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USAGE OF EFFICIENCY MATRIX BASED ON ADIDAS AG 2011–2017

Bachelor's thesis
International Business Administration, Finance and Accounting

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Tallinn 2019

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ABSTRACT

The activity of each company is associated with usage of various resources, investments, earning profit and cash. However, the questions of whether the resources are used efficiently, whether the company earning maximum profit and cash possible as well as uses investments efficiently, rise on the daily basis. Moreover, the managers want to know how the company is ranked among competitors by efficiency criteria as well as to indentify is overall efficiency improved during the analysed period.

The aim of the reserch is to check notion of efficiency matrix by analysing the efficiency of Adidas Group and make recommendations for efficiency improvements based on the efficiency matrix results. The methods of the research are efficiency matrix analysis, benchmark index of company's overall efficiency analysis, analysis of the growth of company's overall efficiency and variance analysis.

Based on results, the most efficient year for the company during 2011–2017 was 2017, due to ability of the company to increase efficiency of main business activities, whereas 2014 was the most inefficient, mainly as a result of crisis on several markets. Moreover, Adidas Group was ranked as the second company by efficiency criteria among closest competitors (Nike and Puma), where Nike was the first and Puma the last. It was suggested to improve six key areas to compete with the company with highest effciency (Nike), such as daily cash management, efficiency of investment activities, sales profitability, assets usage, labour usage, expense management.

Keywords: financial statement analysis, efficiency analysis, ranking.

INTRODUCTION

The activity of each economic unit is connected with the usage of various resourses. The economic unit is a legal entity or individual which performs the economic activity. It includes corporations, natural persons, municipalities, cooperatives, states and so on. Companies are also the examples of the economic units. The resources are used to form the final results of activity. Moreover, each resource along with others forms the results only through expenses. So, the question about whether the resources are used efficiently appears on the daily basis. To answer the question, the managers usually determine the strengths and weaknesses of the company compared with major competitors and consequently to set the goals for the future. Both profitable and non-profitable companies can be inefficient as it associated with unwise usage of resources.

Since the main purpose of entrepreneurial activity in the conditions of market relations is to earn profit and cash, the understanding of whether the company is earning maximum implementable or feasible profit is important. Furthermore, the managers want to know if the company uses the investments efficiently. By the way, it is necessary to know if the company is generating as maximum cash as possible. Finally, the managers want to identify how the company is ranked among the competitors and to know if the overall efficiency is being improved or declined during the analysed period.

Efficiency is a broad concept which refers to different areas of business activities and it can not be evaluated by using a single financial ratio. In addition to the problem, the methods which were developed to calculate the efficiency are complicated to understand for the average person as it demands the higher education in finance or business area. The liquidity, solvency, profitability are the narrow areas which refer to a certain categories of company's abilities and they can be well-covered with financial ratios.

Adidas AG is one of the largest sportswear manufacturer in the world. The company successfully produces several products and equipment for professional and amateur athletes. In addition, the financial performance of the company is improving each year. For example, the sales of the

company are growing each year. The author of the thesis assumes that the company has a great potential to grow further. First of all, the new high quality products are being produced every year to attract new customers and occupy the higher market share than its competitors. Moreover, the company signs new contracts with professional sportsmen, sport clubs and celebrities to make the brand more recognisable in the world.

The **actuality** of this thesis is supported by the fact that there are new companies established every year, new financial analysis tools are being developed and the importance of financial analysis becomes more significant as the quantity of users is also growing.

The **research problem** of the study is that a company's efficiency represents the level of company's performance that characterise how well the company uses the input variables to achieve the output variables; however, the efficiency can't be estimated using only one financial ratio and comparing the company with the closest competitors by using different indicators is a complex process.

The **purpose** of the study to test the usability of efficiency matrix concept when analysing the efficiency of Adidas Group. To discover the hidden reserves of Adidas Group and make the proposals on how to improve the efficiency in the future based on the efficiency matrix.

The **object** of this research is the German sportswear manufacturer Adidas Group, which operates globally. The study of efficiency of the company is based on the company's overall efficiency matrix for a recent period of six years, 2011–2017, when the company started to be more recognisible on the global scale and during which sales significantly grew. The study will provide the overview of weaknesses and strenghts of the company's business activities, which will allow to be compared and ranked among its closest competitors based on efficiency and to show trends of the efficiency. The research questions are:

1. Which year was the most efficient for Adidas Group among 2011–2017? Why?
2. Which year provided the lowest efficiency results for the company among 2011–2017 and why?
3. How Adidas was ranked among its closest competitors (Nike and Puma) in 2017 based on efficiency results?
4. Which improvements and recommendations can be suggested for the company to increase efficiency based on the matrix analysis of efficiency?

The **methodology** of the study is efficiency matrix analysis based on annual reports 2011–2017, analysis of the benchmark index of company's overall efficiency based on the efficiency matrix results in 2017, analysis of the growth of company's overall efficiency based on the efficiency matrix results of 2011–2017 and variance analysis.

The first part of this thesis begins with the theoretical background of financial analysis including a generalised theory of financial analysis and the users of financial analysis. In addition, the first chapter introduces efficiency matrix, the new tool of financial analysis, and the methods for utilising the results of this tool for comparison with closest competitors and to check the dynamics of efficiency over the period of time. The second chapter starts with an industry overview and the company itself. Finally, the second part provides the practical approach of the new financial tool of efficiency matrix based on the chosen company's information, the process of comparison of the chosen company among the closest competitors based on the overall efficiency results, comparison of the efficiency dynamics of the chosen company and further recommendations for the company based on all the obtained final results.

Acknowledgements. The author would like to especially thank Paavo Siimann for his professional advice, useful feedback, helpful comments and support and patience, which have helped and motivated the author to write this Bachelor Thesis. The author would like to thank his own family for their help, understanding and support during writing of the Bachelor Thesis.

1. THEORETICAL BACKGROUND OF FINANCIAL ANALYSIS

The aim of this chapter is to generalise the financial analysis theory and introduce the new financial analysis tools such as company's overall efficiency matrix, benchmark index of the company's overall efficiency and growth index of the company's overall efficiency, which focuses more deeply on the broad concept which is poor studied but equally important – efficiency.

1.1 Financial analysis theory

Financial analysis is the process of research and evaluation of the main indicators of the company, together with giving an objective assessment of its financial position, financial performance and cash flows. In addition, the analysis helps to understand the reasons of poor financial condition as well as possibilities of its stabilisation (Peterson & Fabozzi, 2006, pp. 2–6; Sherman, 2015, pp. 2–4; Бочаров, 2009, pp. 5–9).

The financial analysis is prepared by the company's professionals and then provided to the company's management to make business decisions and strategies (Бернстайн, 2002, p. 24; Robinson, Henry, Pirie, & Broihahn, 2015, p. 2; Helfert, 2001, pp. 8–11). The subject of financial analysis is to understand the dynamics of financial indicators and the reasons for their change, the impact of changes in financial indicators on each other and the impact on the financial condition of the company as a whole (Sherman, 2015; Бочаров, 2009, pp. 5–15).

The financial analysis can be divided into two types: external and internal analysis. Internal analysis is carried out with the aim of improving the efficiency of company management and the development of management decisions. Its results are used for planning, monitoring and forecasting company development. External analysis can be carried out by all parties interested in the activities of the company (each, depending on their interests, using public reporting data) (Файдушенко, 2013, pp. 10–11; Сазонов, 2017, pp. 7–9).

The object of financial analysis are the financial activities and financial operations of companies and organizations engaged in financial calculations. The methods of financial analysis are the ways to approach the study of changes in financial performance and the relationships between them. The methods include:

- comparative analysis;
- trend analysis;
- vertical analysis (common-size analysis);
- horizontal analysis;
- financial ratio analysis;
- variance analysis (also known as component analysis).

The comparative method of financial analysis based on comparing the values of separate groups of similar financial indicators among themselves over a determined period (quarter, year, month and so on) within the company or between the companies in the same field of activity. In the process of using the analysis, the sizes of absolute and relative deviations of the compared indicators are calculated. The method helps to understand the trends of changes of absolute figures or percentages (Ravinder, 2013; Бочаров, 2009, pp. 70–75).

The trend analysis is a method of financial analysis, which examines the values of indicators for a certain period of time, where the current values of indicators are compared with their past values. One of the main tasks in trend analysis is to establish patterns of changes in indicators over time, as well as to determine its trends (Бочаров, 2009, pp. 59–63; Файдушенко, 2013, pp. 79–81). The analysis shows the dynamics over the period. As the rule, the lowest or the highest year is taken and then compared with other years to see the changes**.** Horizontal analysis is a comparison of each reporting item with the previous period. The horizontal analysis shows the changes within the determined period. (Сазонов, 2017, p. 16) Horizontal analysis studies the dynamics of individual financial indicators over time (Ravinder, 2013; Sherman, 2015, pp. 30–33; Dobesova, 2011, p. 19).

Vertical analysis is a method of financial analysis which identifies the proportion of individual items (accounts) of financial statements in the final indicator, taken as 100%. In addition, it determines the structure of the final financial indicators and identifies the impact of each of them on the overall result of economic activity. The analysis aims to study the structure of assets,

liabilities, income, expenses, cash of the organization (Sherman, 2015, p. 34; Dobesova, 2011, p. 20; Бочаров, 2009, pp. 63–70).

Finally, ratio analysis is financial analysis method which is used to calculate the relationships between the individual items (accounts) of financial statements to check or control the company's financial performance. The ratio analysis examines a company's different areas of operating, financing and investing activities such as liquidity, solvency, profitability, etc. Moreover, the analysis allows to determine weak and strong areas of the company's activities (Бочаров, 2009, pp. 84–88; Sherman, 2015, pp. 43–67).

The main subpart of financial analysis is financial statement analysis. The financial statement analysis represents an assessment of the financial and economic activities of the company in the past, present and expected future and it is necessary for making management and business decisions. The goal of the analysis is to determine the financial position of the company, to identify weaknesses and potential sources of problems in its further work and to discover the strengths on which the company can rely (Haskins, Ferris, & Selling, 1996, p. 37).

The main source of information about the business activities of the company is the financial statements. Financial statements are representations of the financial position, financial performance and cash flows of the company at the reporting date. The purpose of financial analysis is to provide the information about the financial performance of the company to different users for making economic decisions. In practice, there are four main financial statements: statement of financial position (balance sheet), income statement, cash flow statement and statement of change in equity (statement of retained earnings) (Haskins, Ferris, & Selling, 1996, pp. 37–49).

A statement of financial position (balance sheet) represents the information about the assets, liabilities and owner's equity of the company at the reporting date. The income statement reflects information about the company's revenue and expenses or financial results of the company for the reporting period. (Temte, 2003, pp. 14–64) The cash flow statement represents information about the company's cash inflows and outflows and gives an idea of the company's cash sources and key directions of its usage in three areas of activities: operating (main), investment and financial (Johnston & Johnston, 2006, pp. 71–72). The statement of change in equity (statement of retained earnings) represents the changes and movements of owner's equity for a period of time (Sherman, 2015, pp. 19–28; Dobesova, 2011, pp. 17–18; Gibson, 2008, pp. 46–48).

To sum up, the financial analysis is used to estimate or assess the financial position, financial performance and cash flow of the company and, in turn, to make business decisions or strategies based on the results. The analysis is divided into two types (internal and external), which are carried out for different purposes. In order to perform the financial analysis, six key methods of the analysis are applied, which focus on changes in financial performance and the relationships between them. Financial statement analysis is a basic subpart of the financial analysis, which determines the financial position of the company in recognising weak areas that the management of the company needs to improve and strong areas on which the company can rely.

1.2. Financial statement analysis users

The objective of financial statements is to provide the information to users for making different kinds of economic decisions (Ravinder, 2013; Шеремет, 2006). The users of financial statements can be individuals or legal entities interested in information about the activities of the company. They can be divided into two categories:

1) internal users;
2) external users.

Internal users – users who directly take part in the working process of the company or the management personnel who make various economic and financial decisions in the company activity to improve the profitability and performance of the company (Dobesova, 2011, pp. 15–17). The internal users include:

- owners;
- managers;
- employees.

External users – users who are not directly involved in the working process of the company.
The external users' category includes:

- tax officers;
- auditors;
- analysts;
- government officers;
- creditors;
- suppliers;
- competitors;

- clients.

Each user of the categories has his own aims in utilising of financial statement analysis. For example, the main internal users of financial statements are the owners as they risk their investments and reputation if the business directions of the company are ill-advised. It is important for them to see what the return on the spent investments and efforts are, as well as how great the levels of economic risk and the possibility of material losses are (Gibson, 2008, p. 1; Foster, 1986, pp. 1–22; White, Sondhi, & Fried, 1994, p. 4).

Employees seek to determine whether the company receives sufficiently high profits in order to increase salaries (Merritt, 2013). Managers and top managers of economic departments can analyse indicators better than anyone (Foster, 1986, pp. 3–5). They are the users of financial statements that form the foundation of the company, determining the most effective and profitable direction of its activities. They also examine the need for different resources or whether investment decisions have been made correctly. They make future forecasts based on existing indicators (Ganbaatar, 2010, pp. 12–13; Sherman, 2015, pp. 4–7).

Tax officers use the financial statements to understand whether the company pays the taxes and does not avoid them. In addition, there are government departments, which control whether the corrected amount of taxes is paid and how the company uses resources of the government. Potential investors use the information from financial statements to assess the risks and profits associated with the investments and acquisitions of securities of the company (Пелюшкевич, 2014, pp. 12–13).

Creditors determine whether the company is able to pay interest on loans on time and repay the debts. A bank is a common example of a creditor. Furthermore, suppliers want to know whether the company is able to pay for goods purchased on credit or whether the company can purchase more goods from them (White, Sondhi, & Fried, 1994, p. 5; Бернстайн, 2002, pp. 10–11).Clients use the financial statements to evaluate the conditions of the company, especially in the case of long-term contracts and relations with the company or whether the company will be in a position to supply these goods in the future (Foster, 1986, pp. 6–7).

Auditors check the financial statements to determine whether it is created correctly and in appropriate manner. Finally, competitors use the financial statements of the company to estimate its financial performance, financial position and condition. The information contained in the

statements can help to build and create new competitive strategies or alter existing strategies and forecasts (Бернстайн, 2002, p. 25).

To conclude, financial statements provide the information for users to make various economic decisions. The users of financial statement analysis are divided into external and internal users. The main difference between internal and external user is that an internal user is directly involved in the working process of the company whilst external isn't. Each user in the category has its own purpose for using the financial statement analysis.

1.3. Principles of efficiency matrix analysis

1.3.1. Analysis of the efficiency level of the company in terms of submatrices for efficiency

Efficiency is a broad economic phenomenon and the level of efficiency cannot be reflected as a result of a single ratio. In the opinion of the author of this thesis, this is due to the fact that the efficiency is an extensive or multilateral concept, which can be used and measured in different areas of business activities. The matrix approach was developed and applied in order to analyse a phenomenon such as the efficiency of the company. Efficiency matrix is a versatile financial tool that helps to analyse the efficiency fields of main business activities of the company. The efficiency field represents systematicity of qualitative indicators, whose values' grow as efficiency increases.

One of the first attempts at matrix integration for efficiency analysis was provided by Mereste in 1981, which was used in the practice of light manufacturing. In the following years, the matrix approach was developed further and used in other different industries of light manufacturing (Старцева, 2016). The subsequent studies of this broad phenomenon helped to analyse efficiency of different economic activities, including business activities, efficiency of different industries of companies and follow the dynamics of changes of efficiency.

Economic efficiency is a relative indicator that measures the obtained result with the costs or resources used to achieve this result (Старцева, 2016; Мансуров, 2011). Thus, economic efficiency reflects the relationship between the result of the activity and the costs or resources applied to obtain this result (Мазурова, 2010, p. 5). The input and output indicators need to be chosen in order to analyse the efficiency by composing the matrix approach. Viippola (2017) and

Gofaizen (2016) mentioned and implemented the matrix approach in their works to analyse the economic efficiency. Alver (1989) provided a more general consideration for resources and expenses as input indicators and results as output indicator and arranged the following scheme:

RESOURCES ⇨ *EXPENSES* ⇨ *RESULTS*

According to (Старцева, 2016) and (Siimann, 2018), the scheme suggests that resources are converted via expenses to the final result. J. Alver and Siimann (2015), also mentioned this suggestion in their research. In the opinion of the author of the thesis and that of Siimann (2018), the indicators of the scheme can be divided further for a deeper analysis of efficiency field of the main business activities.

All the companies' business activities have the following structure: operating activities, investment activities and financing activities. First of all, the investment activities appear at the beginning. For instance, a creditor provides a loan for the company or investments come from the company's owner. When the company finds the required investments, the financing activities appear. For instance, the company can purchase or invest in assets. Finally, the operating activities emerge. This type of activities is related to the income earning or acquiring losses and cash flows (inflows or outflows). All the company's business activities are interrelated. Therefore, according to (Siimann, 2018, pp. 70–71), the business activities can be characterised by the following scheme for a better understanding:

CAPITAL⇨*RESOURCES*⇨*EXPENSES* ⇨ *INCOME*⇨*PROFIT* ⇨ *CASH FLOW*

The scheme suggests that the process of raising capital makes it feasible to acquire or invest in resources, which are converted via expenses to income, profit and cash flow. In the author's opinion, for a more thorough analysis or to analyse additional areas of the business activities, the indicators of this scheme can be further divided if required, depending on the aims of analysts. For example, cash flow can be converted into dividends or reinvested again in resources.

The ways of raising capital:

- owner's equity;
- loan;
- In addition to the capital there are other ways of financing, (e.g., provisions).

Resources are categorised as:

- assets;
- employees.

Income can be divided into:

- revenue;
- gains.

Profit is defined as the difference between income and expenses.

Cash flow is categorised as:

- operating;
- investment;
- financing.

Thereafter, the six aforementioned business activities items can create the company's overall efficiency matrix, which contain eight quantitative indicators and is divided into 28 efficiency field elements in total. The efficiency field of the matrix provides 17 submatrices. Each quantitative indicator represents the item of the business activity (Siimann, 2018, p. 84). The efficiency matrix is established with the next suppositions:

- only the information which is comprised in accessible public annual reports is used;
- attention is paid to the order of how the quantitative indicators are presented in the efficiency matrix: capital-resources-expenses-income-profit-cash flow (the essential point for the efficiency matrix is that it should be structured, quantitative indicators of the matrix should be ordered in economically significant order);
- information that easily comparable between entities is applied;
- the pattern includes an even number of quantitative indicators, thus allowing the dynamic analysis and the comparative analysis of efficiency levels in a way that the outcome of the analysis is influenced by all the quantitative indicators.

The quantitative indicators of the company's overall efficiency matrix include:

1. average capital (C),
2. average number of employees (E),
3. average assets (A),
4. operating expenses (O),
5. sales revenue (S),
6. earnings before interest and tax expense (EBIT, P),
7. net operating cash flow (R),
8. free cash flow (F).

According to (Siimann, 2018, p. 83), it is better to use average values for resources and capital quantitative indicators for more proper process of comparison of expense, income, profit and cash flow indicators, which have values in financial statements.

Average capital quantitative indicator involve owner's equity and loan. As companies have different capital structures, the total of these two indicators exclude differences in the structures. Average number of employees and average assets represent the resource indicator for the matrix.

The operating expenses appear from the expense indicator, as the operating expenses are composed of all the expenses associated with sales of the company (Siimann, 2018). Sales revenue represents the income, which the company earn from the operating activities, so that is why it is chosen as an indicator for income.

As the companies have different capital structures it is appropriate to use EBIT as a representative of profit indicator. The regulations of countries can influence net profit and operating profit does not take financial income from assets items into account (Siimann, 2018). Net operating cash flow and free cash flow represent the cash flow indicator. The free cash flow is computed as net operating cash flow added to net investing cash flow.

The efficiency matrix has the following properties: the elements of the main diagonal of the efficiency matrix are equal one; with respect to the main diagonal, symmetrically arranged elements are reverse to each other (Старцева, 2016, p. 50). An efficiency field is a certain field that is defined by a triangular matrix containing direct indicators of production efficiency (Table 1.1). The inverse field of efficiency is a certain field that is defined by a triangular matrix containing inverse performance indicators (Старцева, 2016, p. 50; Siimann, 2018, pp. 65–68).

The efficiency matrix has the following advantages:

1) Simplicity and convenience for the users (even without business education).
2) Provides the full picture of weaknesses and strengths of the company's activities.
3) The efficiency matrix can be used at the same time with various financial analysis tools.
4) The matrix assists in analysing all the financial ratios in an easy and clear way.
5) There is no need for the additional reports, as the efficiency matrix attempts to use the information that appears during financial accounting.
6) The way of matrix approach can be automatised in a simple way.

Table 1.1. The company's overall efficiency matrix.

Quantitative factor	Free cash flow (F)	Net operating cash flow (R)	EBIT (P)	Sales (S)	Operating expenses (O)	Average Assets (A)	Average number of employees (E)	Average Capital (C)
Free cash flow (F)	11 1	12 R/F Op. cash flow to Free cash flow	13 P/F EBIT to Free cash flow	14 S/F Sales to Free cash flow	15 O/F Op. expenses to Free cash flow	16 A/F Assets to Free cash flow	17 E/F No of employees to Free cash flow	18 C/F Capital to Free cash flow
Net operating cash flow (R)	21 F/R CM **Free cash flow to Op. cash flow**	22 1	23 P/R EBIT to Op. cash flow	24 S/R Sales to Op. cash flow	25 O/R Op. expenses to Op. cash flow	26 A/R Assets to Op. cash flow	27 E/R No of employees to Op. cash flow	28 C/R Capital to Op. cash flow
EBIT (P)	31 F/P Free cash flow to EBIT	32 R/P PCM **Op. cash flow to EBIT**	33 1	34 S/P Sales to EBIT	35 O/P Op. expenses to EBIT	36 A/P Assets to EBIT	37 E/P No of employees to EBIT	38 C/P Capital to EBIT
Sales (S)	41 F/S Free cash flow to Sales	42 R/S ICM Op. cash flow to Sales	43 P/S IPM **EBIT to Sales**	44 1	45 O/S Op. expenses to Sales	46 A/S Assets to Sales	47 E/S No of employees to Sales	48 C/S Capital to Sales
Operating expenses (O)	51 F/O Free cash flow to Op. expenses	52 R/O ECM Op. cash flow to Op. expenses	53 P/O EPM EBIT to Op. expenses	54 S/O EIM **Sales to Op. expenses**	55 1	56 A/O Assets to Op. expenses	57 E/O No of employees to Op. expenses	58 C/O Capital to Op. expenses
Average Assets (A)	61 F/A Free cash flow to Assets	62 R/A RCM Op. cash flow to Assets	63 P/A RPM EBIT to Assets	64 S/A RIM Sales to Assets	65 O/A REM **Op. expenses to Assets**	66 1	67 E/A No of employees to Assets	68 C/A Capital to Assets
Average number of employees (E)	71 F/E Free cash flow to No of employees	72 R/E Op. cash flow to No of employees	73 P/E EBIT to No of employees	74 S/E Sales to No of employees	75 O/E Op. expenses to No of employees	76 A/E RM **Assets to No of employees**	77 1	78 C/E Capital to No of employees
Average Capital (C)	81 F/C Free cash flow to Capital	82 R/C KCM Op. cash flow to Capital	83 P/C KPM EBIT to Capital	84 S/C KIM Sales to Capital	85 O/C KEM Op. expenses to Capital	86 A/C Assets to Capital	87 E/C KRM **No of employees Capital**	88 1

Source: Siimann (2018, p. 82).

In summary, economic efficiency is measurement of acquired result and the resources used to obtain the result. It cannot be calculated using only one financial ratio as it is a broad concept. Therefore, the input and output indicators need to be selected to analyse the efficiency. The efficiency matrix approach can be arranged based on the companies' business activities, which can be characterised by the following scheme:

CAPITAL ⇨ *RESOURCES* ⇨ *EXPENSES* ⇨ *INCOME* ⇨ *PROFIT* ⇨ *CASH FLOW*

(the process of raising capital makes it feasible to acquire or invest in resources, which are converted via expenses to income, profit and cash flow). Capital, resources, expenses are considered as the input indicators, while income, profit, cash flow are considered as output indicators. Based on the aforementioned points, the efficiency matrix is developed, which consists of eight quantitative indicators (represents main business activities), is divided into 28 efficiency elements and provides 17 submatrices.

1.3.2. Analysis of benchmark index of company's overall efficiency

Benchmarking is a process of comparative study of activities of one economic company with the positive and best experiences of another company (primarily competitor). The efficiency of the company is a multi-measurable or multivariate phenomenon and the process of benchmarking is complicated if implemented with existing tools. However, a new efficiency tool has been invented,

which helps to make a benchmark process based on the company's efficiency – benchmark index of company's overall efficiency (BICOE).

The first mention about the comparative tool was provided by Mereste (1981), who initially developed the comparative multiplier matrix and later suggested a comparative multiplier of efficiency. The matrix contained the elements under the main diagonal of the efficiency matrix and the indicator of one factory was divided with the indicator of the factory of comparison. At the beginning it was supposed that the multiplier was based on arithmetic mean (formula 1.1), as the arithmetic mean is easier and more comfortable to calculate, despite all advantages of the geometric mean.

$$C_{ef}^{A/0} = \frac{2\sum c'^{A/0}_{ij}}{n^2-n}, \quad (1.1)$$

where $c'^{A/0}_{ij}$ – values of all the comparative matrix elements which should increase as efficiency grows, regardless of whether the elements practically increased or decreased,
n – number of quantitative indicators.

Subsequently, Root (1985) provided the hypothesis that the geometrical mean should be used instead of the arithmetic mean, as the grow or increase of efficiency can only be indicated only if the result is higher than 100%. Therefore, in this case, some points should be considered with the usage of arithmetic mean, as results depend on the location of the elements relative to the main diagonal (under or on top). Consequently, the usage of geometrical mean is considered more logical.

Siimann (2018) took into the consideration the previous works and developed the financial analysis tool, which can easily calculate the company's overall efficiency and then be implemented in the efficiency benchmark process among the competitors. At first, it should be determined what to assume as the benchmark (Siimann, 2018, p. 97):

1) Company's own information and data
2) Industry leader of the market
3) All the companies' average indicators in the industry

The restriction about the BICOE is that the index can be used only if the compared companies are profitable (EBIT and cash flow indicators are positive). Otherwise, if the companies have negative EBIT or cash flow indicators, there is no point in calculating or sometimes it is not even possible. In the opinion of the author of the thesis, the reason is that positive EBIT has a positive influence on the ratio, whereas the change in the sign of EBIT will have an opposite influence (negative) on

the ratio. For example, EBIT as the numerator of the ratio changes from negative variable to positive variable, while the denominator remains positive in both cases. Thus, EBIT of the previous year was negative and changes to positive EBIT for the following year. It means that the profitability of the company has been improved but the relative change of the EBIT to the denominator is negative. The same principle is considered with cash flow indicators.

According to Siimann (2018), the first way of calculating BICOE is based on the growth indices of all the elements of an efficiency field (formulas 1.2 and 1.3). In this way, the next steps should be done:

- Create overall efficiency matrices using all companies' financial information for a period analysed.
- Divide the all companies the efficiency field elements by the efficiency field elements assumed as the benchmark:

$$c_{ij}^{A/0} = \frac{x_{ij}^{A}}{x_{ij}^{0}} \ , \tag{1.2}$$

where $c_{ij}^{A/0}$ – element of efficiency field of a comparative matrix,
x_{ij}^{A} – value of an efficiency field element of the company analysed,
x_{ij}^{0} – value of the efficiency field element of the company chosen as a benchmark (the same period).

- Calculation of BICOE (benchmark index of a company's efficiency):

$$BICOE = \sqrt[\frac{n^2-n}{2}]{\prod c_{ij}^{A/0}} \ , \tag{1.3}$$

where $c_{ij}^{A/0}$ – all efficiency elements of comparative matrix,
n – number of quantitative indicators.

- Make a ranking of the companies according to the benchmark index results of overall efficiency from the highest to the lowest order.
- Analyse and define the reasons why the company you analysed has taken a specific place in the order. (the more the $c_{ij}^{A/0}$element surpasses one, the higher the efficiency of the company, while the more the $c_{ij}^{A/0}$element is lower than one, the poorer the efficiency of the company).
- Make proposals for improvements of efficiency of the chosen company based on the results.

According to Siimann (2018), the second way of calculating BICOE is not to include the overall efficiency matrix. As the company's overall efficiency matrix include eight quantitative indicators and adding the benchmark index C_j , there formula (1.4) is used:

$$BICOE = \sqrt[28]{\prod_{j=1}^{8} C_j^{8-(2j-1)}} =$$

$$= \sqrt[28]{C_1^7} \times \sqrt[28]{C_2^5} \times \sqrt[28]{C_3^3} \times \sqrt[28]{C_4^1} \times \sqrt[28]{C_5^{-1}} \times \sqrt[28]{C_6^{-3}} \times \sqrt[28]{C_7^{-5}} \times \sqrt[28]{C_8^{-7}} \quad (1.4)$$

When the values of benchmark index of a company's efficiency are calculated, the overall result should be compared with number 1 (Siimann, 2018, p. 99). If the company's BICOE is more than one, then the efficiency level is higher than efficiency level of the benchmark company and vice versa. For instance, if the BICOE is 1.10 then the overall efficiency of the chosen company is 10% higher than the level of the benchmark company. If the BICOE is 0.9, then the overall efficiency of the chosen company is 10% lower than the level of the benchmark company.

Both ways of calculating the BICOE are valid and the values are equal. The main difference between both ways is that the former is more detailed and provides the numerical value of BICOE and the ranking order of the companies can also be composed. However, the second way is less time consuming.

To conclude, based on the results of the efficiency matrix approach, the benchmark analysis can be implemented. According to the aims or purposes of managers of the company, the assumption of what to consider as the benchmark needs to be determined. The performance of the analysis among the competitors is possible only if the competitors are profitable (EBIT is positive) and the cash flow group indicators are positive for the period analysed. The benchmark index of company's overall efficiency can be calculated by using two ways, where one is more detailed and provides the ranking order of the companies and the other, which is less time consuming.

1.3.3. Growth analysis of company's overall efficiency

The efficiency level is important concept for companies, as the managers want to know how efficiently the resources in the business activities are used. Moreover, another important question arises for the company: whether the company's overall efficiency improved or deteriorated during the analysed period. To find the answer for the question, the growth index of a company's overall efficiency (GICOE) tool was developed by Siimann in 2018. The tool helps to understand and comprehend of how the overall efficiency field of the company changed (Siimann, 2018, p. 100).

The GICOE can be applied only if the indicators of the company's overall efficiency matrix are positive in a like manner as BICOE. Otherwise, there is no point of calculating. In addition, the GICOE can be calculated in two ways as well as BICOE.

The first mention about dynamic ranking tool was provided by Mereste (1980), who proposed the overall efficiency index where the elements of efficiency matrix were inserted. It was presumed that the arithmetic mean (formula 1.5) would be used in the calculation of the index.

$$I_{ef} = \frac{2\sum I'_{\beta_{ij}}}{n^2-n}, \quad (1.5)$$

where $I'_{\beta_{ij}}$ – growth indices of all efficiency matrix elements which should grow, regardless of whether the elements practically increased or decreased,
n – number of quantitative indicators.

Subsequently, Root (1981) indicated that indices denoted the change in efficiency are multiples. Thus, the use of geometrical mean (formula 1.6) was considered more logical and correct.

$$I_{ef}^{G} = \sqrt[\frac{n^2-n}{2}]{\prod I'_{\beta_{ij}}}, \quad (1.6)$$

where $I'_{\beta_{ij}}$ – growth indices of all efficiency matrix elements which should grow, regardless of whether the elements practically increased or decreased,
n – number of quantitative indicators.

Next, Siimann (2018), by having explored taking into consideration the previous works, developed the financial analysis tool, which allows following the dynamics and changes of the company's overall efficiency during a determined period.

According to Siimann (2018), the first way of calculating is used with growth indices of all elements of an efficiency field (formulas 1.7 and 1.8). In this way, the next steps should be executed:

- Create overall efficiency matrices using the entire financial information of the company for a period analysed and for basic year (the year to compare with).
- Divide all the efficiency field elements of the chosen period of the company by the efficiency field elements of basic year:

$$i_{ij}^{t1/t0} = \frac{x_{ij}^{t1}}{x_{ij}^{t0}}, \quad (1.7)$$

where $i_{ij}^{t1/t0}$ – element of growth index of a company's overall efficiency,
x_{ij}^{t1} – efficiency field element of the analysed company of the chosen period,

x_{ij}^{t0} – efficiency field element of the analysed company of the preceding period.

- Computing of the GICOE (growth index of a company's overall efficiency):

$$GICOE = \sqrt[\frac{n^2-n}{2}]{\prod i_{ij}^{t_{k/t_0}}}, \quad (1.8)$$

where $i_{ij}^{t_{k/t_0}}$ – all index matrix efficiency field elements,
n – number of quantitative indicators

- Make a ranking of the companies according to the growth index results of overall efficiency from the highest to the lowest order.
- Analyse and define the reasons why the company you analysed has taken a specific place in the order. (the more the i_{ij} element surpasses one the greater the growth of efficiency of the company, the more the element i_{ij} is lower than one the bigger the recession of the company's efficiency).
- Make proposals for improvements of efficiency of the chosen company based on the results.

According to Siimann (2018), the second way of calculating GICOE is not to include the overall efficiency matrix. As the company's overall efficiency matrix include eight quantitative indicators and adding the benchmark index I_j, there formula (1.9) is used:

$$GICOE = \sqrt[28]{\prod_{j=1}^{8} I_j^{8-(2j-1)}} =$$

$$= \sqrt[28]{I_1^7} \times \sqrt[28]{I_2^5} \times \sqrt[28]{I_3^3} \times \sqrt[28]{I_4^1} \times \sqrt[28]{I_5^{-1}} \times \sqrt[28]{I_6^{-3}} \times \sqrt[28]{I_7^{-5}} \times \sqrt[28]{I_8^{-7}} \quad (1.9)$$

When the values of growth index of a company's overall efficiency are calculated, they should be compared with number 1 (Siimann, 2018, p. 102). If the company's GICOE is more than one, then the efficiency level has increased than the efficiency level of the company in the preceding period and vice versa. For instance, if the GICOE is 1.1 then the overall efficiency of the chosen company has increased 10% comparing to the level of the efficiency level of the company in the preceding period. If the GICOE is 0.9, then the overall efficiency of the chosen company has declined 10% comparing to the level of the efficiency level of the company in the preceding period.

Both ways of calculating the GICOE are valid and the values should be equal. The differences of GICOE are similarly to BICOE's. The advantage of the first way is that it is more detailed and

provides the numerical value of GICOE, while the ranking order of the companies can be composed. However, the second way is less time consuming.

To conclude, based on the results of the efficiency matrix approach the efficiency growth analysis can be implemented. The analysis examines and follows the dynamics of changes of overall efficiency of the company within analysed period. The growth index of company's overall efficiency can be calculated by using two ways, where one is more detailed and provides the ranking order of the companies based on the results of the analysis and the other is less time consuming.

1.3.4. Variance analysis

Variance analysis (also known as component analysis) – the analysis that helps to discover the reasons of changes in the values of ratios by dividing them into components. All the elements that are below of the main diagonal of efficiency matrix, are the efficiency elements. According to Mereste (1980), each quantitative indicator can be viewed in two manners:

1) component with impact;
2) performance indicator.

With the matrix approach conducted by Siimann, the following statements were discovered:

- the rows and column vectors are related;
- square matrix consists of two triangular matrices;
- the triangular matrices are symmetric to each other;
- efficiency matrix is matrix model where the elements are interrelated;
- the key element of the matrix is on the first column of the last row;
- after the aims of analyses are reached, the matrix model allows to develop component systems by many variants.

By addressing to the company's overall efficiency matrix (Table 1.1) and using the matrix approach the component expression emerges**:**

$$\boldsymbol{x_1 = x_{81} \times x_8}, \quad (1.10)$$

by which it can be inferred that free cash flow equals the product of the ratio Free cash flow to Average capital and Average capital. The previous sentence presumes: to increase free cash flow earned the capital or free cash flow earned per euro of capital invested or both should be increased (considering that Free cash flow to Average capital remains the same). The same relationships can be composed between all the quantitative elements included in the efficiency matrix (Siimann,

2018, p. 89). The most important element was defined based on the efficiency matrix: Free cash to Average capital (F/C). In the same matrix, there are seven main elements of efficiency presented:

1) Free cash flow to Net operating cash flow (F/R);
2) Net operating cash flow to EBIT (R/P);
3) EBIT to Sales (P/S);
4) Sales to Operating Expenses (S/O);
5) Operating expenses to Average assets (O/A);
6) Average assets to Average number of employees (A/E);
7) Average of employees to Average Capital (E/C).

Consequently, the can be relationship created:

$$\frac{F}{C} = \frac{F}{R} \times \frac{R}{P} \times \frac{P}{S} \times \frac{S}{O} \times \frac{O}{A} \times \frac{A}{E} \times \frac{E}{C}, \quad (1.11)$$

The more general form for the relationship is the next:

$$x_{81} = x_{21} \times x_{32} \times x_{43} \times x_{54} \times x_{65} \times x_{76} \times x_{87} \quad (1.12)$$

By placing the formula (1.10) into the formula (1.12), there is a relationship between Free cash flow and eight elements appear:

$$x_1 = x_{21} \times x_{32} \times x_{43} \times x_{54} \times x_{65} \times x_{76} \times x_{87} \times x_8. \quad (1.13)$$

Thus, it means that a change in every component in the formula affects the Free cash flow. Every component needed to be increased but other indicators should not decrease simultaneously in achieving an increase in the Free cash flow.

The formula (1.10) can be changed to

$$T = a \times b \quad (1.14)$$

and the dynamics can be defined as:

$$\frac{T_1}{T_0} = \frac{a_1 \times b_1}{a_0 \times b_0}. \quad (1.15)$$

Following the formula (1.15), the component indices are composed:

$\frac{T_a}{T_0} = \frac{a_1 \times b_0}{a_0 \times b_0}$. – index of component (a);

$\frac{T_1}{T_a} = \frac{a_1 \times b_1}{a_1 \times b_0}$. – index of component (b).

The absolute impact of every component may be discovered by chain replacement as the difference between the numerator and denominator of the component index (Siimann, 2018, p. 104). In consequence, the following sequence arises:

1) The absolute impact of component (a) – Average capital on the indicator which is analysed:

$$\Delta T(a) = T_a - T_0 = (a_1 - a_0) \times b_0 \quad (1.16)$$

2) The absolute impact of component (b) – Free cash flow to Average capital on the indicator which is analysed:

$$\Delta T(b) = T_1 - T_a = a_1 \times (b_1 - b_0) \quad (1.17)$$

Besides, similarly to the analysis of two components, a component analysis with the bigger quantity of components can be used. The relative impact of every component in the total change can be found as the division of its absolute impact on the indicator analysed on the total change in the indicator, which is analysed:

$\Delta T(a)/\Delta T$ – component (a), (1.18)

$\Delta T(b)/\Delta T$ – component (b). (1.19)

In summary, the variance analysis helps comprehend the reasons of changes of the elements of the company's overall efficiency matrix and discover the impact of the components to the elements in the matrix. The matrix approach helps to discover relationships between the elements and compose formulas for the component analysis based on the relationships of the elements. The definition of the absolute impact of the components can be detected by using the chain-linking method. Finally, the relative impact of the components can be discovered using the absolute impact on the indicator analysed and the total change in the indicator.

To sum up the first chapter, the next conclusions should be mentioned:

- The financial analysis is used to estimate the financial position, financial performance and cash flow of the company and then to make business decisions as well as to recognise weak areas the management of the company needs to improve and strong areas on which the company can rely.
- The financial analysis provides the information for users to make various economic decisions, while each user has his own purposes of financial statement analysis.
- Economic efficiency is measurement of acquired result and the resources used to obtain the result; to analyse the efficiency, the input and output indicators need to be selected.
- The company's overall efficiency matrix can be composed based on the companies' business activities, where the quantitative indicators of the company's overall efficiency represent the company's business activities; capital, resources, expenses are considered as input indicators, while income, profit and cash flow are considered as output indicators (the process of raising capital makes it feasible to acquire or invest in resources, which are converted via expenses to income, profit and cash flow).

- Benchmark analysis can be performed when the results of the company's overall efficiency matrix are defined or calculated, depending on the aims or purposes of managers of the company.
- The implementation of the benchmark analysis among the competitors is possible only if the competitors are profitable (EBIT and cash flow indicators are positive) for the period analysed.
- The growth index analysis of company's overall efficiency investigates the dynamics of changes of overall efficiency of the company within the period analysed and can only be applied only if the indicators of the company's overall efficiency matrix are positive.
- The variance analysis allows comprehend the reasons of changes of the elements of the company's overall efficiency matrix and the matrix approach allows to detect relationships between the elements and compose formulas for the component analysis based on the relationships between the elements.

The next chapter reveals an example of implementation of the efficiency analysis tools as well as the analysis of the calculated or received data. In addition, based on the received results of the calculations, the recommendations for further efficiency increase for the company are provided.

2. EFFICIENCY ANALYSIS OF ADIDAS GROUP

The purpose of the this chapter is to analyse Adidas Group, the industry of the company and the efficiency of the company by applying the new financial analysis tools such as company's overall efficiency matrix, benchmark index of the company's overall efficiency and growth index of the company's overall efficiency as well as provide the recommendations to the company based on the results of the analysis.

2.1. Competition overview

The industry in which the company operates includes design and manufacturing of athletic apparel, footwear, sports accessories and equipment for sport or physical exercises. The sportswear tends to ensure comfort to a wearer or a sportsperson. Adidas, Nike, Puma, Under Armour, New Balance, Asics are some of the examples of the industry players. All of these big players operate in different locations of Europe, North and Latin America and the Asia-Pacific region. According to Statista, the USA is the largest market of the sportswear industry. The aforementioned companies sell their products through retail stores, online stores, licensees, independent distributors.

Figure 2.1 indicates that the total trend of sales of three main industry leaders is increasing. Nike is the world's leader in the sportswear industry with the highest numbers of sales. According to Statista, North America is the main market for Nike as around 50% (around 15 billion euros) of the global revenue was generated in the USA in 2017. The main reasons of the success can be referred to marketing campaigns and contracts with professional athletes and teams.

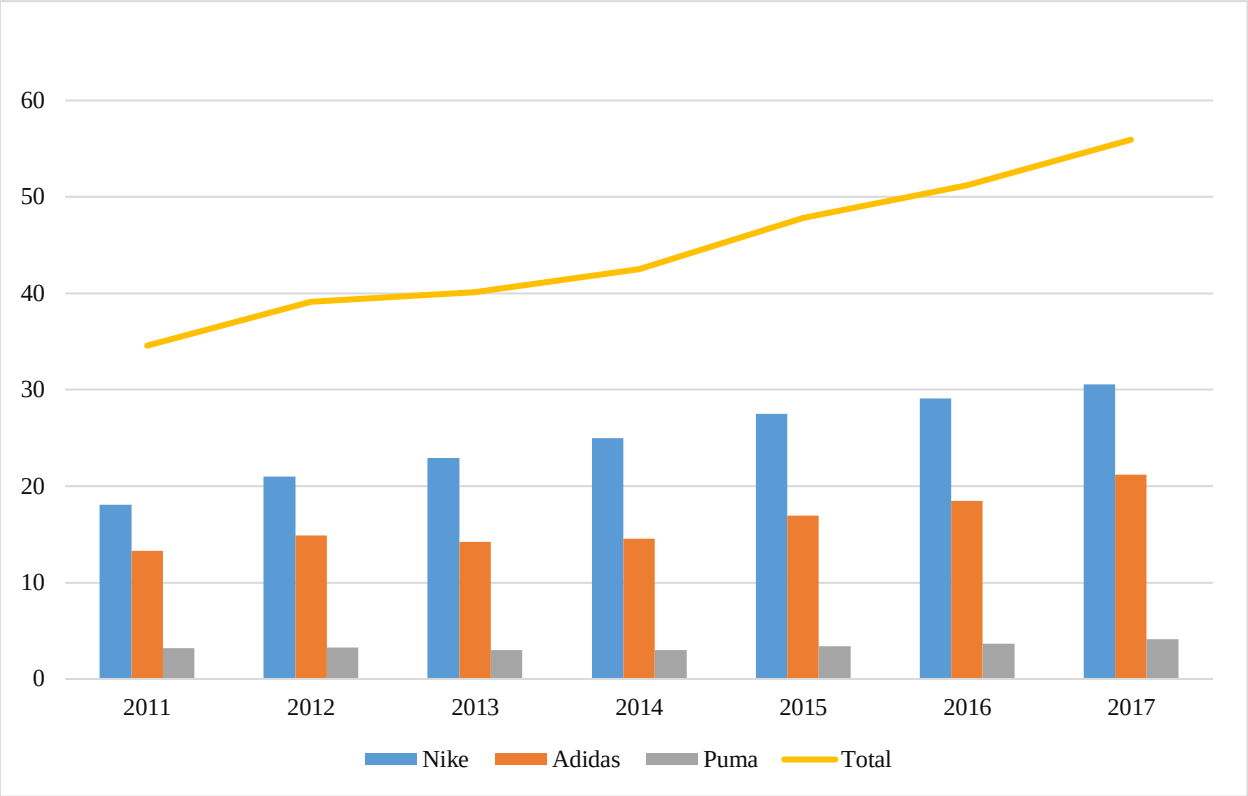

Figure 2.1. Total sales revenue of three main industry leaders of the industry (in billions euros)
Source: Compiled by the author on the basis of data provided by Statista.

Adidas is the largest manufacturer in Europe and the second largest manufacturer in the world after Nike. In 2017 the annual total sales revenue of Adidas was more than 21 billion euros. In 2013 sales revenue of Adidas dropped by 5% comparing with 2012. The weakness of currencies in some countries, including Russia, the third largest market of that year, a supply reduction in athletic apparel and footwear and weakness in the golf market due to the wet weather that year caused the decrease in sales turnover. In recent years (2011–2017), Adidas has improved its sales performance. The reasons for that are successful marketing strategies, the design and manufacturing of new collections of sportswear, contracts with celebrities, professional athletes and sports clubs as well as Nike. Footwear is the most important for both Nike and Adidas as it generated more than 50% of global revenue in 2017.

Puma is a German company and is another large manufacturer of sportswear of the world. According to Statista, Europe and the USA are the key markets for Puma as there are around 75 % of global sales were generated in these markets in 2017. Moreover, total sales revenue of the three main industry leaders of the industry (Figure 2.1) indicates that 2013 was the challenging year for Puma as well as for Adidas. In the author's opinion, currency weakness in some market countries,

lack of brand recognition, problems with commercial products, desirable distribution and success of other competitors subsequently caused a significant drop in sales revenue. In recent years the company has improved its sales performance. In 2017, the company generated over 4 billion euros, which is 38% higher than in 2013 due to new contracts with professional sports teams, celebrities and athletes. Consequently, contracts with athletes and sports clubs are the main tactic of these three largest industry leaders. In addition, according to Statista, Puma generated over 45% of the sales revenue from footwear sales.

2.2. Company overview

Adidas Group is a German manufacturer, which operates in the sportswear industry worldwide. The company is the largest manufacturer in Europe and the second largest in the world. The core brands of the Group are Adidas and Reebok. The mission of the company is to be the best sports company in the world. The key headquarters of the company are in Herzogenaurach, Amsterdam, Boston, Portland, Shanghai, Hong Kong and Panama. The company had 56,888 employees in 2017, which reflects a decrease of 3%, in comparison with 2016 (Adidas, 2018, p. 81). There are employees from over 100 nations working at the main headquarter in Herzogenaurach (Germany).

Based on the annual reports (2011–2017) of Adidas Group, the following main events appeared during the period analysed:

- In 2011:
    1. Extension of sponsorship agreement between Adidas and Spanish national football team.
    2. Launch of the lightest basketball shoes – adizero Crazy Light.
    3. Launch of adipower Predator – the lightest boots of Predator line.
    4. Extension of sponsorship agreement between Adidas and Bayern Munich, one of the most famous football club in the world.
- In 2012:
    1. Launch of football boots – Predators, which is made of superlight rubber.
    2. Launching of Truwalk zero, which are the lightest shoes ever made.
    3. Investigation of violation of commercial rights at Reebok business in India.
- In 2013:
    1. Release of new football Nitrocharge, which are the energy-retaining boots.

2. Release of miCoach Smart Run – a smart chip for runners and footballers to track runs, heart rate and coaching.
3. Economic downturn in the third largest market of Adidas Group – Russia/CIS.
4. Golf market instability.

- In 2014:
  1. Release of new football boots for the 2014 World Cup.
  2. Germany won the 2014 World Cup, with Adidas as a sponsor of the team.
  3. Executional mistakes of the Group management regarding the golf market.
  4. Crisis in the Russian market.
  5. Depreciation of currencies of different markets.
- In 2015:
  1. Release of shoes made of yarns recycled from the ocean waste.
  2. Acquisition of Runtastic, a leading fitness app provider.
  3. Challenges with home market of Reebok.
  4. TaylorMade – adidas Golf continues to meet challenges in the golf market.
- In 2016:
  1. Release of world's first high-performance laceless boots by Adidas.
  2. Release of PureBOOST X (running shoes), especially for women.
  3. Continue of decrease of sales revenue from Russian market.
- In 2017:
  1. Adidas Group and Siemens announced collaboration in digital production of sporting goods.
  2. Implementation of Futurecraft 4D – the world's first high-performance footwear featuring midsoles that are processed with oxygen and light and presentation of the first-ever ultraboost laceless.
  3. Extension of partnership with Major League Soccer untill 2024.
  4. Continue of decrease of sales revenue from Russian market.

The company outsources the production to different independent suppliers to minimise production costs or for competitive costs, which are mostly in Asia (77% of total production in 2011 and 79% in 2017), according to Figure 2.2. Moreover, according to annual reports (2011, 2017), the company cooperated with 308 independent suppliers in 2011, whereas in 2017 the company operated with 296 independent manufacturing partners.

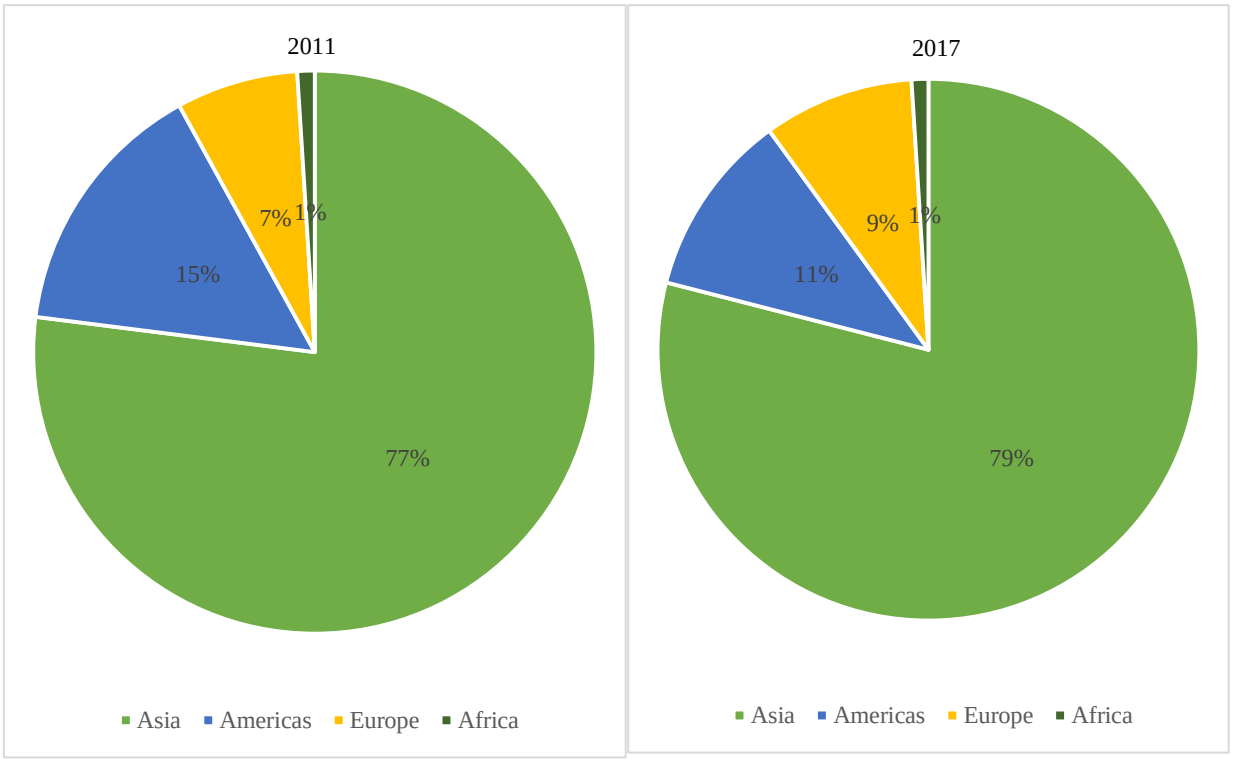

Figure 2.2. Sportswear industry suppliers of Adidas Group in 2011 and in 2017
Source: Compiled by the author based on data provided by Adidas Group's annual reports (2011 and 2017).

According to Figure 2.2, Americas represented 15% of the whole production, Europe 7% and Africa only 1%. Furthermore, 97% of entire footwear production was produced in Asia, while 35% of it was produced in China, 29% in Vietnam and 26% in Indonesia. Americas represented only 2% of entire footwear production and Europe 1%. In total, 245 million shoes were produced by suppliers in 2011. In 2011, the key producer of the athletic apparel was Asia, representing 83% of total production, while Europe represented 11% and Americas 6%. China was the largest producer, representing 35% of total production, 14% in Thailand and 11% in Indonesia. In total, 321 units of athletic apparel were produced in 2011.

Finally, the main producer of the hardware production was Asia, which represented 98% of total volume produced, with Europe producing only 2%. China was the largest producer, representing 66% of the total production, Vietnam represented 21% and Pakistan 10%. In total, approximately, 51 million units of hardware were produced in 2011 (Adidas Group, 2012, pp. 93–94). The main supplier of the company in 2017 was Asia, which was 79% of the whole production (Adidas, 2018). The Americas' suppliers represented 11% of the whole production, European's suppliers represented only 9% of the total production and Africa took only 1%.

Moreover, 97% of entire footwear production was produced in Asia whereas only 2% was produced in Americas and only 1% in Europe. Vietnam represented the largest volume of footwear production in 2017 – 44% of entire footwear production. The second largest sourcing country was Indonesia with 25% of entire Asian footwear volume and China represented only 19% in 2017. In all, the total volume of footwear produced accounted for 403 million pairs of shoes in 2017.

In 2017, the key producer of athletic apparel was Asia, which represented 93% of entire production. Suppliers in the Americas represented 4% of total production of athletic apparel, with Europe representing 3% and Africa only 1%. According to Adidas Group's annual report (2017), China was the largest manufacturer of athletic apparel with 23% of the total volume produced. The second largest source country was Cambodia with 22%. Finally, Vietnam represented 18% of the produced volume in 2017. In aggregate, the total volume of athletic apparel produced accounted for 404 million units in 2017.

In addition to athletic apparel, Asia represented the highest volume of hardware production such as balls and bags, which accounted for 82%. Europe represented 16% of the total production and the Americas only 2%. Furthermore, China was the largest manufacturer of hardware production, representing 40% of the total volume produced. Pakistan was the second largest manufacturer with 18%. Finally, Turkey represented only 15% of the total volume produced in 2017. The total volume of hardware produced accounted for 110 million units.

Table 2.1 concludes the general information shortly and key data about Adidas Group during the period analysed (2011–2017), where it can be seen that in 2014 financial indicators, such as market capitalisation and net income of the company were the lowest (11.77 and 0.50 billion euro respectively), while market capitalisation and net income in 2017 were the highest (34.08 and 1.10 billion euro respectively).

Table 2.1. General information of Adidas Group 2011–2017.

Year	Number of employees	Sales revenue (billion euro)	Volume of items produced (million units)	Main sportswear supplier (% of total production volume)	Net profit (billion euro)	Market capitalisation (billion euro)
2017	56,888	21.22	917	Asia–79	1.10	34.08
2016	58,902	18.48	851	Asia–80	1.02	30.25
2015	55,555	16.92	778	Asia–79	0.64	18.00
2014	53,731	14.53	666	Asia–83	0.50	11.77
2013	49,808	14.20	642	Asia–78	0.79	19.38
2012	46,306	14.88	595	Asia–76	0.52	14.09
2011	46,824	13.32	602	Asia–77	0.61	10.52

Source: Compiled by the author based on data provided by Adidas Group's annual reports (2011–2017) and Statista.

However, the volume of items produced in 2011 was higher than in 2014 (602 and 666 million units respectively). Furthermore, the lowest sales revenue of the company was in 2011 (13.32 billion euro) and the highest indicator was in 2017 (21.22 billion euro). Finally, the number of employees increased each year, except in 2017, according to Table 2.2.

2.3. Efficiency analysis of Adidas Group 2011–2017

In order to compose the company's overall efficiency matrix, the initial data of all the indices of the company's annual report data is required (Table 2.2). In the case of Adidas Group, the information from the 2011–2017 annual reports was used to compose the company's overall efficiency matrix.

Table 2.2. Initial data of Adidas Group 2011–2017.

Year / Q1 (in mil euros, excl E)	Free cash flow (F)	Net operating cash flow (R)	EBIT (P)	Sales (S)	Operating expenses (O)	Average assets (A)	Average no of employees (E)	Average capital (C)
2017	1,583	2,263	2,085	21,218	19,280	14,598	57,895	7,605
2016	1,168	1,782	1,606	18,483	17,268	14,260	57,229	7,775
2015	936	1,527	1,104	16,915	16,037	12,880	54,643	7,484
2014	500	1,037	894	14,534	13,813	12,008	51,770	7,153
2013	822	1,065	1,186	14,203	13,215	11,625	48,057	6,797
2012	1,195	1,412	948	14,883	13,930	11,444	46,565	6,593
2011	668	1,234	977	13,322	12,560	10,928	44,683	6,321
2017/2016	1.36	1.27	1.30	1.15	1.12	1.02	1.01	0.98
2016/2015	1.25	1.17	1.45	1.09	1.08	1.11	1.05	1.04
2015/2014	1.87	1.47	1.23	1.16	1.16	1.07	1.06	1.05
2014/2013	0.61	0.97	0.75	1.02	1.05	1.03	1.08	1.05
2013/2012	0.69	0.75	1.25	0.95	0.95	1.02	1.03	1.03
2012/2011	1.79	1.14	0.97	1.12	1.11	1.05	1.04	1.04
CAGR 2017/2011	1.15	1.11	1.13	1.08	1.07	1.05	1.04	1.03

Source: Compiled by the author based on Appendix 1.

CAGR shows (Table 2.2) that all eight quantitative indicators (free cash flow, net operating cash flow, earnings before interest and taxes, sales, operating expenses, average assets, average number of employees and average capital) increased during the period analysed. The highest increase happened in free cash flow in relative term, rising from 668 million euro in 2011 to 1,583 million euro in 2017. As can be seen from the initial data information (Table 2.2), 2013 and 2014 were the most challenging years for the company during the period analysed. The main reasons of decreases in 2013 were depreciation of currencies in Russia (one of the largest sales area for the company), Japan, Brazil, Argentina, Australia, Canada and Turkey as well as product supply and distribution problems regarding Russia/CIS and poor management decisions concerning the global golf market, according to annual reports (2013, 2014).

Negative currencies effects caused the deprivation of 750 million euros, (Adidas Group, 2014). The main reasons of the decline in 2014 were the economic downturn in Russia as well as further depreciation of Russian rouble and other currencies and underestimated golf market at the beginning of 2014. Over the years of 2015 and 2016, both input the output indicators increased, according to initial data of the company (Table 2.2). The highest increase in both relative and absolute term among input indicators was in operating expenses – 1.16 (from 13,813 million euro in 2014 to 16,037 in 2015), as the result of business growth as well as expense for point-of-sale and increase in marketing expenses, sales and logistics expenses.

The most significant growth in the relative term among output indicators was in free cash flow – 1.87 (from 500 million euro in 2014 to 936 million euro in 2015), mainly due to an increase in accounts payable, while net cash used in investing activities due to the purchase of Runtastic – an Austrian mobile fitness company (Adidas Group, 2016). Finally, the highest increase in the absolute term among output indicators was in sales from 18,483 million euro in 2016 to 21,218 million euro in 2017, due to an increase in the production units of footwear, apparel and hardware units as well as increase in sales (except for Russia/CIS) and growth in euro terms.

Based on the framework of the company's overall efficiency matrix (Table 1.1) and initial data of Adidas Group 2011–2017 (Table 2.2), the company's overall efficiency matrix for Adidas Group is compiled in Table 2.3. When comparing 2017 values with 2011 (Table 2.3), the value of 27 elements out of 28 of the Adidas Group's efficiency matrix increased, whereas one element (net operating cash flow) decreased during the period analysed (CAGR: 0.975). This was mainly due to an increase in earnings before interest and taxes in both absolute and relative terms from 948 million euro in 2012 to 1,186 million euro in 2013, as well as a decline in net operating cash flow from 1,412 million euro in 2012 to 1,065 million euro in 2013 (decrease 25%). The latter was due to increase in trade receivables and a significant increase in inventories as the company purchased more goods than it sold. Besides, cash outflow from investing activities increased by 26 million euro, mainly due to investments in furnishing and fitting of the company's stores as well as investments in logistics and IT systems.

Table 2.3. Overall efficiency matrix of Adidas Group 2011–2017

Year / QI (in mil euros excl E)	Free cash flow (F)	Net operating cash flow (R)	EBIT (P)	Sales (S)	Operating expenses (O)	Average assets (A)	Average no of employees (E)	Average capital (C)
F	1							
R	F/R							
2017	0.700							
2016	0.655							
2015	0.613							
2014	0.482	1						
2013	0.772							
2012	0.846							
2011	0.541							
2017/2011	1.292							
2016/2011	1.211							
2015/2011	1.132							
2014/2011	**0.891**							
2013/2011	1.426							
2012/2011	1.563							
CAGR								
2017/2011	1.044							
P	F/P	R/P						
2017	0.759	1.085						
2016	0.727	1.110						
2015	0.848	1.383						
2014	0.559	1.160	1					
2013	0.693	0.898						
2012	1.261	1.489						
2011	0.684	1.263						
2017/2011	1.110	**0.859**						
2016/2011	1.064	**0.878**						
2015/2011	1.240	1.095						
2014/2011	**0.818**	**0.918**						
2013/2011	1.014	**0.711**						
2012/2011	1.844	1.179						
CAGR								
2017/2011	1.018	**0.975**						
S	F/S	R/S	P/S					
2017	0.075	0.107	0.098					
2016	0.063	0.096	0.087					
2015	0.055	0.090	0.065					
2014	0.034	0.071	0.062	1				
2013	0.058	0.075	0.084					
2012	0.080	0.095	0.064					
2011	0.050	0.093	0.073					
2017/2011	1.488	1.151	1.340					
2016/2011	1.260	1.041	1.185					
2015/2011	1.104	**0.975**	**0.890**					
2014/2011	**0.686**	**0.770**	**0.839**					
2013/2011	1.154	**0.810**	1.139					
2012/2011	1.601	1.024	**0.869**					
CAGR								
2017/2011	1.068	1.024	1.050					
O	F/O	R/O	P/O	S/O				
2017	0.082	0.117	0.108	1.101				
2016	0.068	0.103	0.093	1.070				
2015	0.058	0.095	0.069	1.055				
2014	0.036	0.075	0.065	1.052	1			
2013	0.062	0.081	0.090	1.075				
2012	0.086	0.101	0.068	1.068				
2011	0.053	0.098	0.078	1.061				
2017/2011	1.544	1.195	1.390	1.038				
2016/2011	1.272	1.050	1.196	1.009				
2015/2011	1.097	**0.969**	**0.885**	**0.994**				
2014/2011	**0.681**	**0.764**	**0.832**	**0.992**				
2013/2011	1.170	**0.820**	1.154	1.013				
2012/2011	1.613	1.032	**0.875**	1.007				
CAGR								
2017/2011	1.075	1.030	1.056	1.006				

A	F/A	R/A	P/A	S/A	O/A			
2017	0.108	0.155	0.143	1.454	1.321			
2016	0.082	0.125	0.113	1.296	1.211			
2015	0.073	0.119	0.086	1.313	1.245			
2014	0.042	0.086	0.074	1.210	1.150	1		
2013	0.071	0.092	0.102	1.222	1.137			
2012	0.104	0.123	0.083	1.301	1.217			
2011	0.061	0.113	0.089	1.219	1.149			
2017/2011	1.774	1.373	1.598	1.192	1.149			
2016/2011	1.340	1.107	1.260	1.063	1.054			
2015/2011	1.189	1.050	**0.959**	1.077	1.083			
2014/2011	**0.681**	**0.765**	**0.833**	**0.993**	1.001			
2013/2011	1.157	**0.811**	1.141	1.002	**0.989**			
2012/2011	1.708	1.093	**0.927**	1.067	1.059			
CAGR								
2017/2011	1.100	1,054	1.081	1,030	1.023			
E	F/E	R/E	P/E	S/E	O/E	A/E		
2017	0.027	0.039	0.036	0.366	0.333	0.252		
2016	0.020	0.031	0.028	0.323	0.302	0.249		
2015	0.017	0.028	0.020	0.310	0.293	0.236		
2014	0.010	0.020	0.017	0.281	0.267	0.232	1	
2013	0.017	0.022	0.025	0.296	0.275	0.242		
2012	0.026	0.030	0.020	0.320	0.299	0.246		
2011	0.015	0.028	0.022	0.298	0.281	0.245		
2017/2011	1.829	1.415	1.647	1.229	1.185	1.031		
2016/2011	1.365	1.128	1.283	1.083	1.073	1.019		
2015/2011	1.146	1.012	**0.924**	1.038	1.044	**0.964**		
2014/2011	**0.646**	**0.725**	**0.790**	**0.942**	**0.949**	**0.948**		
2013/2011	1.144	**0.802**	1.129	**0.991**	**0.978**	**0.989**		
2012/2011	1.717	1.098	**0.931**	1.072	1.064	1.005		
CAGR								
2017/2011	1.106	1.060	1.087	1.035	1.029	1.005		
C	F/C	R/C	P/C	S/C	O/C	A/C	E/C	
2017	0.208	0.298	0.274	2.790	2.535	1.919	7.613	
2016	0.150	0.229	0.207	2.377	2.221	1.834	7.361	
2015	0.125	0.204	0.148	2.260	2.143	1.721	7.302	
2014	0.070	0.145	0.125	2.032	1.931	1.679	7.238	1
2013	0.121	0.157	0.175	2.090	1.944	1.710	7.071	
2012	0.181	0.214	0.144	2.257	2.113	1.736	7.063	
2011	0.106	0.195	0.155	2.108	1.987	1.729	7.069	
2017/2011	1.970	1.524	1.774	1.324	1.276	1.110	1.077	
2016/2011	1.421	1.174	1.336	1.128	1.118	1.061	1.041	
2015/2011	1.183	1.045	**0.954**	1.072	1.078	**0.996**	1.033	
2014/2011	**0.661**	**0.743**	**0.809**	**0.964**	**0.972**	**0.971**	1.024	
2013/2011	1.144	**0.803**	1.129	**0.991**	**0.978**	**0.989**	1.000	
2012/2011	1.715	1.097	**0.930**	1.071	1.063	1.004	**0.999**	
CAGR								
2017/2011	1.120	1.073	1.100	1.048	1.041	1.018	1.012	

Source: Compiled by the author on the basis of the initial data of Adidas Group 2011–2017 (Appendix 1).

Furthermore, according to company's overall efficiency matrix (Table 2.3), the overall efficiency growth of the company for each year can be calculated, comparing it with the base year of 2011 (Table 2.4). This shows that 2017 was the most efficient year for Adidas Group in comparison with 2011 with an 33% overall efficiency increase due to the increase of all efficiency elements' values, except one (net operating cash flow to earnings before interest and taxes). On the other hand, in 2014 the overall efficiency of the company decreased by 17%, compared with 2011.

Table 2.4. Growth index of overall efficiency of Adidas Group 2011–2017.

Year	GICOE
2017/2011	**133%**
2016/2011	114%
2015/2011	104%
2014/2011	**83%**
2013/2011	101%
2012/2011	115%

Source: Compiled by author based on overall efficiency matrix of Adidas Group.

In addition, the overall efficiency of the company slightly increased in 2013 (challenging year) and 2015 (recovery year), whereas in 2012 and 2016 the overall efficiency of the company increased by 14%–15%. Based on overall efficiency matrix of Adidas Group (Table 2.3), the highest decreases during the period analysed were in all efficiency elements of the first column of the overall efficiency matrix due to a significant decrease in free cash flow and precisely during 2013 and 2014 (the most challenging years).

Moreover, based on the initial data of the company (Table 2.2), it can be seen that free cash flow decreased from 1,195 million euro in 2012 to 822 million euro in 2013. The main reason for this is the decline in cash from operating activities from 1,065 million euro in 2012 to 1,412 million euro in 2013, which was mainly due to reduced payments from customers (increase in accounts receivable) as well as an increase in inventories. In addition, investments in property, plant and equipment, such as investments in furnishing and fitting of stores and investments in logistics infrastructure and IT systems as well as investments in expansion of store base, especially in Russia/CIS, were also reasons for the decrease in free cash flow in 2013 (Adidas Group, 2014).

Furthermore, based on the initial data of the company (Table 2.2), it can be seen that free cash flow decreased further from 822 million euro in 2013 to 500 million euro in 2014. The main reasons are an increase in cash outflow from investing activities – lower proceeds from the sale of short-term financial assets, further expansion of retail activities and investments in property, plant and equipment, such as investments in furnishing and fitting of stores and investments in logistics infrastructure and IT systems as well as purchase of Luta Ltd, a company specialising in sportswear (Adidas Group, 2015).

In addition to free cash flow, significant decrease in the efficiency elements of the first column were due to:

- In (F/P) efficiency element in 2013 was caused by an increase in earnings before interest and taxes from 948 million euro in 2012 to 1,186 million euro in 2013, mainly due to a decrease in cost of sales by 400 million euro (Adidas Group, 2014).
- In (F/S) efficiency element in 2014 was caused by an increase in sales revenue from 14,203 million euro in 2013 to 14,534 million euro in 2014, due to strong whosale and retail growth (Adidas Group, 2015).
- In (F/O) efficiency element in 2014 was caused by an increase in cost of sales from 7,203 million euro in 2013 to 7,610 million euro in 2014 as well as an increase in operating expenses by 200 million euro from 2013 to 2014, such as marketing expenses, sales and logistics expenses.
- In (F/A) efficiency element in 2014 was caused by an increase in total assets from 11,599 million euro in 2013 to 12,417 million euro in 2014, as mainly due to an increase in cash and cash equivalents, accounts receivable and assets classified as held for sale (Rockport) (Adidas Group, 2015).
- In (F/E) efficiency element in 2014 was caused by an increase in number of employees from 49,808 to 53,731, due to an extension of the company's own retail stores (Adidas Group, 2015).
- In (F/C) efficiecny element in 2013 was caused by an increase in total equity due to an increase in retained earnings as well as an increase in short-term borrowings, whereas in 2014 it was caused by positive currency translation as well as an increase in hedging reserves.

To conclude, the highest decrease during the period analysed were in all efficiency elements of the first column of the overall efficiency matrix (Table 2.3), due to the significant decrease of free cash flow during 2013 and 2014. Moreover, the most efficient year for the company was 2017, while 2014 was the most inefficient (Table 2.4).

2.4. Benchmark analysis of Adidas Group 2017

Based on the data from Appendix 1 of Nike and information from efficiency matrix of Adidas Group (Table 2.3) for 2017, the comparative efficiency matrix can be arranged between Adidas Group and Nike (Table 2.5), in which Adidas Group is considered as a base company.

Table 2.5. Comparative efficiency matrix of Adidas Group and Nike for 2017.

Year / QI (in mil euros excl E)	Free cash flow (F)	Net operating cash flow (R)	EBIT (P)	Sales (S)	Operating expenses (O)	Average assets (A)	Average no of employees (E)	Average capital (C)
F	1							
R 2017	F/R 1.055	1						
P 2017	F/P 0.756	R/P 0.717	1					
S 2017	F/S 1.107	R/S 1.050	P/S 1.465	1				
O 2017	F/O 1.168	R/O 1.107	P/O 1.545	S/O 1.054	1			
A 2017	F/A 1.245	R/A 1.180	P/A 1.647	S/A 1.124	O/A 1.066	1		
E 2017	F/E 1.266	R/E 1.201	P/E 1.675	S/E 1.144	O/E 1.085	A/E 1.017	1	
C 2017	F/C 0.959	R/C 0.909	P/C 1.269	S/C 0.866	O/C 0.821	A/C 0.771	E/C 0.757	1

Source: Compiled by the author.

Table 2.5 summarises that only eight elements of the Adidas Group's efficiency matrix are higher than Nike's: F/P, R/P, F/C, R/C, S/C, O/C, A/C and E/C. Consequently, based on the results, it can be concluded that Adidas Group could raise its overall efficiency by increasing the use of assets, sales profitability and reducing operating expenses. Based on comparative efficiency matrix of Adidas Group and Nike (Table 2.5) or formula (1.4), the benchmark index of overall efficiency of Adidas Group and Nike can be calculated (Table 2.6).

Table 2.6. Benchmark index of overall efficiency of Adidas Group and Nike.

Year	BICOE
2017	108%

Source: Compiled by author.

Table 2.6 concludes that the overall efficiency of Nike was higher for 8% compared to Adidas Group in 2017, due to more efficient usage of cash, lower operating expenses, more efficient assets usage as well as more efficient usage of employees. Based on the data from Appendix 1 of Puma, and information from efficiency matrix of Adidas Group (Table 2.3) for 2017, the comparative efficiency matrix can be arranged between Adidas Group and Puma (Table 2.7), in which Adidas Group is considered as a base company.

Table 2.7. Comparative efficiency matrix of Adidas Group and Puma for 2017.

Year / QI (in mil euros excl E)	Free cash flow (F)	Net operating cash flow (R)	EBIT (P)	Sales (S)	Operating expenses (O)	Average assets (A)	Average no of employees (E)	Average capital (C)
F	1							
R	F/R							
2017	0.868	1						
P	F/P	R/P						
2017	0.914	1.053	1					
S	F/S	R/S	P/S					
2017	0.551	0.635	0.603	1				
O	F/O	R/O	P/O	S/O				
2017	0.530	0.610	0.580	0.962	1			
A	F/A	R/A	P/A	S/A	O/A			
2017	0.558	0.643	0.611	1.013	1.053	1		
E	F/E	R/E	P/E	S/E	O/E	A/E		
2017	0.534	0.615	0.584	0.969	1.008	0.957	1	
C	F/C	R/C	P/C	S/C	O/C	A/C	E/C	
2017	0.476	0.548	0.521	0.864	0.898	0.853	0.891	1

Source: Compiled by the author.

Table 2.7 summarises that the following 24 elements of the Adidas Group's efficiency matrix are higher than Puma's: F/R, F/P, F/S, R/S, P/S, F/O, R/O, P/O, S/O, F/A, R/A, P/A, F/E, R/E, P/E, S/E, A/E, F/C, R/C, P/C, S/C, O/C, A/C and E/C. Consequently, based on the results, it can be concluded that Adidas Group could increase its overall efficiency by rising the use of assets and slightly improve cash management. Based on comparative efficiency matrix of Adidas Group and Puma for 2017 (Table 2.7.) or formula (1.4), the benchmark index of overall efficiency of Adidas Group and Puma can be calculated (Table 2.8).

Table 2.8. Benchmark index of overall efficiency of Adidas Group and Puma.

Year	BICOE
2017	72%

Source: Compiled by author.

It can be concluded from Table 2.8 that the overall efficiency of Puma was lower for 28% than the overall efficiency of Adidas Group in 2017, due to less efficient investment usage, lower profitability, higher operating expenses, less efficient labour usage as well as less efficient capital management. Based on benchmark index efficiency results (Table 2.6 and Table 2.8), the ranking process by efficiency criteria can be performed (Table 2.9).

Table 2.9. Benchmark index of overall efficiency of Adidas Group and Puma

Company	BICOE
Nike	108%
Adidas Group	100%
Puma	72%

Source: Compiled by author.

Based on Table 2.9, it can be concluded that Adidas Group's is ranked between Nike and Puma, whereas Nike is a leader and Puma is the last.

2.5. Variance analysis of Adidas Group 2011–2017

By referring to the formula (1.10), it was mentioned that free cash flow equals the product of ratio ratio of Free cash flow to Average capital and Average capital. Consequently, as a solution to the distribution problem, the following formula can be composed, which characterises the free cash flow formation by expressing formula (1.13) in a manner of the formula (1.11):

$$F = C \times \frac{E}{C} \times \frac{A}{E} \times \frac{O}{A} \times \frac{S}{O} \times \frac{P}{S} \times \frac{R}{P} \times \frac{F}{R}, \quad (2.10)$$

where F – Free cash flow,

C – Average capital,

$\frac{E}{C}$ – Average number of employees to Average capital,

$\frac{A}{E}$ – Average assets to Average number of employees,

$\frac{O}{A}$ – Operating expenses to Average assets,

$\frac{S}{O}$ – Sales revenue to Operating expenses,

$\frac{P}{S}$ – Earnings before interests and taxes to Sales revenue,

$\frac{R}{P}$ – Net operating cash flow to Profit,

$\frac{F}{R}$ – Free cash flow to Net operating cash flow.

By implementing the chain-linking method and formula (1.15), the results of variance analysis are presented in Table 2.10, where F(Conditional) can be received after the replacement of every

component, the influence of every component in Free cash flow (ΔF) and the influence of every component in Free cash flow in a percentage equivalent.

Table 2.10. Distribution of absolute increment.

	Year	F	C	E/C	A/E	O/A	S/O	P/S	R/P	F/R
	2017	1583	7605	7.613	0.252	1.321	1.101	0.098	1.085	0.700
	2016	1168	7775	7.361	0.249	1.211	1.070	0.087	1.110	0.655
	2015	936	7484	7.302	0.236	1.245	1.055	0.065	1.383	0.613
	2014	500	7153	7.238	0.232	1.150	1.052	0.062	1.160	0.482
	2013	822	6797	7.071	0.242	1.137	1.075	0.084	0.898	0.772
	2012	1195	6593	7.063	0.246	1.217	1.068	0.064	1.489	0.846
	2011	668	6321	7.069	0.245	1.149	1.061	0.073	1.263	0.541
2017/2016	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	1142	1182	1196	1304	1341	1516	1483	1583
	Δ F	415	-26	39	14	108	37	176	-33	100
	%(Δ F)	100%	-6%	9%	3%	26%	9%	42%	-8%	24%
2016/2015	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	972	980	1036	1008	1023	1362	1092	1168
	Δ F	232	36	8	56	-28	15	339	-269	76
	%(Δ F)	100%	16%	3%	24%	-12%	6%	146%	-116%	33%
2015/2014	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	523	528	536	581	582	617	736	936
	Δ F	436	23	5	9	44	1	36	119	200
	%(Δ F)	100%	5%	1%	2%	10%	0%	8%	27%	46%
2014/2013	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	865	886	849	859	841	620	800	500
	Δ F	-322	43	20	-36	10	-18	-222	181	-300
	%(Δ F)	100%	-13%	-6%	11%	-3%	6%	69%	-56%	93%
2013/2012	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	1232	1233	1214	1134	1140	1495	901	822
	Δ F	-373	37	1	-19	-80	7	355	-594	-79
	%(Δ F)	100%	-10%	0%	5%	22%	-2%	-95%	159%	21%
2012/2011	Δ F (Component)	Δ F	Δ F(C)	Δ F(E/C)	Δ F(A/E)	Δ F(O/A)	Δ F(S/O)	Δ F(P/S)	Δ F(R/P)	Δ F(F/R)
	F(Conditional)	-	697	696	700	741	746	648	764	1195
	Δ F	527	29	-1	3	41	5	-98	116	431
	%(Δ F)	100%	5%	0%	1%	8%	1%	-19%	22%	82%

Source: Compiled by author.

Based on Table 2.10, it can be inferred that increase in Free cash flow by 527 million euro in 2012 was due to:

- Increase in Free cash flow to Net operating cash flow from 0.541 times to 0.846, which was an 82% impact on total change and a gain of 431 million euro, mainly due to a decrease in cash outflow from investing activities from 566 million euro in 2011 to 217 million euro in 2012 as a result of the selling of short-term financial assets, e.g. Immobilieninvest und Betriebsgesellschaft Herzo-Base GmbH & Co. KG (Adidas Group, 2013, p. 194).
- Increase in Net operating cash flow to EBIT from 1.263 to 1.489 times, which was a 22% impact on total change and a gain of 116 million euro, mainly due to a significant increase in cost of sales from 2011 to 2012 by 787 million euro and operating expenses (marketing expenses, sales and logistics expenses) by 583 million euro (Adidas Group, 2013, p. 190).

In 2013, a decrease in Free cash flow by 373 million euro was mainly due to:

- Decrease in Net operating cash flow to EBIT from 1.489 to 0.898 times, which was a 159% impact on total change and a loss of 594 million euro, mainly due to a significant increase of inventories from 2012 to 2013 by 276 million euro, especially in in Russia/CIS, reduced customer payments (increase in receivables) by 167 million euro as well as an increase in investment activities in property, plant and equipment – furnishing of stores, investments in IT systems and logistics (Adidas Group, 2014, p. 192).
- Increase in EBIT to Sales revenue from 0.064 to 0.084 times, which had a 95% impact on total change and a gain of 355 million euro. It was mainly due to a decrease in cost of sales from 2012 to 2013 by 578 million euro as well as operating expenses (marketing expenses, sales and logistics expenses) by 137 million euro (Adidas Group, 2014, p. 188).

In 2014, a decrease in Free cash flow by 322 million euro was mainly due to:

- Decrease in Free cash flow to Net operating cash flow from 0.772 to 0.482 times, which was a 93% impact on total change and a loss of 300 million euro, was mainly due to higher cash outflow from investing activities as the company sold significantly less short-term financial assets and acquired Luta Ltd, with a view to increasing the efficiency level in the future (Adidas Group, 2014, p. 194).
- Decrease in EBIT to Sales revenue from 0.084 to 0.062 times, which was a 69% impact on total change and a loss of 222 million euro. This was mainly due to an increase in cost of sales by 400 million euro from 2013 to 2014, as well as an increase in operating expenses marketing expenses, sales and logistics expenses) by 190 million euro (Adidas Group, 2015, p. 190).

In 2015, an increase in Free cash flow by 436 million euros was mainly due to:

- Increase in Free cash flow to Net operating cash flow from 0.482 to 0.613 times, which was a 46% impact on total change and a gain of 200 million euro. This was mainly due to the significant increase in accounts payable (the company takes more days to pay its bill); in 2014, the increase was 823 million euro (Adidas Group, 2016, p. 188).
- Increase in Net operating cash flow to EBIT from 1.160 to 1.383 times, which was a 27% impact on total change and gain of 119 million euro. This was mainly due to an increase in cost of sales by 1,138 million euro as well as an increase in accounts payables, as mentioned previously (Adidas Group, 2016, p. 184).

In 2016, an increase in Free cash flow by 232 million euro was mainly due to:

- Increase in EBIT to Sales revenue from 0.065 to 0.087 times, which was a 146% impact on total change and gain of 339 million euro, mainly due to the company increasing sales revenue within one year by 1,568 million euro, while cost of sales increased insignificantly (Adidas, 2017, p. 140).
- Decrease in Net operating cash flow to EBIT from 1.383 to 1.110 times, which was a 116% impact on total change and loss of 269 million euro. This was mainly due to a higher increase in receivables (clients take longer periods to pay their bills) (Adidas, 2017, p. 143).

In 2017, an increase in Free cash flow by 415 million euro was mainly due to:

- Increase in EBIT to Sales revenue from 0.087 to 0.098 times, which was a 42% impact on total change and a gain of 176 million euro. This was mainly due to an insignificant increase in cost of sales, while sales revenue increased by 2,735 million euro (Adidas, 2018, p. 152).
- Increase in Operating expenses to Average assets from 1.211 to 1.321 times, which was a 26% impact on total change and a gain of 108 million euro. This was mainly due to an increase in usage intensity of assets (Adidas, 2018, p. 150).
- Increase in Free cash flow to Net operating cash flow from 0.655 to 0.700 times, which was a 24% impact on total change and a gain of 100 million euro. This was mainly due to a decrease in inventories in 2017 (Adidas, 2018, p. 155).

2.6. Recommendations for efficiency improvements

Based on comparative efficiency matrix of Adidas Group and Nike for 2017 (Table 2.5) and comparative efficiency matrix of Adidas Group and Puma for 2017 (Table 2.7) as well as overall

efficiency matrix of Adidas Group 2011–2017 (Table 2.3), the scheme of areas for improvements for Adidas Group in 2017 can be performed. However, in the opinion of the author, it is more sensible to compare Adidas Group with Nike only, as it a market leader as well as the company with the highest overall efficiency among three mentioned companies (Figure 2.3). The criteria for the scheme are:

1) Strengths implies the Adidas Group's areas where comparative coefficients and growth indices of efficiency field are higher than 1.
2) Improvements stands for the Adidas Group's areas where comparative coefficients are lower than 1 and growth indices of efficiency field are higher than 1.
3) Setbacks implies the Adidas Group's areas where comparative coefficients are higher than 1 and growth indices of efficiency field are lower than 1.
4) Weaknesses stands for the Adidas Group's areas where comparative coefficients and growth indices of efficiency field are lower than 1.

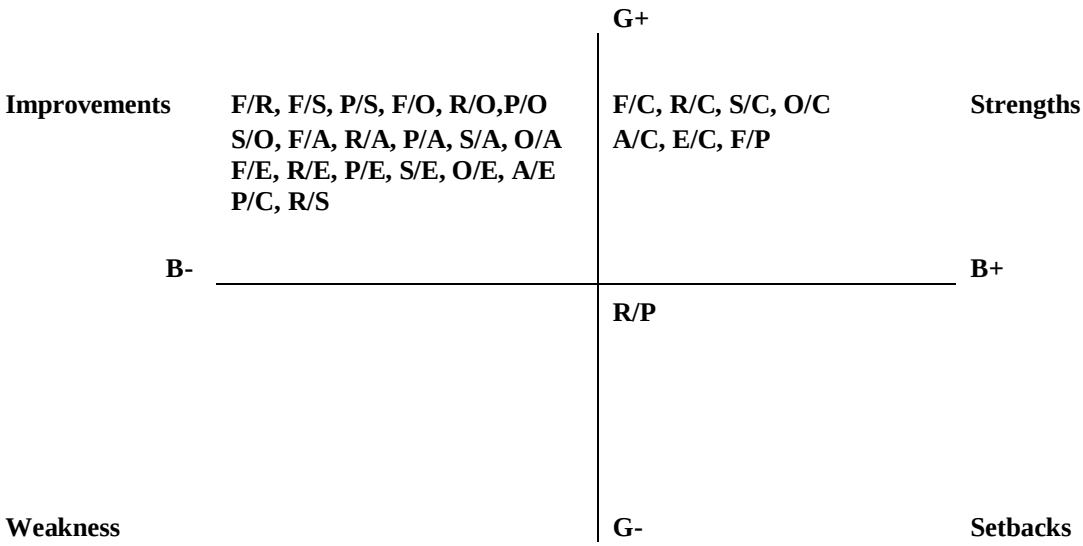

Figure 2.3. Improvements of the efficiency elements for Adidas Group comparing with Nike. Source: Compiled by author.

Figure 2.3 concludes that Adidas Group has seven efficiency field elements, considered as strong areas comparing with Nike, while other efficiency field elements should be taken into consideration by Adidas Group in order to improve the overall efficiency and to compete better with the market leader (Nike). Moreover, Net operating cash flow to EBIT efficiency element of Adidas Group is also higher that Nike's. However, the efficiency element decreased within the year.

Consequently, based on improvements of the efficiency elements scheme (Figure 2.3), in order to increase the competitiveness of Adidas Group with the market leader (Nike) in the upcoming years, the following key areas are highlighted and presented below, which it is recommended that Adidas Group improve:

1. Cash management from daily operations (i.e. decrease in credit sales, inventories).
2. Increase of investment activities and ensure that it facilitates efficiency growth in subsequent years.
3. Profitability increase.
4. Increase the usage of assets.
5. Labour usage (slight decrease in number of employees).
6. Decrease in operating expenses as well as cost of sales.

However, according to improvements of the efficiency elements for Adidas Group comparing with Nike (Figure 2.3) net operating cash flow to sales, net operating cash flow to capital, sales revenue to capital, operating expenses to capital, average assets to capital, average number of employees to capital are efficiency field elements are in a strengths group comparing with Nike.

CONCLUSION

The aim of the thesis was to test the usability of efficiency matrix concept when analysing the efficiency of Adidas Group. Moreover, the purpose of this study to make the proposals to improve efficiency in the future, based on the efficiency matrix results. The object of the study was Adidas Group – a German sportswear manufacturer and one of the global market leaders. The study of efficiency of the company is based on the company's overall efficiency matrix for a period of recent six years 2011–2017.

To respond to the first question "Which year was the most efficient for Adidas Group during 2011–2017? Why?"
According to the received results, 2017 was the most efficient year for the company compared with the base year of 2011 (higher for 33%), which was mainly due to increase in all efficiency element values. All eight quantitative indicators of the company increased significantly as the business grew. The company was able to increase its overall efficiency by significantly improving the key areas such as investment activities. In the previous six years, 2011–2016, the company invested in many areas that helped to increase efficiency in 2017 and for the company to become more profitable. The company significantly increased sales revenue, while operating expenses and cost of sales increased, though not as significantly as sales revenue. Assets, capital and employees indicators increased as well, however, though not significantly. In addition, the company was able to change strategies, create new products and sign new contracts with celebrities, professional athletes and clubs.

To respond to the second question "Which year provided the lowest efficiency results for the company among 2011–2017 and why?
According to the received results, 2014 provided the lowest efficiency results for the company during the period analysed, compared with the base year of 2011 (lower for 17%), mainly due to:

- an economic downturn in Russia (third largest market of Adidas Group);
- depreciation in the currencies of Russia, Japan, Brazil, Argentina, Australia, Canada and Turkey;

- underestimation of the golf market;
- increase in investing activities (increase efficiency in future);
- increase of operating expenses (marketing expenses, sales and logistics expenses).

To respond to the third question "How Adidas was ranked among the closest competitors in 2017 based on efficiency results?"
According to the received results, Adidas was ranked as the second efficient company among its closest competitors, behind Nike and ahead of Puma, based on the efficiency criteria. Nike's overall efficiency is 8% higher than Adidas Group's, whereas Puma's overall efficiency is 28% lower than Adidas Group's.

To respond to the fourth question "Which improvements and recommendations can be suggested for the company to increase the efficiency based on the matrix analysis of efficiency?
According to the received results, Adidas Group's overall efficiency grew during the period analysed and all the efficiency elements increased during the period analysed, except one (net operating cash flow). In order to increase competitiveness with the market leader, it is suggested that Adidas Group focus on the following areas: cash management from daily operations (i.e. credit sales decrease, inventories decrease), increasing investment activities, which will increase the efficiency in the future, profitability increase, reducing in number of employees, increase the usage of assets, management of daily operating expenses (decrease in operating expenses as well as cost of sales).

Subsequently, the results of this research can be used by Adidas Group to increase its overall efficiency to compete with the market leader (Nike), as well as to see and understand the reasons for the decrease of overall efficiency in the past and avoid it in the futere. Furthermore, the efficiency matrix can be divided further, depending on the goals of an analyst or researcher. For example, as it was mentioned, cash flow can be converted into dividends or reinvested into capital. Moreover, the author of the thesis would suggest analysing the relationship between the overall efficiency results and a company's position on the market among competitors. For example, as it was mentioned previously, Nike was the market leader, Adidas Group was the second market leader, whereas Puma was the third. Based on the benchmark analysis results of the company's overall efficiency, it was concluded that Nike had the highest efficiency, Adidas was the second, and Puma was the third.

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APPENDICES

Appendix 1. Initial data for matrix compilation

Adidas Group initial data for efficiency matrix compilation 2011–2017

Indicator (mil €)	2011	2012	2013	2014	2015	2016	2017
Average capital (mil €)	6,321	6,593	6,797	7,153	7,484	7,775	7,605
Average number of employees	44,683	46,565	48,057	51,770	54,643	57,229	57,895
Average assets (mil €)	10,928	11,444	11,625	12,008	12,880	14,260	14,598
Operating expenses (mil €)	5,567	6,150	6,013	6,203	7,289	7,885	8,766
Cost of sales (mil €)	6,993	7,780	7,202	7,610	8,748	9,383	10,514
Sales (mil €)	13,322	14,883	14,203	14,534	16,915	18,483	21,218
EBIT (mil €)	977	948	1186	894	1,104	1,606	2,085
Interest expense (mil €)	108	97	73	59	65	70	62
Net operating cash flow (mil €)	1,234	1,412	1,065	1,037	1,527	1,782	2,263
Net investing cash flow (mil €)	(566)	(217)	(243)	(537)	(591)	(614)	(680)
Free cash flow (mil €)	668	1,195	822	500	936	1,168	1,583

Source: Adidas Group annual reports 2011–2017

Appendix 1 continued

Nike initial data for efficiency matrix compilation 2017

Indicator (mil €)	2017
Average capital (mil €)	12,582
Average number of employees	72,550
Average assets (mil €)	18,610
Operating expenses (mil €)	9,350
Cost of sales (mil €)	16,852
Sales (mil €)	30,406
EBIT (mil €)	4,377
Interest expense (mil €)	52
Net operating cash flow (mil €)	3,846
Net investing cash flow (mil €)	(1,008)
Free cash flow (mil €)	2,512

Source: Nike annual report 2017

Puma initial data for efficiency matrix compilation 2017

Indicator (mil €)	2017
Average capital (mil €)	1,717
Average number of employees	11,641
Average assets (mil €)	2,810
Operating expenses (mil €)	1,726
Cost of sales (mil €)	2,182
Sales (mil €)	4,136
EBIT (mil €)	245
Interest expense (mil €)	14
Net operating cash flow (mil €)	280
Net investing cash flow (mil €)	110
Free cash flow (mil €)	170

Source: Puma annual report 2017

Appendix 2. Balance sheet

Adidas Group Balance sheet 2011–2017 (at the end of each year)

Indicator (mil of €)	2011	2012	2013	2014	2015	2016	2017
Cash and cash equivalents	906	1,670	1,587	1,683	1,365	1,510	1,598
Short-term financial assets	465	265	41	5	5	5	5
Accounts receivable	1,595	1,688	1,809	1,946	2,049	2,200	2,315
Other current financial assets	289	192	183	398	367	729	393
Inventories	2,502	2,486	2,634	2,526	3,113	3,763	3,692
Income tax receivables	77	76	86	92	97	98	71
Other current assets	469	489	506	425	489	580	498
Assets classified as held for sale	25	11	11	272	12	0	72
Total current assets	**6,328**	**6,877**	**6,857**	**7,347**	**7,497**	**8,886**	**8,645**
Property, plant and equipment	963	1,095	1,238	1,454	1,638	1,915	2,000
Goodwill	1,553	1,281	1,204	1,169	1,392	1,412	1,220
Trademarks	1,503	1,484	1,419	1,432	1,628	1,680	806
Other intangible assets	160	167	164	162	188	167	154
Long-term financial assets	97	112	120	129	140	194	236
Other non–current financial assets	42	21	30	42	99	96	219
Deferred tax assets	484	528	486	577	637	732	630
Other non-current assets	107	86	81	105	124	94	108
Total non-current assets	**4,909**	**4,774**	**4,742**	**5,070**	**5,846**	**6,290**	**5,374**
Total assets	**11,237**	**11,651**	**11,599**	**12,417**	**13,343**	**15,176**	**14,019**
Short–term borrowings	289	280	681	288	366	636	137
Accounts payable	1,887	1,790	1,825	1,652	2,024	2,496	1,975
Other current financial liabilities	66	83	113	91	143	201	362
Income taxes	252	275	240	294	359	402	424
Other current provisions	549	563	450	470	456	573	741
Current accrued liabilities	992	1,084	1,147	1,249	1,684	2,023	2,180
Other current liabilities	303	299	276	287	331	434	473
Liabilities classified as held for sale	0	0	0	46	0	0	0
Total current liabilities	4,338	4,374	4,732	4,378	5,364	6,765	6,291

Appendix 2 continued

Adidas Group Balance sheet 2011–2017

Long-term borrowings	991	1,207	653	1,584	1,463	982	983
Other non-current financial liabilities	9	12	22	9	18	22	22
Pensions and similar obligations	205	251	255	284	273	355	298
Deferred tax liabilities	430	368	338	390	368	387	190
Other non-current provisions	55	69	25	38	50	44	80
Non-current accrued liabilities	45	40	64	81	120	120	85
Other non-current liabilities	36	34	29	35	40	46	53
Total non-current liabilities	**1,771**	**1,986**	**1,386**	**2,422**	**2,332**	**1,957**	**1,711**
Share capital	209	209	209	204	200	201	204
Reserves	791	641	321	581	592	749	(29)
Retained earnings	4,137	4,454	4,959	4,839	4,874	5,521	5,858
Owners' equity	**5,137**	**5,304**	**5,489**	**5,624**	**5,666**	**6,472**	**6,032**
Non-controlling interests	(9)	(13)	(8)	(7)	(18)	(17)	(15)
Total equity	**5,128**	**5,291**	**5,489**	**5,618**	**5,648**	**6,455**	**6,017**
Total liabilities and equity	**11,237**	**11,651**	**11,599**	**12,417**	**13,343**	**15,176**	**14,019**

Source: Adidas Group annual reports 2011–2017

Appendix 2 continued

Nike Balance sheet 2017

Indicator (mil €)	Dec. 31, 2017	Dec. 31, 2016
Total assets	20,589	18,924
Short–term loans	5	39
Long–term loans	3,072	1,764
Total equity	10,983	10,845

Source: Nike annual report 2017

Puma Balance sheet 2017

Indicator (mil €)	Dec. 31, 2017	Dec. 31, 2016
Total assets	2,854	2,765
Short–term loans	29	25
Long–term loans	–	–
Total equity	1,657	1,722

Source: Puma annual report 2017

Appendix 3. Income statement

Adidas Group Income statement 2011–2017

Indicator (mil €)	2011	2012	2013	2014	2015	2016	2017
Sales revenue	13,322	14,883	14,203	14,534	16,915	18,483	21,218
Cost of sales	6,993	7,780	7,202	7,610	8,748	9,383	10,514
Gross profit	**6,329**	**7,103**	**7,001**	**6,924**	**8,168**	**9,100**	**10,703**
Royalty and commission income	93	105	103	102	119	105	115
Other operating income	98	127	142	138	96	262	17
Other operating expenses	5,567	6,150	6,013	6,203	7,289	7,885	8,766
Goodwill impairment losses	–	265	52	78	34	–	37
Operating profit	**953**	**920**	**1,181**	**883**	**1,059**	**1,582**	**2,070**
Financial income	31	36	26	19	46	28	46
Financial expenses	115	105	94	67	67	74	93
Earnings before taxes	**869**	**851**	**1,113**	**835**	**1,039**	**1,536**	**2,023**
Income taxes	261	327	340	271	353	454	668
Net income from continuing operations	–	–	773	564	686	1,082	1,354
Losses/gains from discontinued operations, net of tax	–	–	17	(68)	(46)	62	254
Net profit	**608**	**524**	**790**	**496**	**640**	**1,020**	**1,100**

Source: Adidas Group annual reports 2011–2017

Nike Income statement 2017

Indicator (mil €)	2017
Sales revenue	30,406
Cost of sales	16,852
Operating expenses	9,350
Earnings before interest and taxes	4,377

Source: Nike annual report 2017

Puma Income statement 2017

Indicator (mil €)	2017
Sales revenue	4,136
Cost of sales	2,182
Operating expenses	1,726
Earnings before interest and taxes	245

Source: Puma annual report 2017

Appendix 4. Cash flow statement

Adidas Group Cash flow statement 2011–2017

Indicator (mil €)	2011	2012	2013	2014	2015	2016	2017
Earnings before taxes	869	851	1,113	835	1,039	1,536	2,023
Depreciation, amortisation and impairment loses	253	536	340	405	393	376	484
Reversals of impairment losses	(2)	(2)	(2)	(1)	(1)	(2)	(1)
Unrealised foreign exchange gains	(31)	(26)	10	32	36	(7)	(75)
Interest income	(30)	(35)	(25)	(17)	(20)	(21)	(25)
Interests expense	108	97	73	62	65	70	62
(Gains)/Losses on sale of property, plant and equipment	12	12	6	16	15	(24)	17
Other non–cash income	0	3	(1)	(1)	(1)	(0)	3
Payment of external finding of pension obligations (CTA)	–	–	–	(65)	–	–	(30)
Proceeds from early termination of promotion and advertising contracts	–	–	–	–	–	–	76
Operating profit before working capital changes	**1,179**	**1,430**	**1,515**	**1,267**	**1,527**	**1,927**	**2,534**
Increase in receivables and other assets	(41)	(135)	(302)	(36)	(183)	(462)	(477)
Decrease/Increase in inventories	(353)	23	(299)	(76)	(639)	(656)	(216)
Increase in accounts payable and other liabilities	449	94	151	(117)	823	973	422
Cash generated from operations before interest and taxes	**1,234**	**1,412**	**1,065**	**1,037**	**1,527**	**1,782**	**2,263**
Interest paid	(113)	(90)	(68)	(59)	(55)	(46)	(65)
Income taxes paid	(314)	(380)	(390)	(284)	(386)	(427)	(556)
Net cash generated from operating activities – continuing operations	**–**	**–**	**608**	**694**	**1,086**	**1,309**	**1,641**
Net cash generated from operating activities – discontinued operations	–	–	(6)	7	3	39	6
Net cash generated from operating activities	**807**	**942**	**634**	**701**	**1,090**	**1,348**	**1,648**
Purchase of trademarks and other intangible assets	(58)	(58)	(52)	(49)	(49)	(64)	(74)
Proceeds from sale of trademarks and other intangible assets	0	1	1	1	0	0	0
Proceeds from sale of trademarks and other intangible assets	0	1	1	1	0	0	0
Purchase of property, plant and equipment	(318)	(376)	(422)	(499)	(464)	(578)	(678)
Proceeds from sale of property, plant and equipment	2	19	4	4	6	5	2

Appendix 4 continued

Adidas Group Cash flow statement 2011–2017

Proceeds from sale of assets held for sale	–	–	–	–	–	14	–
Proceeds from sale of a disposal group	–	–	–	–	–	29	6
Proceeds from disposal of discontinued operations net of cash disposed	–	–	–	–	–	–	174
Acquisition of subsidiaries and other business units net of cash acquired	(20)	(57)	–	(6)	(214)	–	–
Proceeds from disposal of subsidiaries net of cash	–	14	–	–	164	–	–
(Purchase of)/proceeds from sale of short–term financial assets	(192)	195	226	37	(0)	(0)	(0)
(Purchase of)/proceeds from investments and other long-term assets	(10)	10	(20)	(36)	(48)	(33)	(132)
Interest received	30	35	25	17	20	21	25
Net cash used in investing activities – continuing operations	**–**	**–**	**(237)**	**(531)**	**(584)**	**(605)**	**(676)**
Net cash used in investing activities – discontinued operations	–	–	(6)	(6)	(6)	(9)	(4)
Net cash used in investing activities	**(566)**	**(217)**	**(243)**	**(537)**	**(591)**	**(614)**	**(680)**
(Repayments of)/proceeds from long-term borrowings	(57)	(3)	–	–	(10)	–	–
Proceeds from issue of a convertible bond	–	496	–	–	–	–	–
Proceeds from issue of a Eurobond	–	–	–	990	–	–	–
Repayment of Eurobond	–	–	–	(500)	–	–	–
Repayment of finance lease obligations	–	–	(2)	(2)	(2)	(3)	(2)
Dividend paid to shareholders of Adidas AG	(167)	(209)	(282)	(314)	(303)	(320)	(405)
Dividend paid to non-controlling interest shareholders	(3)	(3)	(1)	(4)	(6)	(2)	(1)
Acquisition of non-controlling interests	–	(8)	–	–	–	(24)	–
Repurchase of treasury shares	–	–	–	(300)	(301)	(218)	(85)
Repurchase of treasury shares due to share-based payments	–	–	–	–	–	–	(15)
Proceeds from reissuance of treasure shares due to share-based payments	–	–	–	–	–	–	13

Appendix 4 continued

Adidas Group Cash flow statement 2011–2017

Proceeds from short-term borrowings	–	–	67	68	35	159	–
Repayment of short-term borrowings	–	(231)	(221)	(56)	(103)	(138)	(273)
Cash repayments of short-term borrowings	(273)	–	–	–	–	–	–
Net cash used in financing activities	**(500)**	**42**	**(439)**	**(118)**	**(691)**	**(553)**	**(769)**
Effect of exchange rates on cash	**15**	**(3)**	**(35)**	**50**	**(126)**	**(35)**	**(111)**
(Decrease)/increase of cash and cash equivalents	(244)	764	(83)	96	(318)	145	88
Cash and cash equivalents at beginning of the year	1,150	906	1,670	1,587	1,683	1,365	1,510
Cash and cash equivalents at end of the year	**906**	**1,670**	**1,587**	**1,683**	**1,365**	**1,510**	**1,598**

Source: Adidas Group annual reports 2011–2017

Nike Cash flow statement 2017

Indicator (mil €)	2017
Cash generated from operating activities	3,404
Cash used in investing activities	(1,008)

Source: Nike annual report 2017

Puma Cash flow statement 2017

Indicator (mil €)	2017
Cash generated from operating activities	280
Cash used in investing activities	(110)

Source: Puma annual report 2017

Appendix 5. Exchange rates

Exchange rates for Nike's financial data conversion from U.S. dollars to euros 2017

Exchange rate	2017
Average exchange rate	1.130
Exchange rate at the end of fiscal year	1.199

Source: European Central Bank