transit point.

In 2016, the total volume of the Russian aviation market, including foreign carriers, dropped by 4.1% compared to 2015 and reached 102.8 million passengers. In particular, the flights of the Russian airlines have carried 88.6 million passengers, which is 3.8% less than the year before (Picture 3). (Rosaviatsia)

Picture 3. Passenger traffic in Russia (including foreign carriers) (made by author on the base of data)

In such a big country as Russia, air connection becomes one of the essential parts of daily life of people. While there are still many opportunities for travelling by train, air transportation offers more opportunities in terms of convenience and speed. Russian Federation has a pretty good air coverage counting for around 400 airports. Of these 400 airports 70 are seen as international one that offer wider range of air carries than other small airports. The busiest airports in Russia are located in Moscow and Saint-Petersburg and serve 73% of the total passenger turnover during the year (Picture 4). (Rosstat)

Picture 4. Russian airports share in total passenger turnover in 2016 (Rosstat)

The leader among all airports is Domodedovo International Airport, which offers 247 destinations for its clients. At the same time, we can see that while Vnukovo and Sheremetyevo airports have more number of destinations, Pulkovo have a wider range of clients from the part of air companies which can also be a good opportunity for future extension of a rout map. (Table 2)

Table 2. Number of air companies and destination of Russian biggest airports

|  |  |  |  |
| --- | --- | --- | --- |
| № | Airport | Number of airlines | Number of destinations |
| [1](https://www.worlddata.info/europe/russia/airports/svo-sheremetyevo.php) | Domodedovo International Airport | 82 | 247 |
| 2 | [Sheremetyevo International Airport](https://www.worlddata.info/europe/russia/airports/svo-sheremetyevo.php) | 38 | 186 |
| 3 | [Vnukovo International Airport](https://www.worlddata.info/europe/russia/airports/vko-vnukovo.php) | 28 | 160 |
| 4 | [Pulkovo Airport](https://www.worlddata.info/europe/russia/airports/led-pulkovo.php) | 70 | 147 |

Modern airports require significant investment in infrastructure. Therefore, the airport is most often a state system, which is created and financed in order to create maximum profit from public investments.

But many airports in Russia also seek for foreign investments. For example, Pulkovo airport received a great contribution for its development from the part of Fraport, which is now one of the main operators of Pulkovo airport in Saint-Petersburg.

In general, value driver for the airport can be divided into 3 major groups- financial information, non-financial information and other control variables. Non-financial drivers are further sprit into industry specific factors and structure of an ownership. The overall structure of drivers is presented on Picture 5. (Malighetti, 2011)



Picture 5. Value drivers for airports (Malighetti, 2011)

## **2.2. Company overview**

Pulkovo airport is the biggest and busies airport except Moscow airports that is an international airport, which is located in the North-Western Federal district of Russia. At the moment it is the only operating airport in St. Petersburg. It is located 20 km from the center of Saint Petersburg in Primorskiy district of St. Petersburg.

In 2016, Pulkovo served more than 13 million of passengers (Picture 6). It is also the main hub not only for one of the biggest Russian air carries- Rossiya Airline but also for several foreign airlines such as, British Airways, RusLine, Emirates and Air France. (Pulkovo airport web-site)

Picture 6. Passenger turnover of Pulkovo (Pulkovo website)

In 2010 the management of the airport has been given to LLC “Northern Capital Gateway”. The company carries out the first project in the Russian aviation industry on the basis of public-private partnership without attracting budget funds. International consortium of “Northern Capital Gateway” includes such companies as: "VTB Capital", the company Fraport AG and Qatar Investment Authority. (Pulkovo airport web-site)

The volume of investments in the development of Pulkovo airport in the period from 2010 to 2015 inclusive amounted to 1.2 billion euros, which greatly affected company’s performance.

The priorities in the work are reconstruction and development of the airport. The implementation of this project will allow the airport to provide a level of service equal to the standard IATA "C" and get the status of the largest airport in the Baltic region. During the period from 2011 to 2015, a new international passenger terminal with an area of 145 thousand square meters, a passenger and cargo platform, a hotel and a business center on the station square, a complex of Parking lots and a number of other airport infrastructure facilities were built and put into operation.

One of the key figures for every airport is also the number of take-offs and lending it was able to serve. In 2014 airport Pulkovo started the exploitation of new Terminal 1 which was used as for internal as for external flights while closing two old terminals on the reconstruction. The airport facilities were improved- more gates, more registration desks, more comfort and more abilities to serve coming and departing planes. Nevertheless, we can see that even though the number of served flights increased later it started to decrease again even though Terminal 2 was opened in 2016 for internal flights. (Picture 7)

Picture 7. The number of flight operations (take-offs and landings) (Pulkovo website)

Many people choose assess the airport from the point of view of getting the fastest way to get to another destination. That is why airports constantly try to diversify the destination map and establish new contracts with airlines. (Picture 8)

Picture 8. The number of destinations (Pulkovo website)

The main functions of “Northern Capital Gateway” are:

1. Maintenance of aircrafts;
2. Passenger service, baggage handling, cargo, mail;
3. Aviation security;
4. Provision of technological processes;
5. Operation, reconstruction and construction of facilities and complexes;
6. Ensuring compliance of activities with all legal regulations;
7. Accounting and records management;
8. Ensuring economic efficiency and prospects of production development of the airport;
9. Ensuring external economic activity, conclusion of commercial, technical and other contracts and agreements;
10. Risk analysis and management. (Volkova,2012)

### **2.2.1. Strategic analysis**

Civil aviation is an aviation industry used to meet the needs of citizens and the economy. This industry is a complex, extensive system that requires great attention from the part of safety regulations at the same time providing quality services to passengers.

The importance of air transport in providing passenger transport increases every year, and airports are key components of the air transport system of the country.

Pulkovo airport has been developing in St. Petersburg for over 80 years. The advantageous geographical location of the city allows airport "Pulkovo" to serve a fairly large area of the population: more than 9 million people living around Saint-Petersburg use the services of the airport. (The book of employee)

The external environment of the airport is a set of political, socio-economic, market, legal, technological and other factors that can affect the operation of the airport.

For the analysis and generalization of factors of external environment on the organization PEST analysis was used. The main purpose of the analysis is to determine key factors that create threat to the functioning of the company and opportunities provided by the external environment. (Table 3)

Table 3. PEST-analysis

|  |  |
| --- | --- |
| **Political factors** | **Economic factors** |
| The imposition of sanctions by Ukraine;The political situation in Turkey and Egypt is bad;The expansion of international partnerships;Improvement of the regulatory framework in the field of airports, airport certification systems and licensing of various types of airport activities. | Changes in the exchange rate, which affect the increase in the cost of services;Inflation rate;Low solvency of the population. |
| **Social and cultural factors** | **Technological factors** |
| Decrease in the quality of education;Increase in demand for airport services as the fastest available mode of transport. | Demand for new technologies (improvement of the security system, automation of activities, fast service system, development of mobile applications |

Thus, the identified environmental factors have a significant impact on the activities of the organization. PEST-analysis shows that political and economic factors are adversely affecting airport operations, impacting the reduction in demand our airport services. This affects the financial effectiveness of the airport. Demand for services can be stimulated by technological and socio-cultural factors.

In order to assess company’s position on the market and its strengths and weakness it is useful to make SWOT-analysis, which aids companies to evaluate questions within and outside the firm. This analysis is done through a definition of strengths, weaknesses, external opportunities and threats that provides a base for future decision-making. (Colbert) SWOT analysis for Pulkovo airport is presented in table 4.

Table 4. SWOT-analysis

|  |  |
| --- | --- |
| **Strengths** | **Weaknesses** |
| 1. Advantageous location.
2. Pulkovo is the forth by quantity of the served passengers airport in Russia after Moscow airports.
3. High quality of service.
4. Coordinated work of the departments.
5. Positive image of the airport among customers and partners.
6. Modern equipment facilities;
7. High security;
8. Meeting international standards.
9. Availability of a large-scale development strategy;
10. The latest technical base of the airport;
11. Absence of competitors.
 | 1. Significant turnover and reduction of employees;
2. Low wages of working personnel;
3. High prices for services;
4. Low airport capacity;
5. A high level of bureaucracy;
6. There is no alternative to drive to the airport (can only be reached by road);
7. Periodic failures in operating activities (baggage storage, etc.);
8. The dependence on weather conditions (frequent fog can cause delays).
 |
| **Opportunities** | **Threats** |
| 1. Expansion of flight destinations;
2. Possibility of investing in the expansion of the new terminal;
3. Establishing new partnerships;
4. Growth in consumer demand for air travel;
5. Launching of Aeroexpress to the airport from one of the city's railway stations;
6. Technological modernization of the luggage compartment.
 | 1. Falling demand for air transportation due to the crisis;
2. A sharp increase in the price of materials (for example, fuel);
3. Aggravation of competitive struggle;
4. Introduction of new sanctions or the tightening of the old ones;

5. Terroristic attacks. |

 According to SWOT-analysis company has a really good perspective for future development. In the previous part we also so that passenger turnover increased almost twice in the last six years which means that the company is on the right direction of development. At the same time, due to the current situation in the world it is better to pay attention to security issues. As it was also seen from the industry overview, Pulkovo works with 70 air carriers, which also provides a great opportunity for direction diversity, and thus increase of the passenger turnover.

### **2.2.2. Financial analysis**

***Balance sheet analysis***

Analysis of the results of financial and economic activity is better to start with a study of the dynamics of the balance sheet. This analysis will allow to draw conclusions about changes in the values of assets and liabilities and to determine the trends.

In order to do this the balance sheet of the company was aggregated and all non-real assets were excluded from it. (Appendix 1) Non-real assets include-deferred tax assets and other deferred expenses as they do not really create value. The amount of equity was then decreased by the amount of non-real assets.

Pictures 9 and 10 represent horizontal analysis of Northern Capital balance sheet.

Picture 9. Horizontal analysis of assets (made by author on the base of financial analysis of the company)

In general, the total balance stays at the same level for the three analyzed years. We can see an increased in the amount of cash received in 2016 at about 25% while the amount of accounts receivable decreased on 20% which can witness an improvement in working with receivables. Inventories stayed at the same level for three years while we can also see a decreased in non-current assets, which was caused by a decrease, is unfinished construction in 2015 when the second terminal was given for exploitation.

Picture 10. Horizontal analysis of equity and liabilities (made by author on the base of financial analysis of the company)

From the equity and liabilities side, we can see a great decrease in the use of short-term borrowings and loans, which had a drop of almost 94% from 2014 to 2016. While accounts payable stayed almost the same we can also notice that probably, company is trying to switch more to equity financing as a positive dynamic is seen on this account. At the same time, the company payed part of its long-term debt thus decreasing its amount on 20%. This decrease in the amount of short and long-term credits can be explained by the fact that most investment projects that required big amounts of capital are already finished and now company do not require that big amounts of loans and borrowings. We can also note that equity was negative during 2014, which usually occurs if the asset value, which was used to secure a loan is lower than the balance on this loan.

To continue the analysis of financial and economic activity, and reflect the structural changes and their comparison with changes in the indicators, the analysis of the balance sheet structure was carried out. (Picture 11 and 12)

Picture 11. Vertical analysis of assets (made by author on the base of financial analysis of the company)

On average about 80% of the assets side is given for non-current assets which is typical for airport activity because their major assets include: airport terminals, land, transport, equipment and different kind of instruments. Receivables take only 3%, which supports the idea of good accounts receivables management.

Picture 12. Vertical analysis of equity and liabilities (made by author on the base of financial analysis of the company)

The structure of sources of financing clearly shows the great change in sources of financing. The part of short-term liabilities changed from 72% in 2016 to just 3% in 2016. We can also see that company uses the advances of having good relationships with its suppliers as it is able to have almost 1/5 of sources coming from it. Moreover, we can conclude that equity part is growing. It is also important to mention that due to big loss in 2014, which was caused by sharp change in the currencies, the company is still dealing with negative retained earnings even though there was a profit in the last two years.

According to the profit and loss statement of the Northern Capital Gateway, in 2015 revenue increased by 15%. What is more important is that net profit became positive in 2015 and even grew on 661% in 2016. In part, this increase in the efficiency of company is lying in the ability to create profit from non-operating activity, which was concluded in receiving positive results from the changes in currency, which is also a sign of a good risk management. In addition, company started to pay 13% less interest expenses due to decrease in loans and borrowings, which was notices earlier. (Appendix 2)

Analysis of the structure of the form № 1 allows to formulate conclusions on the structural changes in the balance sheet and the reasons for changes in the solvency of the enterprise, which will be done further.

In order to reveal the sources of financing current assets it is necessary to calculate working capital. Sufficiency of working capital also shows as the financial position of the firm. We can see appositive trend in the company’s financial position. From critical in 2014 it moved to normal in 2016. Critical position was caused by bad economic situation in Russia when there was a sharp change in currencies. Company lost a lot in that year due to that fact as her position wasn’t hedged. However, we can see that Northern Capital Gateway had a good management after that situation, which helped to improve financial position. From the table below we can also make a conclusion that company switched to financing its operations with equity and long-term liabilities while in 2014 it also used accounts payable and short-term debt. (Table 5)

Table 5. Working capital analysis

|  |  |  |  |
| --- | --- | --- | --- |
|   | **2014** | **2015** | **2016** |
| **WC** |  |  |  |
| WC narrow | -69460512 | -43931960 | -32666282 |
| WC traditional | -41822653 | -1951360 | 1217683 |
| WK broad | -1111072 | 670546 | 3071456 |
| **Sufficiency of WC** |  |  |  |
| Narrow | -69750899 | -44175855 | -32928042 |
| Traditional | -42113040 | -2195255 | 955923 |
| Broad | -1401459 | 426651 | 2809696 |
| **Financial Solvency** | **Critical** | **Unstable** | **Normal** |

Analysis of other solvency ratios will show a firm’s ability to make payments and pay off its long-term liabilities to third parties, such as banks, creditors, bondholders. (Table 6)

Table 6. Solvency Ratios

|  |  |  |  |
| --- | --- | --- | --- |
| **Solvency Stock Measures** | **2014** | **2015** | **2016** |
| *Equity Ratio* | -0.42 | 0.02 | 0.17 |
| *D/E* | -2.87 | 44.85 | 3.85 |
| *IntCov* | -4.08 | 1.19 | 1.94 |
| *Debt/EBITDA* | -3.61 | 17.15 | 7.92 |

Equity ratio shows that Pulkovo is still quite dependent on banks because debt takes about 83% of all assets while equity is only 17% in 2016. Debt to equity ratio was negative in 2013 probably because of the case that the book value of liabilities was higher than the book value of assets. In 2015 in order to recover somehow from the troubles of 2014 the company took a lot of debt which was almost 45 times more than equity and thus was exposed to high risks. In 2016 we can see again the trend of company’s recovery. Interest coverage ratio is in favor of Northern Capital Gateway. Company is solvent from that position, as EBITDA is higher than interest paid.

The indicator of debt burden of the organization is Debt to EBITDA ratio, which shows the ability to repay existing obligations. The ratio is higher than 3 which means that company may face problems with repaying its obligations.

The liquidity analysis measures short-term liquidity of the company, that is, its ability to cover its short-term obligations by applying liquid assets to cash. Insufficient short-term liquidity of the company may prevent the use of emerging opportunities on the market, use special offers and discounts. Insufficient liquidity for several reporting periods can be a warning signal for the owners, which means the company's inability to pay off its debts and liabilities, which ultimately can lead not only to a drop in profitability, and hence the value of the company, but also to bankruptcy. The higher the indicators from the group of liquidity ratios, the more stable the position of the company. (Table 6)

Table 6. Liquidity ratios

|  |  |  |  |
| --- | --- | --- | --- |
|   | **2014** | **2015** | **2016** |
| Cash ratio | 0,17 | 0,75 | 1,02 |
| Quick Ratio  | 0,20 | 0,82 | 1,08 |
| Current Ratio | 0,20 | 0,84 | 1,11 |

Cash ratio equals to the ratio of cash and short-term financial investments to current liabilities. The normal value for the coefficient is considered to be more than 0.2. From the table above we can see that the company improved its cash ration in 2015. From the one hand the higher is the indicator, the better is the solvency of the enterprise but on the other hand, a high coefficient indicates that free cash is not used in order to develop the business.

Quick ratio characterizes the organization's ability to repay its short-term obligations through the sale of liquid assets including both cash, short-term financial investments and accounts receivable. Quick ratio is not far from the cash ratio, which shows small amount of account receivables. In 2016 the ratio achieved the level of 1.08 which is higher than the average in this industry (0,45).

Current ratio sows the ability of the company to cover its current liabilities with all current assets. The ration increased by 5 times from 2014 to 2016 what can be considered as a big improvement in company’s liquidity management. The growth was achieved mainly due to the fact than airport decreased significantly the use of short-term loans and borrowings, which we noticed in the analysis of the structure of sources of financing.

The cash conversion cycle is a measure used to evaluate the effectiveness of a firm's management and the general situation of the company. The result of the calculation measures how long a firm needs to manufacture and sale the goods and turn them into cash. (Picture 13)

Picture 13. Cash Conversion Cycle (made by author on the base of financial analysis of the company)

The accounts receivable turnover ratio indicates the ability of a company to collect debts from its clients. It shows how many times during the year average receivables are collected and represents a valuable indicator of a firm’s financial and operational performance. Days in accounts receivables dropped on 33% percent from 2015 to 2016. Even though we saw a positive dynamic indicating the decrease in accounts receivables, now we can see that actually company is not doing well in collecting debt from its customers.

Inventory turnover is showing how fast a firm can convert into cash its inventory. In general, aviation sphere does not have a lot of inventories on its balance as there assets mostly consists of non-current assets thus pretty low days in inventories in normal for this industry and do not indicate anything bad.

Days in accounts payable is liquidity measurement that assesses how quickly an organization pays off different types of its creditors – suppliers, tax authorities. employees etc. This ration is very high for Pulkovo, which reveals the company’s ability to pay back very fast. That can create a positive image for the airport and helps the company to establish new relationships with other suppliers and creditors easier.

Cash Conversion Cycle is negative for the company in the analyzed period. Negative CCC is normal for aviation industry as the airport collects receivables before the company itself is required to pay for what it owes. Moreover, the company is using its working capital to full efficiency. (Appendix 3)

The group of profitability ratios is the most commonly used for analyzing the financial condition of the company, since the coefficients of this group reflect the return on invested funds. Thus, the ROE indicator reflects the return on the capital invested by the owners, while ROA shows how effectively the assets of the enterprise are used. ROA coefficient also has some subtypes such as ROTA and RONA. (Picture 14)

Picture 14. ROTA and RONA (made by author on the base of financial analysis of the company)

ROTA and RONA show the efficiency of assets that are financed through interest bearing loans as account payables are excluded. First of all, we should note that both indicators grew through the analyzed period, which witnesses in more effective use of assets. Secondly, we can see an interesting situation. ROTA was higher than RONA in 2014, showing that company is dependent on its accounts payable.

ROEis one of the key indicators of company’s efficiency.  It is usually the best to evaluate for financial performance. (Table 7)

Table 7. ROE analysis

|  |  |  |  |
| --- | --- | --- | --- |
|   | 2014 | 2015 | 2016 |
| ROE (average method) | 218.53% | -21.80% | 22.29% |
| Financial leverage (ROE/ROTA) | -8.99 | -4.02 | 2.44 |
| COD | 3.22% | 4.94% | 6.16% |
| Spread | -27.52% | 0.48% | 2.97% |

ROE itself was negative in 2015 but we can see that it turned positive in 2016. Index of financial leverage represents a solvency ratio that aid to understand how well the company uses its leverage to increase ROE. Basically we see that the firm wasn’t using effectively leverage in its capital structure but the good thing there is that this indicator increased over time, which says that additional debt was used beneficially by the company. As the company has sufficient amounts of debt that implies that it is leveraged. In our case it is good because the spread is positive in the last two years.

***Activity analysis***

During the last decade a trend of commercialization and privatization brought more pressure and competition for airports, which make these entities constantly search for new ways to generate money. By implementing alternative but stable forms of revenue activities, airports become a really complex and profit oriented structure. By diversifying its general activity, airports become more appealing to others and drive its value fir investors. (Toth, 2015)

All airports activities can be divided into two groups:

1. Aviation activity- aircraft, flights and passenger service, mail, cargo, baggage handling, security charges etc.
2. Non-aviation activities- parking, hotels, currency exchange, various commercial passenger services, conference centers, car rental etc. (Aslam, 2014)

Currently, many airports are more and more concentrating on being able to create non-aeronautical revenue as the situation on the market can be quite unstable due to different influencing factors. As we saw in the industry and external situation analysis, passenger turnover decreased in a last year, which was caused by economic factors, but still the company was able to increase its revenue, probably because of its non-aviation activity.

Pulkovo airport is not an exception in providing additional services. For now, non-aviation revenue makes 21% of total revenue but company is developing in this area. (Picture 15)

Picture 15. Revenue structure (made by author on the base of financial analysis of the company)

The airport creates additional revenue streams from providing advertisement placement services, parking services, fuel filling services, property renting etc. Non-aviation revenue was growing from 2014 to 2015 but then dropped by 11% in 2016. The aviation structure consists of three parts: airport charges, ground services and other aviation services. (Picture 16)

Picture 16. Aviation revenue structure (made by author on the base of financial analysis of the company)

Costs of sales for “Northern Capital Gateway” mostly consists from expenses on stuff working for the airport and depreciation and amortization. Personnel expenses include wages and salaries of people directly employed by the airport, different befits such as bonuses, pensions, life insurance etc. On the graph below we can see a sharp increase in the amount of COGS which occurred due to the new terminal that stated to work from 2014. (Picture 17)

Picture 17. COGS structure (made by author on the base of financial analysis of the company)

# **Summary of Chapter 2**

LLC Northern Capital Gateway carries out the activity in the market of airport services in St. Petersburg and is for the present moment the 4th largest airport in Russia. The company is mostly dependent on conditions in the economy and politics, which influence the demand on airport services from the part of passengers and air carries. The changes occurring in airport sphere including privatization are creating a solid base for future development.

Company had changes in the number of flight destinations it could offer to its clients and also in the number of air companies it deals with. International passenger turnover was decreasing in the last years while Russian people started to travel more.

Financial analysis of statements of the company was made and following characteristics were identified:

1. Retained Earnings are negative for the analyzed period following the sharp change in RUB to EUR currency in 2014. The company is still dealing with the negative affect of that situation;
2. Company is quite dependent on banks but can effectively use new debt as it can be seen from positive spread;
3. Airport was able to increase its facilities in the last years, which increased its revenue streams from aviation;
4. Non-aviation activities have make a small part of total revenue of the airport;
5. Company has good relationship with supplier, employees and other creditors as it is able to repay its accounts payables very fast;
6. Company was investing a lot into fixed assets in the last years;
7. Company seems to increase the amount of equity in its sources of financing.

The identified features will be used later to build forecast for statements in order to identify the most valuable drivers.

From this, we can make a conclusion that performance metrics of Value Based Management that are based on residual income are not the best choice for Northern Capital Gateway because of its negative value. TSR and CFROI can’t be decomposed on the lower system of drivers. And among SVA, CVA and EVA, SVA and EVA have a higher opportunity for creating a system of value drivers and also are already used by several airports, which also supports the results of carried financial analysis.

Based on the financial analysis and industry specifics the following hypothesis were stated by the research work:

1. Share of aviation revenue is positively related to EVA;
2. Leverage is negatively related;
3. ROIC is positively related to EVA;
4. ROA is positively related to EVA;
5. Passenger turnover growth is positively related to EVA;

In chapter 3 the methodology of the carried analysis is described and the used model and research tools are stated. Further, the model is tested and significant variables are identified for the company’s value on the base of the hypotheses stated above. Recommendations are given for the improvement on those factors.

# **CHAPTER 3. RESEARCH FINDINGS**

## **Methodology**

***Research design***

Many studies were done in the past years about the effectiveness of Value Based Management. All these research works analyzed how VBM contributed to the business of the companies. Although there is decent amount of works written on VBM, not much of them study the concept of VBM in terms of airports. This is actually an interesting thing to discover as airports play a significant role as for a city itself as for a country and people who live in it.

The research philosophy of the work is objectivism that states that there is an objective reality and research should be made in order to discover it. It is actually close to positivism that claims that there is one, really objective reality that we can measure and observe using several instruments. This is very structured and controlled approach. The researcher himself is distant from the observed phenomena. Statistics and math are central for the research work. Thus, financial analysis and statistical techniques are a base for the aim of the work. The master thesis is based on the facts observed while the research is carried out and phenomena is reduced to simple elements presented by the systems of drivers. The limitation of that research philosophy is caught in the idea that it is always assumed that everything is quite objective and reflects the real situation but in reality it is not always like that and there is almost never an objective outcome.

A key goal of a good performance metric is to assess how well a company was doing in accordance to its objectives. The primary aim of an enterprise is usually assumed to be the value maximization and thus the performance indicator should capture that task. In reality, many companies use measures based on accounting profit to assess their performance from the financial perspective and in this case face two major problems:

1) The cost of equity is ignored;

2) Accounting profit doesn’t reflect the whole situation.

Economic Value Added performance metric is overcoming these two problems. It was developed by a consulting firm in United States called Stern Steward & Co and nowadays the metric is use by many big and multinational companies, such as Coca-Cola, General Electric, Siemens and so on. (Ryan,2018)

EVA is the best metric in terms of capturing the real economic profit of a firm. It is more linked to the aim of creating the shareholders’ value. EVA is unique and differs from other performance metrics as it is not totally dependent on accounting measures. The problem with metric based on accounting is that they reflect only historical data and also may be distorted and thus not show the real situation.

From the accounting perspective EVA is based on such items as cost of debt, the amount of debt and equity and net operating profit. However, what is different is that it also includes the cost of equity and makes accounting data more economically viable. (Shil,2008)

|  |  |  |
| --- | --- | --- |
|  | EVA=NOPAT-Capital Charge=NOPAT- Invested Capital \* WACC | (8) |

***Approach***

The approach that is used in the research work is deduction. First of all, the work starts with the theoretical review on Value Based Management. Then the certain company is studied in detail- market analysis is made, financial analysis is conducted and conclusion on the main feature of the company are made. On that based a particular performance metric is chosen that will be best of all suitable for that company. After that, the metric is decomposed on several factors, which are also then broken further in specifics that were identified before for the company. The future cash flows are forecaster with the use of statistical models, such as Monte-Carlo. At the end, the regression analysis is done in order to identify the most significant drivers of the company’s value.

On the base of it, conclusions and recommendations for future development of the company are made.

***Method***

All types of research design are used in the research work. Descriptive design helps to study and describe the current situation and tendencies in the sphere of study-aviation. Descriptive research design acts as a valuable method for researching a specific area of studying and as a further base for quantitative studies. The questions that are mostly studied by this type of research are “what is driving the industry”, “what are strong and weak points of the company”, “Is there a potential on the market” and “what are the key revenue streams of the airport”.

Exploratory design is used to assess the situation and provide background for further studies. This includes the financial analysis of the company, some research of the airport clients’ values and discussions with Northern Capital Gateway employees and management.

Finally, explanatory design will be helpful to provide linkages between different drivers of the company and its’ value. This will be achieved through statistical methods such as regression and sensitivity analysis.

Using all research designs helps to fully reveal the importance of these issues for the companies and gives a base for providing the company with an advice for further development.

General research methods used in the work:

* Financials analysis;
* Data observation;
* Sensitivity analysis;
* Decomposition method;
* Regression analysis;

***Data Collection***

In the research will be used as primary data as well as secondary data.

The biggest role will play careful observation of the secondary data. First of all, will be used annual reports of the company in order to make full analysis of the position of the company on the market on the current date. This will include analysis of the balance sheet, Profit and Loss Statement and Cash Flow Statement. This will help to reveal the directions of investments in the company now and possible risks. Secondly, I will use general information from the website to gather data on airport additional activity like advertising, renting etc.

The primary data will be gathered through communications with managers of the company in order to get more details and information about company’s current and projected activities.

For regression analysis historical data will be used that could be found on the company’s website. The data was gathered for the years from 2007 to 2017 through financial statements of the company, audit reports, statistical data.

For providing theoretical background for future studies I used following data resources:

* Data basis- Thomson Reuters, Spark, Rosstat;
* Financial reports of the companies- balance sheet, Cash Flow Statement, Profit and Loss Statement, Notes, Auditors Report;
* Research papers, issues, scientific journals- Elserver, Damodaran website, EBSCO, SCOPUS etc;
* Tutorials.

***Variables***

In order to carry out regression analysis, data and variables were then assessed on the monthly basis on the base of quarterly reports of comparable airports such as Mumbai Airport, Helsinky Airport, Chengdu Airport. The base for choosing comparable airports were- the number of terminals and runways, status of hub and number of carried passengers during the year. Monthly passenger growth was calculated on the base of data provided on the website of Pulkovo airport. ROIC, ROA and financial leverage were recalculated on the basis of auditing reports and notes to financial reports.

For the purposes of the work, regression analysis will be used in order to estimate the significance on financial and nonfinancial factors. The factors were chosen on the base of financial analysis, market research and industry specifics. The factors were also chosen from the point of view of the ability to be managed in the future. Many technics for modeling and analyzing several variables are included, when the aim is to understand the relationship between a dependent variable and different independent variables. Regression analysis provides an understanding how dependent variable will vary if one of the predictors is changed, while other predictors are fixed.

In order to test the regression model Eviews statistical package was used. In the package different types of tests were made that would be discussed further.

Based on the financial analysis and industry specifics the following hypothesis were stated by the research work:

1. Share of aviation revenue is positively related to EVA;

The hypothesis was stated on the base of financial analysis as we saw that aviation revenue occupies around 80% of the total revenue. Moreover, this factor was used in the work of Paolo Magnetti who determined value drivers in airport sphere in Europe.

1. Leverage is negatively related;

From the financial analysis of the company we can see that amount of debt was changing in recent years, moreover, company started to finance its operations from equity part too in the last years. This driver was also identified as a significant one by P. Magnetti and Michele Meoli.

1. ROIC is positively related to EVA;

From the begging of 2012, the airport is following a big transformation project which is sponsored from the part of VTB, VTB Capital, Fraport and Qatar Investment. From this point, it should be important for investors to their return on it.

1. ROA is positively related to EVA;

This indicator was also used by authors stated below as a driver of value for airports. In their research work they identified that this factor is significant. Moreover, from chapter two, it was also seen that ROTA was increasing in the last years.

1. Passenger turnover growth is positively related to EVA;

In chapter two I identified that even though the number of passengers decreased in the last two years, the revenue stream itself increased. So probably, the passenger turnover growth is not significant for the value of Pulkovo airport.

Table 8 provides an overview and classification of all variables that are included in the research.

**Table 8. Characteristics of variables used in the research.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Nature** | **Variable** | **Description** | **Name** |
| **Dependent** |  | EVA |  | *EVA\_1* |
| **Independent** | **Financial** | Share of aviation revenue | Share of revenue created by the main business- services for airlines and passengers. (Aviation revenue/total revenue) | *AR\_SHARE* |
| Leverage | Financial leverage of the company showing the share of debt in the total sources of financing.(Debt/Total assets) | *D\_EV* |
| ROIC | Efficiency of using invested money. (NOPAT/Invested Capital) | *ROIC* |
| ROA | Efficiency of using assets of the airport (Net income/Total assets) | *ROA* |
| **Non-financial** | Passenger turnover growth | The growth rate of a number of served passengers through the year. (Difference between this and last year in passenger turnover/Last year passenger turnover) | *PASSENGER\_GR* |

***Model***

Regression will represent a linear model specification so that the dependent variable EVA is a linear combination of independent variables.

$EVA\_{t}$*=*$β\_{0}$*+*$β\_{1}$*\*AR\_SHARE(t)+*$β\_{2}$*\**$ PASSENGER\\_GR(t)$ *+*$β\_{5}\*D\\_EV(t)+ β\_{3}\*ROIC(t)+β\_{4}\*ROA(t)+ε\_{t}$

{\displaystyle y\_{i}=\beta \_{0}+\beta \_{1}x\_{i}+\beta \_{2}x\_{i}^{2}+\varepsilon \_{i},\ i=1,\dots ,n.\!}Quantitatively a liner regression will be defined by least squares procedure (so that the distance is minimized between every observation and the regression line itself).

The regression will be checked by several coefficients and tests:

1. $R^{2}$ – a statistical metric that shows how close to the fitted regression line are the data. It shows which part of the dependent variable can be predicted from the independent variables. It can be also referred as a determination coefficient. The coefficient of determination takes range between 0 and 1. The closer $R^{2}$ is to 1, the better the model is. (Frost, 2013)
2. F-test – compares the fitting of different linear models, which assess at the same time multiple coefficients. F- test is compared with P value of the overall test on significance. If the P value is less than F-test, the null hypothesis is rejected and it means that the given model offers a better fit than the intercept one. (Frost, 2016)
3. Normality test- is used to evaluate the data set on a normal distribution and calculate the probability of a random variable underlying the date set for the ability to be normally distributed. One of the ways to decide if the date set is normally distributed is to look on the histogram. The distribution should be bell-shaped. Test for normality shows the value of kurtosis- the measure of symmetry. The normal kurtosis value is 3, if it is higher than 3 than the distribution is fat-tailed, if less than 3- platykurtic. The second measure of symmetry is skewness which in case of 0 implies for a symmetric distribution. If the skewness is positive than the distribution is skewed to the right, if negative- skewed to the left. A lot of different statistical tests are used to check the normality– Shapiro- Wilks, D’Agostino, W/S test etc. As I was using Eviews for performing regression analysis, I was using Jarque- Bera test, which represents asymptotically chi-squared distribution with the degree of freedom equal to 2. (Thadewald, 2004)
4. Heteroscedasticity test. The model should be also tested if it has homogeneous nature or not. Heteroscedastic data is defined as the one with unequal variability or in other words is a non constant standard deviation of a variable that is taken over a precise amount of time. (Williams, 2015) For heteroscedasticity test, I used Breusch-Pagan-Godfrey test.
5. Correlation test. The model should be evaluated on the association between two or more variable. The normative value should be no more than 0.6.

## **Empirical results**

Now when the dependent variable as well as independent variables are chosen, we can run regression and test stated hypothesis. The regression model is also tested on normality and heteroscedasticity. The results of the ran regression are presented in table 9.

Table 9. Results of regression analysis

|  |  |  |
| --- | --- | --- |
| Dependent Variable: EVA |  |  |
| Method: Least Squares |  |  |
| Date: 04/20/18 Time: 14:44 |  |  |
| Sample: 2010M01 2017M12 |  |  |
| Included observations: 96 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 588.9529 | 315207.9 | 1.868459 | 0.0650 |
| AR\_SR | -432.5267 | 354742.9 | 1.219268 | 0.2259 |
| D\_EV | -226.1432 | 80147.38 | -2.821592 | 0.0059 |
| ROA | 154.8668 | 107742.1 | 1.437384 | 0.1541 |
| ROIC | 151.2198 | 84968.73 | 17.79712 | 0.0000 |
| PASSENGER\_GR | 26.51014 | 12197.60 | 2.173389 | 0.0324 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.805591 |     Mean dependent var | 40801.66 |
| Adjusted R-squared | 0.794790 |     S.D. dependent var | 178676.2 |
| S.E. of regression | 80940.49 |     Akaike info criterion | 25.50128 |
| Sum squared resid | 5.90E+11 |     Schwarz criterion | 25.66155 |
| Log likelihood | -1218.061 |     Hannan-Quinn criter. | 25.56606 |
| F-statistic | 74.58811 |     Durbin-Watson stat | 0.459737 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

***Overall model description***

From the table above we can see that we have 96 include observations. C is the constant, which has value of 588952.9 in case if there are no any independent variables. R-square is equal to 0.81 which is very close to 1 and is a sign that the model is very successful in predicting. So we can say that 80,5% of changes in EVA are explained by the changes in independent variables. Probability F-statistics tests the overall significance of the model. In the model prob (F-statistics) has the value less than 0.01 and we can say that all independent variables in total in the given model have a significant effect on the EVA at 1% significance level.

 From the normality test we can see that the histogram looks more or less bell-shaped which indicates the normality distribution. Skewness is -0,35 which indicates a slight skew to the left. Kurtosis is equal to 4.8 and is higher than the normal value we can say that the distribution is fat-tailed. (Appendix 8)

 For heteroscedasticity test data was transformed into homogeneous view. From the Breusch-Pagan-Godfrey test on heteroscedasticity we can see than p-value is 0,079 which is higher than the level of significance and thus we do not reject the null hypothesis which states that there is a constant variance. So we can make a conclusion that there is no heteroscedasticity.

 All independent variables were also checked for correlation. From the table 10 we can see that there is no correlation within the variables of the model.

Table 10. Correlation matrix

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | AR\_SR | Passenger gr | ROIC | ROA | D\_EV |
| AR\_SR | 1 |   |   |   |   |
| Passenger gr | -0.11886 | 1 |   |   |   |
| ROIC | -0.21445 | -0.11358 | 1 |   |   |
| ROA | -0.06417 | -0.22681 | 0.153521 | 1 |   |
| D\_EV | -0.23956 | 0.229432 | -0.03056 | -0.30264 | 1 |

***Independent variables results***

1. ***Aviation revenue share***

Share of aviation revenue has a negative relation to EVA if all other variables are hold constant and it is statistically insignificant at 5% level of significance.

1. ***Debt to Enterprise value***

Debt to equity value has a high significance for the dependent variable as its p-value is equal to 0. 0059. The stated hypothesis is confirmed and that means that company has to pay more attention to the value of its leverage. Airports are now working in a quite unstable environment due to tough economic situation in the country. This fact increases the probability of default risk from a higher leverage if the company won’t be able to repay its debts. Moreover, airport has some of its’ loans and credits are taken in foreign currencies which is also increasing the risk for the company.

1. ***ROA***

Return on assets is not significant for the value of Northern Capital Gateway, which means that the stated hypothesis wasn’t confirmed.

1. ***ROIC***

Return on invested capital have a big positive effect on the airport’s value and is also significant at 1% level of significance. The importance of these factor is explained due to the large amounts of investments that airports all over the world do now in order to increase their operational efficiency and attract investments in future for further development.

1. ***Passenger growth***

From the results of regression analysis, we can see that the growth rate of passenger growth is significant at 5% and its growth is positively influencing EVA.

## **3.3 Managerial application**

The overall growth of EVA could be achieved through influence on the identified factors: ROIC, passenger growth and financial leverage. (Picture 18)



Picture 18. EVA growth

1. ROIC growth

Return on Invested Capital is a valuable indicator of the airport’s efficiency. As Pulkovo now is getting a lot of investments from government and outside local and foreign companies, it should show that investments into to it are worth it.

There are two principal ways to increase ROIC:

* + 1. Increase NOPAT;
		2. Manage invested capital.

I would stop my attention on giving recommendations on the first part of the way to increase ROIC- increase of NOPAT.

NOPAT is defined as net operating profit after taxes and is a well-known metric to evaluate company’s profitability if its capitalization won’t be leveraged, thus has no effect of sources of financing as it is focused on operating earnings. It shows the amount of cash that could be given to company’s shareholders if a firm won’t have any debt obligations. NOPAT do not include interest payment in its calculation. (Bragg,2007)

The general formula for NOPAT looks like:

|  |  |  |
| --- | --- | --- |
|  | NOPAT=Operating Profit \* (1-t) | (9.1) |

where t stays for a corporate tax rate.

NOPAT can be further decomposed on lower levels:

|  |  |  |
| --- | --- | --- |
|  | NOPAT= (Revenue-COGS-Operating Expenses-D&A) \* (1-t)  | (9.2) |

Operating expenses include- Commercial Expenses, General and Administrative Expenses, Other Operating Expenses, Interest Expenses and Income Taxes.

In order to build the system of value drivers for the company “Northern Capital Gateway” of the base of NOPAT the whole revenue of the company was divided into several groups:

1. Revenue from aero activities
	1. Airport Charges;
	2. Ground services;
	3. Other aero revenue.
2. Revenue from non-aero activities
	1. Additional services connected with transport (special transport, parking, fuel);
	2. Property renting;
	3. Advertisement placement;
	4. Other non-aero revenue.

The cost of goods sold of the company will be regrouped by the following way:

1. Expenses connected employees;
2. Amortization and Depreciation
3. Other

There we should note that due to the industry specifics the company includes amortization and depreciation into its costs of goods sold. Moreover, the company doesn’t have any commercial expenses and other operating expenses. General and administrative expenses include the same items as COGS and will be added to it, thus the NOPAT formula will be modified:

|  |  |  |
| --- | --- | --- |
|  | NOPAT= (Revenue-COGS-Interest Expenses) \* (1-t) | (9.3) |

Now based on the revenue and operating expenses decomposition and the financial analysis of the company in chapter 2, we can build the system of factors influencing NOPAT. (Appendix 7)

The main way to influence NOPAT of the company is to influence its revenue. From the results of sensitivity analysis, we can see that actually with 1% change in aviation revenue, EVA increases on 7,5% while the increase in non-aviation revenues increases EVA on 2,1% indicating that both of these factors have a positive influence on the dependent variable. (Appendix 8)

***Non aero revenue growth***

Globally, in the last years non-aero revenues have reached 40% of the total number of revenues. (Calleja, 2016) As for now, non-aeronautical revenues account for less than 20% at Pulkovo. That is actually a great opportunity for further diversification of the company.

Especially, in the unstable economic and political situation Northern Capital Gateway should search for the ways to generate revenues in case of decline in passenger turnover. Moreover, expectations from modern passengers is rising as they always refer to some better airports. Pulkovo as an international airport with 2 terminals and potential to expand has high possibilities of taking best foreign practices work for Saint-Petersburg airport as well.

1. **Additional services connected with transport;**

These type of non-aero transportation could be further increased by providing additional transport solutions of getting to the airport. The project on aeroexpress was already introduced by the city and can make additional revenue stream for the airport. Another way, could be introduction of buses from different metro stations (Zvezdnaya, Kupchino) and Pushkin area so that people would prefer to use bus and not go for taxi in some cases as bus could be easier achievable.

Moreover, parking time is not flexible now, so the payment for staying from 1 to 15, from 15 to 30 and then every 30 minutes is fixed. The price is rather high and probably the introduction of minute or hour rates could create more revenue streams.

1. **Advertisement placement services**

Pulkovo is already creating some revenue from advertising placement but what if it can go further and boost advertising revenue through smart advertising? Pulkovo can give advertisers a chance to use innovative ways to promote their products and services. Holding special events, giving branded spaces can not only let the airport create additional revenues but also get a social buzz and improve the experience of their passengers.

One more way to increase potential revenues from non-aviational activities is to create mobile app where people can do online-shopping- rent a car, book the room in a hotel, book rest rooms, call taxi and so on. Companies can also use it as a source to place their advertisement and get closer to people.

1. **Property renting**

As we can see from the financial analysis and sensitivity analysis one of the biggest parts of non-aero revenues is occurred by revenues from renting activities. Pulkovo serves as a hub for several local and international companies. If we look on the examples of different local and international airports (Athens, Fraport, Bangkok) that serve like hubs, we can see that many of them are building their own shopping malls somewhere around the airport or even inside. That can give passengers that wait for their flights spend their time in a more interesting way. Free time encourages people to spend their money and thus push revenues from renting for the airport.

1. **Other commercial non-aero revenue.**

One of the ways actually to indirectly increase the revenue from duty-free stores and cafeteria zone is to introduce smart control systems which are just using the scan of your passport to identify your personality and number of flight. That can reduce the time passengers spend in the queue at passport control. This can increase the amount of time people spend in the waiting zone and thus increase the probability on being abler to spend money while not being in a rush.

One more important factor that was identified by DKMA survey is that improvement of passenger experience is making a good commercial sense as satisfied and happy client tend to spend more money. The level of satisfaction can be increased in several ways: increasing the selection of restaurants and shops, providing better quality of food and drinks, having enough available sittings.

Introducing Pulkovo loyalty cards that can be bring real value for the passengers and regular customers of the airport such as- getting discounts on parking, collecting points while shopping at the airport stores, eating and drinking in bars, restaurants and cafeterias, having access to lover currency exchange rates, getting free gifts and so on. To strengthen the value of this card Pulkovo can align with some other airports in and outside Russia, different shops and restaurants. One of the possible partner in this program can be Fraport airport that is making big investment in Pulkovo airport now. Later these points can be spent for paying services available in the airport.

As well as for the growth of revenue from advertisement placement, mobile app can be beneficial in order to boost revenue from other commercial non-aero activities. Airports are quite challenging environment that can cause a lot of stress. With mobile app, people can automatically get push notifications that inform them about the traffic jams on the road before their flight, amount of time you need to get to the airport, information about the gate and the shortest security line etc. This can reduce the amount of stress, save time and also manage the traffic in the airport itself. Passengers won’t be in a rush before the flight, will be more calm and satisfied and thus can turn their attention of airport restaurants, cafes, services and shops.

***Aero revenue growth***

 There are not that many ways how to increase aero revenues. One of the most promising ways to increase revenue from aeronautical activities is to expand the airport itself. Unfortunately, that requires a lot of time and investments and may not be always possible. Some other ways to increase aero revenue may be:

1. Increasing partnerships with more airlines that can also offer more destinations for the passengers;
2. Introducing alliances with other airports and aviation companies and becoming hub for more air companies;
3. Increasing the amount of flight per day;
4. The other way that can also become a driver of aero revenues is an improvement of the passenger’s experience in the airport. Some of those issues were already discussed in the ways of increasing non-aeronautical revenue. Here we can also add – faster check-in services, baggage control systems, digitalization etc.

The other way to increase ROIC is to manage the amount of invested capital.

*Decomposition of Capital Investments*

 Capital investments show funds that were invested in a company in order to reach objectives of the business. It refers as well to the acquisition of fixed assets that are necessary to increase the operating capacity of the company and be able to capture a bigger share on the market. This also leads to increase in revenues for the company. Enterprises make continual investments in capital in order to maintain current business as well as to expand it in upcoming years.

For airports fixed assets play a big role as they are the main base for any airport business. Fixed assets of airports include- flight terminals, machinery, vehicles, land and different equipment needed to serve air companies and passengers. In the last years with the increase of the use of information technology such as big data tools and digitalization models, investments in intangible assets also started to play a big role in airports’ business.

|  |  |  |
| --- | --- | --- |
|  | Capital Investment= Working Capital+ Property, Plant and Equipment + Intangibles Assets | (10) |

While it’s quite difficult to manage all of the items included in invested capital, there are still some ways to manage it better. In order to manage better the amount of invested capital, company should pay more attention to managing its accounts receivables.

1. Find out which payment methods can be better for your customers and thus give them an opportunity to make the invoice payment easier for them.
2. Make credit management prioritized – do not extend the contract if the debt is not payed for a long time just to keep up the sales;
3. Consider using shorter payment terms;
4. Introduce automatization systems for making process more accurate and reliable.

Company can also pay more attention to the amount of inventories it keeps on it’s balance.

1. Passenger growth

Some of the methods that boost non-aero and aero revenues can also influence on the passenger growth –accessibility of the airport (transportation system), better services, mobile apps, positive experience while staying in the airport.

In addition to this airport can discover the most popular destinations among different kind of people – business, family travelers, sole travelers etc. and develop their rout map even further.

What can be also beneficial for passengers is if Northern Capital Gateway will try to establish more partnerships with low cost airlines as people are always searching for cheaper flights.

Moreover, Pulkovo can introduce more airport marketing services, such as indoor advertising, display advertising, e-mail marking, website development, mobile advertising etc. That can help people to be more updated about important information about airport offers and changes and thus can become a valuable source of new customers.

1. Financial Leverage

 A company is in a need for financial leverage because it needs to operate its business. Not every time it is possible to run the business only on the term of equity. Moreover, the company benefits from financial leverage in terms of getting a tax shield. As we saw in the financial analysis of the company, the airport is quite successful in the use of the debt as the assets that were purchased with that debt can earn more than the cost of the debt. But as we also saw, the company had some falls when there was no sufficient amount of taxable income to shield and retained earnings for the company were negative. In that situation financial leverage reduces the value of equity and thus reduced the value of the company itself. From the financial statements of the company, we can see that it has sufficient amounts of debt that are taken in foreign currencies. In 2014 it put the airport into a really tough situation due to the ruble default. Today, the situation is also quite unstable and foreign debt became twice more expensive than it was before the default.

For airport industry and for aviation industry as whole it is normal to have high degree of financial leverage.

 The recommendations that can be given in this area are the following:

1. If the debt is take in currencies, the company should hedge it risk from the situations if the ruble will default again;
2. In case of getting loss, try to critically assess the amount of debt that is needed to run the business normally;
3. Try to reduce costs of running the business.

## **Summary of chapter 3**

 In this chapter it was outlined the methodology of the made research – the type of research work, methods that were used, data and model description of conducting the empirical analysis. Moreover, the justification for the chosen performance metric was given. On the base of the model regression analysis was carried out and then the results were further discussed.

The regression analysis tested the following indicators on their significance- share of aviation revenue, return on assets, return on investment, financial leverage and passenger growth. The results of the test showed that return on assets and share of aviation revenue don’t have significant meaning for the dependent variable – EVA.

 From the identified results was made a conclusion that Pulkovo has a big opportunity to develop its non-aero activities and attract more cash flows in these area. As for now, non-aero revenue accounts to just about 20% of the total share of Northern Capital Gateway while on average European airports earn around 40% of their total revenues from non-aero activities. These figures identify the big potential of creating revenue stream for Pulkovo airport in future. Several recommendations in different non-aero activities were given in order to improve the efficiency of non-aero business activities, such as development of mobile app and website, introducing flexible parking rates and loyalty cards, provision of airport space for creative advertisement placement etc.

 Aviation revenue can be increased by establishing partnerships with other airports and airlines (especially low-cost air carries), developing the rout map on the base of passengers’ needs, improvement of passengers experience in the airport itself and so on.

 All identified measures will help to increase the value of significant factors- return on invested capital and passenger growth.

 The improvement of financial leverage can lay in critical assessment of the airport’s needs (amount of personnel, inventories, equipment etc.) and hedging contracts.

 All of the above recommendations will help Pulkovo to increase the influence of significant factors on EVA in a positive way. The results of the work can be further used by the company to identify other inner and external value drivers and implement the VBM system.

**CONCLUSION**

In today's dynamically developing business environment, companies are forced to constantly look for new sources of competitive advantages on which the strategies for their functioning are based. To carry out such a search it is necessary to analyze and evaluate the company's activities. The theory in which these elements are organically combined is the theory of value-based management (VBM). According to this concept, all efforts in the organization should be aimed at the ultimate goal - increasing the value of the company. By implementing a value-based management system, the company integrates all levels of the organizational structure to work for a common goal and follow a common philosophy.

The implementation of ideas of value-based management in practice begins from the selection of value-based performance metric. For this purpose, it is necessary to understand the environment in which the company operates and look on the company performance itself. The next stage is the most important is the identification of company’s value drivers. To achieve that, the industry analysis and financial analysis of the company should be made in order to identify specific features. Through the system of value creation factors, the general goal of creating value could be reached. In this research work, with the example of one of the most strategically important airports - Pulkovo airport, the previous steps were carried in order to understand which performance metric and value drivers could be implemented by the company.

As a performance metric for assessing Northern Capital Gateway, EVA measurement was chosen. This model is most consistent with the company’s specific and activity.

The selection of the value creation factors of Pulkovo airport was carried out with the help of financial analysis and industry overview. The factors that were chosen for hypothesis testing were the following - ROA, ROIC, D/EV, passenger growth and aviation revenue share.

Regression analysis identified that aviation revenue share and ROA are not significant for the company while financial leverage, return on invested capital and passengers growth are influencing a EVA.

On the base of identified parameters, the following conclusions were made:

* Airport may have an opportunity to increase its value not only from the part of aviation activity but also from the part of non-aviation activity;
* As now the airport is following a big investment project, return on assets doesn’t play a big role for now in value creation while return on invested capital is more important for increasing the value of Pulkovo airport;
* Consistent passenger growth is a driver of the airport’s value.

The following recommendations were given in order to increase the value of the company in the future:

1. ROI improvement:
* Look for the opportunities to increase the revenue from non-aero activities:
* Improving passengers experience in terms of choice of shops and restaurants and quality of the services;
* Promotion of mobile app and loyalty cards;
* Building shopping mall;
* Providing advertisers with an opportunity to use the airport’s space to make creative advertisement;
* Installing smart control systems;
* Additional transport solutions and flexibility of parking timing.
* Increasing aviation revenue streams:
* Introducing alliances with other airports and aviation companies and becoming hub for more air companies;
* Increasing the amount of flight per day;
* Improvement of the passenger’s experience in the airport - faster check-in services, baggage control systems, digitalization etc.
1. Control of leverage:
* Hedging risks from the situations if the ruble will default again;
* Critically assess the amount of debt that is needed to run the business normally;
* Reduction of the costs of running the business.
1. Passenger growth:
* Discovering the most popular destinations;
* Establishing partnerships with low-cost air companies;
* Using more marketing services- improvement of website, mobile app, indoor advertising etc.

Implementation of these recommendations can help the company to develop its business and increase its attractiveness for potential investors and passengers.

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## **Appendix 1. Aggregated balance sheet**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  ***Assets*** | 2014 | 2015 | 2016 | 2014-2015 | 2015-2016 |
| Change (thousand rub) | Growth rate (%) | Change (thousand rub) | Growth rate. (%) |
| Cash and CE | 9008284 | 9282301 | 11534714 | 274017 | 3.04% | 2252413 | 24.27% |
| Receivables | 1478575 | 897193 | 714806 | -581382 | -39.32% | -182387 | -20.33% |
| Inventories | 290387 | 243895 | 261760 | -46492 | -16.01% | 17865 | 7.32% |
| Non-current A | 45610659 | 44926405 | 41953020 | -684254 | -1.50% | -2973385 | -6.62% |
| **Total A** | **56387905** | **55349794** | **54464300** | -1038111 | -1.84% | -885494 | -1.60% |
|  |  |  |  |  |  |  |  |
|  ***L and E*** | 2014 | 2015 | 2016 |  |  |  |  |
| Accounts Payable | 11888318 | 9752843 | 9439824 | -2135475 | -17.96% | -313019 | -3.21% |
| Short-term debt | 40711581 | 2621906 | 1853773 | -38089675 | -93.56% | -768133 | -29.30% |
| Long-term debt | 27637859 | 41980600 | 33883965 | 14342741 | 51.90% | -8096635 | -19.29% |
| Shareholders E | -23849853 | 994445 | 9286738 | 24844298 | -104.17% | 8292293 | 833.86% |
| **Total L and E** | **56387905** | **55349794** | **54464300** | -1038111 | -1.84% | -885494 | -1.60% |

## **Appendix 2. P&L analysis**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **2014** | **2015** | **2016** | **GR 2014-2015** | **GR 2015-2016** |
| **Revenue** | **12,194,704**  | **14,028,486**  | **14,239,891**  | 15.04% | 1.51% |
| Cost of sales | -6,774,318  | -7,039,151  | -7,158,781  | 3.91% | 1.70% |
| **Gross profit** | **5,420,386**  | **6,989,335**  | **7,081,110**  | 28.95% | 1.31% |
| Commercial expenses | 0  | 0  | 0  | 0.00% | 0.00% |
| General and administrative expenses | -2,566,849  | -1,851,720  | -2,554,419  | -27.86% | 37.95% |
| **Profit from operations** | **2,853,537**  | **5,137,615**  | **4,526,691**  | 80.04% | -11.89% |
| Share of loss of associates and joint ventures | 0  | 0  | 0  | 0.00% | 0.00% |
| Interest income | 105,562  | 165,116  | 116,540  | 56.42% | -29.42% |
| Interest expense | -2,752,788  | -3,341,153  | -2,902,208  | 21.37% | -13.14% |
| Other non-operating income | 317,418  | 606,644  | 4,716,771  | 91.12% | 677.52% |
| Other non-operating loss | -18,007,102  | -1,894,295  | -3,059,291  | -89.48% | 61.50% |
| **Profit before income taxes** | **-17,483,373**  | **673,927**  | **3,398,503**  | -103.85% | 404.28% |
| Income taxes | 0  | 0  | 0 | 0.00% | 0.00% |
|  inc. Deferred tax liabilities (assets) | -604,865  | -290,588  | -39,816  | -51.96% | -86.30% |
| Change in deferred tax liabilities | -1,038,212  | -5,716  | 209,831  | -99.45% | -3770.94% |
| Change in deferred tax assets | 3,930,021  | -419,657  | -929,347  | -110.68% | 121.45% |
| Other | 6,036  | 104,749  | 11,620  | 1635.40% | -88.91% |
| **Net income(loss)** | **-14,585,528**  | **353,303**  | **2,690,607**  | -102.42% | 661.56% |

## **Appendix 3. Cash Conversion Cycle calculation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Cash Conversion Cycle** | **2014** | **2015** | **2016** |
| *ITO* | 15.13 | 26.35 | 28.31 |
| *Dinv* | 24.13 | 13.85 | 12.89 |
| *RTO* | 10.85 | 11.81 | 17.67 |
| *Dar* | 33.63 | 30.91 | 20.66 |
| *PTO* | 0.69 | 0.65 | 0.75 |
| *Dap* | 528.31 | 561.08 | 489.28 |
| *OC* | 57.76 | 44.76 | 33.55 |
| ***CCC*** | **-470.55** | **-516.32** | **-455.73** |

## **Appendix 4. Return on assets calculation**

|  |  |  |  |
| --- | --- | --- | --- |
| Rota | **2014** | **2015** | **2016** |
| Average TA | 50964411 | 55868849.5 | 54907047 |
| EBI calculations |   |   |   |
| Net income | -14585528 | 353303 | 2690607 |
| Interest expence | -2752788 | -3341153 | -2902208 |
| Profit tax rate | 20% | 20% | 20% |
| Adjusted interest | -550557.6 | -668230.6 | -580441.6 |
| EBI  | -12383297.6 | 3026225.4 | 5012373.4 |
| **ROTA** | -24.30% | 5.42% | 9.13% |

|  |  |  |  |
| --- | --- | --- | --- |
|   | **2014** | **2015** | **2016** |
| Total assets | 56387905 | 55349794 | 54464300 |
| Accounts Payable | 11888318 | 9752843 | 9439824 |
| Net assets | 44499587 | 45596951 | 45024476 |
| Average net assets | 41159078.5 | 45048269 | 45310713.5 |
| EBI | -12383297.6 | 3026225.4 | 5012373.4 |
| **RONA** | -30.09% | 6.72% | 11.06% |

## **Appendix 5. Revenue analysis**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **2014** | **2015** | **2016** | **Change 2014-2015** | **GR 2014-2015** | **Change 2015-2016** | **GR 2015-2016** |
| **Aero** | **9654556** | **10675607** | **11266616** | **1021051** | **10.6%** | **591009** | **5.54%** |
| **Airport charges, inc.:** | 5772735 | 6478780 | 6836876 | 706045 | 12.2% | 358096 | 5.53% |
| Take-off, landing | 1758919 | 1867338 | 1814907 | 108419 | 6.2% | -52431 | -2.81% |
| Airport security | 1595949 | 1722255 | 1725167 | 126306 | 7.9% | 2912 | 0.17% |
| Use of the station | 2344411 | 2836224 | 3256816 | 491813 | 21.0% | 420592 | 14.83% |
| Other | 73456 | 52963 | 39986 | -20493 | -27.9% | -12977 | -24.50% |
| **Ground services, inc.:** | 3281299 | 3493481 | 3692089 | 212182 | 6.5% | 198608 | 5.69% |
| Tariffs for service of passengers | 1221308 | 1369102 | 1464312 | 147794 | 12.1% | 95210 | 6.95% |
| Use of technical equipment | 0 | 362638 | 375037 | 362638 | 100.0% | 12399 | 3.42% |
| Commercial services for aircrufts | 1230350 | 1277779 | 1314039 | 47429 | 3.9% | 36260 | 2.84% |
| Operational and technical services of aircrufts | 216058 | 262719 | 287655 | 46661 | 21.6% | 24936 | 9.49% |
| Other | 613583 | 221243 | 251046 | -392340 | -63.9% | 29803 | 13.47% |
| **Other aero** | **600522** | **703346** | **737651** | **102824** | **17.1%** | **34305** | **4.88%** |
| services for providing aviation security | 90494 | 115329 | 101362 | 24835.2006 | 27.4% | -13967 | -12.11% |
| Services for passengers of business class | 198589 | 242370 | 233682 | 43781.0447 | 22.0% | -8688 | -3.58% |
| Special services of passengers and crew | 93463 | 94434 | 130571 | 970.823356 | 1.0% | 36137 | 38.27% |
| Providing comunication services for aviation activity | 94529 | 105892 | 121173 | 11362.8189 | 12.0% | 15281 | 14.43% |
| Other | 123447 | 145321 | 150863 | 21874.1125 | 17.7% | 5542 | 3.81% |
| **Non-aero** | **2540148** | **3352879** | **2973275** | **812731** | **32.0%** | **-379604** | **-11.32%** |
| Special transport services | 10280 | 7734 | 3124 | -2546 | -24.8% | -4610 | -59.61% |
| Communication services | 4981 | 7189 | 6910 | 2208 | 44.3% | -279 | -3.88% |
| Providing property for renting | 1892047 | 2580181 | 2100854 | 688134 | 36.4% | -479327 | -18.58% |
| Operational services | 48063 | 73899 | 46984 | 25836.142 | 53.8% | -26915 | -36.42% |
| Adverticement placement services | 120316 | 169206 | 178435 | 48889.7081 | 40.6% | 9229 | 5.45% |
| Parking services | 265195 | 327369 | 336578 | 62173.5138 | 23.4% | 9209 | 2.81% |
| Fuel filling service | 123878 | 99912 | 201401 | -23965.8864 | -19.3% | 101489 | 101.58% |
| Other | 75388 | 87389 | 98989 | 12001.4881 | 15.9% | 11600 | 13.27% |
| **Total revenue** | **12194704** | **14028486** | **14239891** | **1833782** | **15.0%** | **211405** | **1.51%** |

## **Appendix 6. COGS analysis**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| COGS | 2013 | 2014 | 2015 | 2016 | Change 2014-2015 | GR 2014-2015 | Change 2015-2016 | GR 2015-2016 |
| **Personel expenses** | **3175796** | **3069856** | **2873702** | **2996736** | **-196154** | **-6.39%** | **123034** | **4.28%** |
| salary expenses | 2279561 | 2280600 | 2161034 | 2131820 | -119566 | -5.24% | -29214 | -1.35% |
| bonuses | 310037 | 123424 | 45044 | 193210 | -78380 | -63.50% | 148166 | 328.94% |
| provisions for social needs | 556519 | 633938 | 640401 | 628616 | 6463 | 1.02% | -11785 | -1.84% |
| other personnel expenses | 29679 | 31894 | 27223 | 43090 | -4671 | -14.65% | 15867 | 58.29% |
| **Materials** | **726949** | **807892** | **720880** | **723045** | **-87012** | **-10.77%** | **2165** | **0.30%** |
| **D&A** | **452186** | **2298848** | **2814036** | **2937044** | **515188** | **22.41%** | **123008** | **4.37%** |
| **Maintainence expenses** | **773021** | **365724** | **366850** | **305605** | **1126** | **0.31%** | **-61245** | **-16.69%** |
| **Rental expenses** | **75779** | **47235** | **55696** | **14020** | **8461** | **17.91%** | **-41676** | **-74.83%** |
| **Acquisition of IT systems** | **136279** | **99344** | **108292** | **86164** | **8948** | **9.01%** | **-22128** | **-20.43%** |
| **Other expenses** | **60638** | **85419** | **99695** | **96167** | **14276** | **16.71%** | **-3528** | **-3.54%** |
| **Total** | **5400648** | **6774318** | **7039151** | **7158781** | **264833** | **3.91%** | **119630** | **1.70%** |

## **Appendix 7. EVA calculation**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | Total revenue | **Total COGS** | Operating expenses | Interest expenses | Tax | D/EV | E/EV | rd | re | IC | EVA |
| **2010** | 3441673 | 1865436 | 1893752 | 0 | 20% | 0.81 | 0.19 | 0.00% | 11.70% | 4907776 | -255290 |
| **2011** | 6007667 | 3525055 | 2388908 | 45291 | 20% | 0.91 | 0.09 | 0.30% | 11.70% | 10505703 | 36674 |
| **2012** | 7367350 | 4081906 | 2193784 | 0 | 20% | 0.93 | 0.07 | 0.00% | 11.70% | 20401790 | 872203 |
| **2013** | 8859199 | **5400648** | 2459064 | 134404 | 20% | 0.99 | 0.01 | 0.27% | 11.70% | 35730002 | 691440 |
| **2014** | 12194704 | **6774318** | 2566849 | 2752788 | 20% | 1.21 | -0.21 | 3.22% | 11.70% | 3125216 | 80151 |
| **2015** | 14028486 | **7039151** | 1851720 | 3341153 | 20% | 0.84 | 0.16 | 5.99% | 11.70% | 41003997 | 1434604 |
| **2016** | 14239891 | **7158781** | 2554419 | 2902208 | 20% | 0.77 | 0.23 | 6.50% | 11.70% | 40491619 | 1299010 |
| **2017** | 17199428 | 7652851 | 2986914 | 1983425 | 20% | 0.81 | 0.19 | 5.31% | 11.70% | 33132050 | 3651319 |

## **Appendix 8. Normality test**



## **Appendix 9. Heteroscedasticity test**

|  |
| --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 2.046996 |     Prob. F(5,89) | 0.0796 |
| Obs\*R-squared | 9.798189 |     Prob. Chi-Square(5) | 0.0812 |
| Scaled explained SS | 342.3704 |     Prob. Chi-Square(5) | 0.0000 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: |  |  |  |
| Dependent Variable: RESID^2 |  |  |
| Method: Least Squares |  |  |
| Date: 04/21/18 Time: 11:45 |  |  |
| Sample: 2010M02 2017M12 |  |  |
| Included observations: 95 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 307.0251 | 473.6017 | 0.648277 | 0.5185 |
| AR\_S\_1\_NA | -2722.728 | 20905.54 | -0.130240 | 0.8967 |
| D\_EV\_1\_NA | -2999.424 | 14754.00 | -0.203296 | 0.8394 |
| ROA\_1\_NA | -324.0718 | 700.4443 | -0.462666 | 0.6447 |
| ROIC\_1\_NA | -76.07287 | 24.07223 | -3.160193 | 0.0022 |
| PASSENGER\_GR\_1\_NA | -0.079467 | 7.129058 | -0.011147 | 0.9911 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.103139 |     Mean dependent var | 522.8140 |
| Adjusted R-squared | 0.052753 |     S.D. dependent var | 4689.957 |
| S.E. of regression | 4564.575 |     Akaike info criterion | 19.75111 |
| Sum squared resid | 1.85E+09 |     Schwarz criterion | 19.91241 |
| Log likelihood | -932.1779 |     Hannan-Quinn criter. | 19.81629 |
| F-statistic | 2.046996 |     Durbin-Watson stat | 2.011284 |
| Prob(F-statistic) | 0.079635 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

## **Appendix 10. NOPAT decomposition**



## **Appendix 11. Sensitivity analysis**

## **Appendix 12. Invested Capital Decomposition**

