

Czech University of Life Sciences Prague
Faculty of Economics and Management
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Master's Thesis

Financial Analysis of Chosen Company

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DIPLOMA THESIS ASSIGNMENT

Bachelor of Science Mehraneh Tarameshloo

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Thesis title

Financial Analysis of Chosen Company

Objectives of thesis

The aim of this thesis is to apply some of the existing approaches of financial analysis to estimate and evaluate the overall economical situation and performance of the desired company in the selected time period. This will be done to understand the performance and situation of this company and have a better overview of its current and future conditions in order to understand the current and possible risks and opportunities for the company's future growth. We also want to estimate the greatness of the competition this company is dealing with. The other part to which special attention is applied is the financial stability and performance and the overall steadiness of this company in the selected time period that the study is done in.

Methodology

This diploma thesis generally is consisted of two main parts to reach the desired aims and understanding, the first part is regarding the theoretical information about the company and its financial statements and analysis of it and the second one is about the practical part applied to our desired data in the selected time period of this company. In this thesis, we will use secondary data available from the annual reports published by the desired company itself. The literature review part contains a foundational explanation of financial analysis according to the main aims of the thesis. The practical part which is one of the most important parts is mainly concerned with the analysis of the financial statement using some key ratios applied to our desired data.

The proposed extent of the thesis

60-80

Keywords

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Recommended information sources

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Robinson, T., 2012. International financial statement analysis workbook, second edition. Hoboken, N.J.: John Wiley & Sons. ISBN 978-1-119-62805-7

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Declaration

I declare that I have worked on my master's thesis titled " Financial Analysis of a Chosen Company " by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on

Acknowledgement

I would like to express my deepest gratitude to my family and my boyfriend for their unwavering support throughout my academic journey. Their encouragement, patience, and understanding have been the pillars of my success and have enabled me to overcome the challenges that I have faced along the way. Without their love and support, I would not have been able to achieve my goals and complete this thesis. I am forever grateful for their presence in my life and their belief in me.

Financial Analysis of Chosen Company

Abstract

The topic of this diploma is concerned about the Financial Analysis of SAP (System Analysis Program Development), which is the world's most known enterprise application software company which is assisting organizations in all sizes and all areas to run more efficiently by using ERP (enterprise resource planning) and developing networks of intelligent enterprises. This international company has 105000 employees in more than 140 countries with more than 22000 partners globally. Sap is also the first ranked software company in Dow Jones Sustainability Index for 14 years which more than 27.34-billion-euro revenue in FY 2020. This thesis is focused on financial analysis of the company theoretical and practically. The theoretical part of the thesis is mainly focused on fundamental terms and theories as well as the methods which can be used for the financial analysis purposes. Whilst the part which is concerned about the practical features will contain descriptions of the SAP's profile, and the analysis of the industry. In the other parts it will also consist of some methods of financial analysis such as financial ratios, horizontal and vertical analysis. These methods will assist to have an in-depth analysis of SAP's performance and situation as a market leader. All this analysis will be done using the financial statements of the company. This thesis can eventually help all of the internal and external users of the financial statements to have an in-depth analysis of the company, its performance and its overall health.

Keywords: Financial analysis, SAP, Balance sheet, income statement, Asset management, Investments, Annual report, internal factors, external factors

Finanční analýza vybrané společnosti

Abstrakt

Téma této diplomové práce se týká finanční analýzy SAP (System Analysis Program Development), což je světově nejznámější podniková aplikační softwarová společnost, která pomáhá organizacím všech velikostí a ve všech oblastech efektivněji fungovat pomocí ERP (enterprise resource planning) a rozvíjení sítí inteligentních podniků. Tato mezinárodní společnost má 105 000 zaměstnanců ve více než 140 zemích s více než 22 000 partnery po celém světě. SAP se drží na prvních příčkách v Dow Jones Sustainability Index již po dobu 14 let. SAP ve fiskálním roce 2020 dosáhl obrátu více než 27,34 miliardy eur. Tato práce je zaměřena na finanční analýzu společnosti teoretickou i praktickou. Teoretická část práce je zaměřena především na základní pojmy a teorie, jakož i na metody, které lze použít pro účely finanční analýzy. Zatímco část, která se zabývá praktickými funkcemi, bude obsahovat popisy profilu SAP a analýzu odvětví. V ostatních částech bude také sestávat z některých metod finanční analýzy, jako jsou finanční poměry, horizontální a vertikální analýza. Tyto metody pomohou provést hloubkovou analýzu výkonu a situace společnosti SAP jako lídra na trhu. Celá tato analýza bude provedena pomocí účetní závěrky společnosti. Tato práce může nakonec pomoci všem interním a externím uživatelům účetní závěrky provést hloubkovou analýzu společnosti, její výkonnosti a celkového zdraví.

Klíčová slova: Finanční analýza, SAP, Rozvaha, Výkaz zisku a ztráty, správa aktiv, investice, Výroční zpráva, interní faktory, externí faktory

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1 Introduction

SAP is the market leader and one of the most successful IT companies worldwide, as an employee working in SAP, I always wanted to have a deep understanding of the financial dimensions of this successful corporation which is widely known and used by the biggest companies worldwide. The name of the company SAP SE stands for System Analysis Program Development Societas Europaea founded in Weinheim, Germany on April 1, 1972. In SAP's 50-years history of success it is seen that it had a huge impact in the world of information technology. This company is also the largest non-American software company by revenue and the world's publicly traded software company by revenue and the second largest company by market capitalization in Germany. After 2016 SAP as a market leader turned to the fourth largest software and programming company worldwide. This company is a market leader because a single view of the truth can be achieved by centralizing data management in their software which is highly needed by all of the companies worldwide. By making it easier for employees from different departments to access real-time data, their product helps businesses manage complex business processes more effectively. As a result, companies may see an increase in operational effectiveness, productivity, and customer satisfaction, all of which lead to increased profitability.

As it is apparent none of the business organizations can run without finance, in order to have a healthy and profitable business there should be some sound financial condition, with the aim to investigate deeply the financial dimensions of this organization we will understand the mechanism by which the company works, and its future development will be more predictable. In the 21st century with the emergence of the new challenges the shift of a business model and being more efficient compared to past to make better decisions became apparent. The findings in this paper will enlighten us with the strengths or weaknesses of the selected company. The financial data associated to SAP are in the form of financial statements.

2 Objectives and Methodology

The goal of this study is to create a full financial analysis of SAP by using different financial tools. Additionally, the study will find out more information about the financial management practices of the organization, which had to lead the business to perform its activities with greater success.

2.1 Objectives

It is the main goal of this thesis to identify the most significant influences on the performance of a company in a period of 5 years. In accordance with the aforementioned research objective, the current researchers had developed specific research objectives.

- The primary objective of this study is to conduct and analyze the results of a financial analysis of the values obtained from SAPs' annual reports for the time period of 2017 to 2021.
- In this diploma thesis it will be investigated how the financial position and evaluate the overall economic situation and performance of the company changed in that period.
- Another primary aim is to analyze financial stability and performance and the overall financial steadiness of this company
- A very crucial aim is providing a list of suggestions for improving the company's financial management.

2.1.1 Research Questions

In this diploma thesis, using the conducted tools and research method the questions below will be answered:

1. Is the selected company financially healthy and profitable?
2. How the financial position of the company has changed in the selected time frame of 5 years?
3. What possible solutions can be recommended to increase the profitability?

2.1.2 Expected Conclusions

1. From the research it can be find out that the SAP's revenue has been increased in the time period.
2. The increase in the revenue in the time period selected stabilized the company as a market leader because the company's financial position has been improved.

2.2 Methodology

In this thesis the meaning and main point of financial analysis, basic concepts and explanations, comparative base definitions, and various methods of financial analysis will be examined. A significant part of the literature review in this thesis is mainly focused on determining tools applied to examine the data and reach the results such as ratios and horizontal and vertical financial analysis.

Here are the methods used in the thesis to perform the financial analysis on SAP's financial statements:

- **Horizontal Analysis:** Horizontal analysis, often known as trend analysis, is a method of financial analysis that compares the line items of financial statements across time. To do a horizontal analysis of a balance sheet, the dollar amount changes in each line item over a period of time are computed and reported as a percentage of the amount from the base year.

The formula for horizontal balance sheet analysis is:

$$\frac{\text{Current year amount} - \text{Base year amount}}{\text{Base year amount}} \times 100 \quad (1)$$

- **Vertical Analysis:** In order to carry out a vertical analysis of a balance sheet, each line item on the balance sheet must be recast as a percentage of the total assets shown on the balance sheet. The following formula may be used to do a vertical analysis on a balance sheet:

$$\frac{\text{Amount of Line Item}}{\text{Total Assets}} \times 100 \quad (2)$$

- **Profitability Ratio:** Profitability ratios are financial ratios that reveal how efficiently a business turns its inputs into outputs in terms of revenue and net income. One may use these ratios, which are derived from information in a company's financial records, to get a perspective of how stable the business is financially.

- 1) **Gross profit ratio:** This profitability ratio, known as "gross profit," is calculated by subtracting "cost of goods sold" from total revenue (COGS). The ratio is often used to assess the efficacy of a company's pricing strategy and cost management procedures because of the information it gives into their capacity to produce profit from their primary activities. For the purpose of calculating the gross profit ratio, the following equation is used:

$$\text{Gross Profit} = \text{Net Sales} - \text{Cost of Goods Sold} \quad (3)$$

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \quad (4)$$

- 2) **Net profit ratio:** The net profit ratio is a profitability metric used to assess how much money is left over after paying for everything. This ratio is widely used to assess the efficacy of a company's overall operations and financial management procedures, since it gives insight into the company's potential to make profit after all expenditures have been accounted for. Formula for Net Profit Ratio is:

$$\text{Net Profit} = \text{Gross Profit} - \text{Operating Expences} - \text{Taxes} - \text{Intrest}(5)$$

$$\text{Net Profit Ratio:}(\text{Net Profit})/(\text{Net Sales})\times 100 \quad (6)$$

- 3) **Return on equity:** A company's return on equity (ROE) is a profitability statistic that assesses how much of its net income was returned to shareholders as a proportion of their total equity investment. This ratio is often used to assess the efficacy of a company's use of equity financing

because of the information it gives into the company's capacity to create profits for its shareholders. Return on equity may be calculated as follows:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholders' Equity}} \times 100 \quad (7)$$

4) Return on assets: One way to assess a business's profitability is by looking at its return on assets (ROA). The ratio is often used to assess the efficacy of a company's asset management strategies since it gives insight into the company's capacity to produce profit from its assets. Return on assets is calculated as follows:

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}} \times 100 \quad (8)$$

5) Return on Capital Employed

$$\text{Return on Capital Employed} = \frac{\text{Net Operating Profit}}{\text{Capital Employed}} \times 100 \quad (9)$$

$$\text{Net Operating Profit} = \text{Operating Profit} - \text{Taxes} \quad (10)$$

$$\text{Capital Employed} = \text{Shareholders' Equity} + \text{Non current Liabilities} \quad (11)$$

- **Liquidity Ratio:** A group of financial measurements known as "liquidity ratios" is used to analyze a company's capacity to turn its assets into cash in order to satisfy its short-term commitments. These ratios may be used to assess a firm's overall financial health and debt-servicing capacity. Measures of a company's capacity to satisfy its short-term commitments with its current assets include the current ratio and the quick ratio. Insight into a firm's financial health may be gained via analysis of liquidity ratios, which can then be used by potential investors or business partners to make intelligent judgments about whether or not to engage with the company.

1) **Current ratio:** A company's capacity to satisfy its short-term commitments with its current assets is measured by the current ratio, a liquidity ratio. By dividing current assets by current liabilities, the ratio gives information on a company's short-term liquidity. The current ratio is a

measure of a firm's ability to satisfy its short-term commitments. A ratio of 1 or greater shows that the company has adequate current assets to cover its current liabilities. Investors and analysts may receive valuable insight into a company's liquidity by tracking the current ratio over time and comparing it to averages in the industry.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (12)$$

2) Quick ratio: A company's capacity to satisfy its short-term commitments using its most liquid assets, such as cash, marketable securities, and accounts receivable, may be measured by calculating its quick ratio, commonly known as the acid-test ratio. By dividing a company's quick assets by its current liabilities, one may get insight into the company's capacity to meet its short-term obligations without having to liquidate inventory. If a company's quick ratio is more than 1, it has enough liquid assets to cover its current liabilities. If it's less than 1, it may have trouble making its short-term debt payments. The quick ratio is a useful indicator of a business's liquidity that can be studied over time and compared to industry averages to help investors and analysts make educated choices about working with or investing in the firm. For the quick ratio, use the following equation:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} \quad (13)$$

2) Cash ratio:

The cash ratio is a financial ratio that is used to analyze the liquidity of a firm. It evaluates the capacity of the company to pay off its short-term creditors with its available cash and cash equivalents. As compared to the current ratio, this liquidity ratio is considered to be more cautious since it only takes into account the cash and cash equivalents held by the corporation. These are the assets that are considered to be the most liquid. The following is the formula for the cash ratio:

$$\text{Cash Ratio} = \frac{\text{Cash and Cash equivalent}}{\text{Current Liabilities}} \quad (14)$$

- SWOT Analysis:

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a method that is used in strategic planning to examine a company's strengths, flaws, opportunities, and threats. It entails doing an in-depth analysis of the internal and external elements, both of which may have an effect on the performance and position of a business in its industry. In order to do a competitor study of firms like SAP and Microsoft, the SWOT analysis may be used to compare the aforementioned companies' strengths, weaknesses, opportunities, and threats.

While doing a SWOT analysis of SAP and Microsoft as rivals, it is easy to discover their various strengths, such as SAP's reputation for quality and Microsoft's great brand awareness. In addition, there are opportunities for improvement for both companies. It is possible that SAP's complicated software products and Microsoft's difficulties in penetrating particular areas are examples of the company's weaknesses. Possibilities might include the opportunity for SAP to expand into foreign regions and Microsoft to invest in cloud technologies. Both of these developments are examples of opportunities. Alterations in the preferences of customers are one potential source of danger, along with greater competition from other market participants.

The practical section of the thesis describes the company's significant historical data and compares SAP to its competing brands, with all of the calculations and analyses of financial indicators and ratios implemented to the theoretically mentioned techniques. At the end of the report, recommendations will be made based on the results achieved.

The review will be conducted using the method of secondary data. The information will be obtained from the most recent annual reports and financial statements published by SAP in SAP.com from 2017 to 2021 in a period of 5 years. Analysis of financial statements such as ratios, cash flow statements, income statements and balance sheets will be conducted using the data.

2.3 Data Sources and Data Collection

The selected data we used in this paper is from the annual financial reports in SAP investor relations download centre, published by the company annually. The selected years to analyse is in the 5 years' timeframe starting from 2017 to 2021.

In order to analyse the financial performance of a firm as well as its overall health, one may utilize a variety of different sources of financial information. The following are some frequent types of sources for financial analysis:

- **Financial Statements:** a company's revenues, costs, assets, and liabilities, as well as its net income, are broken out in great detail in the company's financial statements, which include the income statement, the balance sheet, and the cash flow statement. They are an important source of financial data that may be used in the process of evaluating the monetary performance and health of a firm
- **Company Reports and Figures:** Reports and papers filed by companies Businesses are required to submit reports and other documents on a regular basis to regulatory bodies, such as the Securities and Exchange Commission (SEC) in the United States. These files and reports, such as annual reports, quarterly earnings reports, and proxy statements, give invaluable insight into the operations, financial performance, and strategic planning of a firm.
- **Stock Market Data:** Data from the stock market, including stock prices, trading volumes, and analyst ratings, may be used to analyze the financial performance and prospects of a firm. Data from the stock market may offer information on a company's share price, market capitalization, and general demand for its shares, among other things.
- **Industry Benchmarks and Comparisons:** the financial performance and indicators of a firm to those of its industry benchmarks and peers may give significant insights about the relative strength and competitiveness of the organization. This kind of study may be helpful in identifying trends and opportunities within the industry, and it can give a foundation for comparing the performance of a firm to that of its rivals.

Economic and Market Conditions: Circumstances in the economy and on the market the conditions in the economy and on the market have the potential to have a substantial influence on the financial performance and prospects of a firm. When doing an analysis of a company's financial performance and prognosis, it is common practice for financial analysts to take into consideration larger economic and market developments, including interest rates, inflation, and consumer spending, among other factors.

2.4 Data Analysis

The focus in this paper is the evaluating and interpreting the selected financial data and other information available to evaluate and estimate the operating performance and the financial condition on the company. It can demonstrate how well the company performs and how it uses both tangible and intangible assets to reach to a return on the investments. It is an important measure to estimate the ability of the company to pay its debts in a timely manner.

2.5 Analysis Tools

To do the analysis and reach to a interpretation of the existing data we can use various tools, one of the most common tools available to interpret the data is the financial ratio analysis and quantitative analysis of the data. For doing this analysis we will use excel. The analysis and interpretation will be done using the charts, graphs and the outcomes exported from excel, so the elaboration to reach a better understanding can be done. (Drake & Fabozzi, 2012)

3 Literature Review

The purpose of this thesis is to conduct a comprehensive financial analysis of SAP, a multinational software corporation based in Germany. The theoretical part of this thesis provides an overview of the relevant theories, concepts, and frameworks related to financial analysis, with a focus on their application to SAP.

Theoretical frameworks for financial analysis are essential for understanding the principles and methodologies that underpin financial analysis. This section of the thesis provides a comprehensive review of the most current and relevant research on financial analysis, with a particular focus on the unique financial characteristics of SAP as a company.

Theoretical concepts and frameworks for financial analysis will be used to guide the empirical analysis of SAP's financial performance, which will be conducted in the empirical part of this thesis. In this section, we will analyze SAP's financial statements, including the balance sheet, income statement, and cash flow statement, and use key financial ratios to evaluate the company's financial performance. By analyzing SAP's financial performance in this way, we aim to provide insights into the company's financial health, strengths, and weaknesses, and to make recommendations for improving its financial performance.

3.1 About the Corporation

- Headquarters: Walldorf, Germany
- Founded: April 1, 1972
- Listing: Frankfurt, New York
- Total revenue (non-IFRS) in financial year 2020: €27.34 billion
- SAP partner companies globally: over 22000
- Development locations worldwide: over 100
- 112,632 employees worldwide (Sep. 30.2022)
 - 159 nationalities worldwide
 - Employee retention at 91.8%
 - Employee Engagement Index at 81% (June 2022)
 - 29.1% women in management
 - ~75% of SAP employees are SAP shareholders

Dietmar Hopp, Hasso Plattner, Claus Wellenreuther, Klaus Tschira, and Hans-Werner Hector are the founders of SAP who left IBM and found a company called Systemanalyse Programmentwicklung (meaning “system analysis program development”). In the early years of the business the founders’ dream of a real time computing system of the businesses came true, they came up with SAP R/1 and they started to provide their service to other businesses (1972-1980). SAP R/2 (1981-1990) When customers need data, the brand new application processes the data and integrates all of an enterprise's business functions so that the business can easily access the real time data. The software kept developing and becoming better till 2011-present that it had great changes, Data can be accessed at any time, from any location, using cloud computing, mobile devices, and in-memory technology.

Now, SAP S/4HANA raises the bar for ERP by leveraging the power of in-memory computing to process enormous amounts of data while also providing support for cutting-edge technologies such as artificial intelligence (AI) and machine learning.

3.1.1 The Reason of SAP’s High Importance

The idea of using cloud base centralised system is a new trend in enterprise resource planning software using widely by the most successful business worldwide, SAP as a market leader is a very important company and this aspect will be examined in 2 different parts as below:

3.1.1.1 Customers

- The customers who run SAP in total are generating 87% of the total global commerce which is in amount of \$46 trillion.
- Among 100 of the largest companies worldwide 99 of them run SAP solutions
- From 100 of greenest and most sustainable companies in the world 97 of them use SAP software.
- Approximately 80% of SAP’s customers are SME (small and midsize enterprises)

3.1.1.2 Strategy

The strategy in which SAP is committed to make this corporation important and successful worldwide, SAP's mission is to provide the tools, innovation, and best practices necessary for enterprises to become intelligent, connected, and sustainable in the cloud data

bases. This strategy is the biggest and most important reason playing a key role in the company's success.

3.1.2 Scope of SAP SE

The control of information is typically handled on a decentralized basis in traditional business models; as a result, each business function stores all its data sets in a variety of databases. Because of this, it is more challenging for employees working in various business functions to access the information of their colleagues. Additionally, duplicating data across multiple departments not only raises the risk of information loss but also the expenses involved with IT storage. SAP software gives various business functions a unified view of the truth by consolidating their information management into a single location. This makes it easier for employees in various departments through an organization to gain access to real-time information, which assists businesses in efficiently managing the complexities of their business operations. As a consequence of this, businesses have the ability to quicken their workflows, make their operations more efficient, improve their effectiveness, and provide better experiences for their customers, finally leading to a rise in their revenues.

3.1.3 Products of SAP

The below part is about the categories of the products in SAP marketplace and the areas they provide solutions and they have related software in. (SAP SE, 2023)

- Enterprise Resource Planning
 - SAP S/4HANA Cloud
- Financial Management
 - Financial Planning and Analysis
 - Accounting and Financial Close
 - Tax Management
 - Treasury Management
 - Accounts Receivable, Billing and Revenue Management
 - Governance, Risk, Compliance (GRC) and Cybersecurity
- CRM and Customer Experience
 - SAP Customer Experience solutions
 - Customer Data

- Marketing
- Commerce
- Sales
- Service
- Spend Management
 - Supplier Management
 - Sourcing and Contracts
 - Procurement
 - Invoices and Payments
 - Services Procurement and External Workforce
 - Travel and Expense
- Supply Chain Management
 - Supply Chain Planning
 - Supply Chain Logistics
 - Manufacturing
 - Product Lifecycle Management
 - Enterprise Asset Management
- Human Capital Management
 - Employee Experience Management
 - Core HR and Payroll
 - Talent Management
 - HR Analytics and Workforce Planning
 - Sales Performance Management
- Business Technology Platform
 - Application and Development and Automation
 - Extended Planning and Analysis
 - Data and Analytics
 - Integration

3.1.4 ERP solutions; the Main Product of SAP

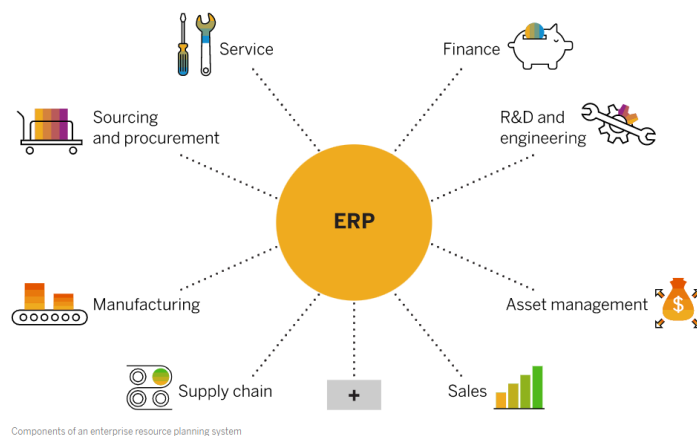
Enterprise resource planning is what "ERP" stands for in this context. The term "ERP software" refers to enterprise resource planning software, which includes applications for all

essential facets of a company's operations, such as procurement, production, materials management, sales, marketing, finance, and human resources (HR).

Business processes can now share information and communicate with one another using ERP systems. ERP systems provide a single source of truth for an organization's shared transactional data, which reduces the likelihood of data inconsistencies and ensures accurate reporting. (Spathis & Constantinides, 2004)

Thousands of companies across all sectors now rely heavily on ERP systems to run their operations. ERP is a necessity for these businesses on par with electricity.

Picture 1. Title: Components of ERP system 2022



Resource: SAP.com 2022

3.2 Financial statement Analysis

What Is financial analysis? It is our main aim in this paper to use financial analysis to evaluate SAP's operating performance and financial situation. To determine the company's operating performance, we look at how effectively it has used both its tangible and intangible assets to generate a return and revenue on its investment. The ability of a company to meet its financial obligations, including the timely payment of interest on its debt, is a way of measuring of its financial health. (Kaufmann, et al., 2001)

When it comes to analysing an economic entity's finance dimensions and health, all of the financial data must be taken into consideration. When it comes to financial markets, analysis serves as a tool for investors who want to form their own rational expectations about what is to come in terms of future cash flows and the future of the business. The results of

these analysis will form an overall overview of the company's situation so that investors can make investment decisions, or otherwise influence the allocation and clearing of capital markets. In most cases, the allocation of resources is based on comparisons on different businesses. Because economic value (wealth) is ultimately created by expectations of future inflows of economic benefits, primarily in the form of or the equivalent of cash flows, financial reporting, and financial analysis. Uncertainty can be rationally addressed through analysis. In order to assist analysts in making decisions about an organization's future cash flows and its current value, financial analysis must provide useful information. (Drake & Fabozzi, 2012)

Everyone knows accounting as the lingua franca of business, businesses need it to communicate the existing financial information they have to different people who need these data, it can vary from the stakeholders to owners, investors, customers, suppliers and whoever can in a way interact with the business. The data and different reports provided by accounting can be used in different field by each of these groups of people. The owner is concerned if the business is profitable. Creditors use this information to make sure the business has enough money to pay its debts. Managers use these data to see if the business is healthy and the employees have enough job security. Customers want to benefit from the relationship and every other group can use these reports, statements and data in a different way. (Friedlob & F., 2003)

3.2.1 Methods of Financial Analysis

Financial analysis is the process of analyzing the financial performance and health of a firm by looking at the company's financial statements. These statements include the balance sheet, income statement, and cash flow statement. Analysts evaluate the economic well-being of a firm as well as its potential for future expansion using one of many different approaches to financial analysis. Below is mentioned all the financial analysis tools used in this thesis with their formulas respectively.

3.2.1.1 Horizontal Analysis of Financial Statements

Horizontal analysis is a kind of financial analysis that includes evaluating the changes that occur in the financial statements of a firm over a specified period of time. This type of study is also known as comparative analysis. This strategy enables comparisons to be made

across various time periods and helps to uncover trends and patterns in a company's financial performance.

In order to carry out a horizontal analysis, one must first study the financial accounts for not one but many periods. After that, the percentage change that occurred in each item on the financial statements is computed, and the results are compared to the respective results from the base year. The following is the formula that should be used to calculate the percentage change:

$$\text{Percentage Change} = \frac{(\text{Current Year Amount} - \text{Base Year Amount})}{\text{Base Year Amount}} \times 100 \quad (1)$$

3.2.1.2 Vertical Analysis of Financial Statements

Vertical analysis is a form of financial analysis that includes assessing the components of a financial statement as a percentage of a base item. This type of analysis is often referred to as a percentage analysis. This approach makes it easier to comprehend the proportional connection between the many elements that appear on a financial statement and offers valuable insights into the status of a company's finances.

In order to carry out a vertical analysis, the financial statement must first be provided in the form of a common-size statement. Within this format, each line item must be written as a percentage of a base item. In an income statement, for instance, the entire revenue is often used as the base item, whereas on a balance sheet, either the total assets or the total liabilities and equity are typically used as the base item.

The following is the method for computing the percentage of each line item on a financial statement in relation to the base item:

$$\text{Percentage of Line Item} = \frac{\text{Line Item Amount}}{\text{Total Revenue}} \times 100 \quad (2)$$

3.2.1.3 Ratio analysis

Ratio analysis is a method that compares several financial ratios that are obtained from a company's financial statements in order to evaluate the company's overall financial health as well as its performance. The liquidity of the firm, its profitability, and its overall efficiency, among other aspects, are all evaluated with the use of these statistics. Ratio analysis is an essential tool for investors, shareholders, and management to use in order to

make educated choices and, when required, to take remedial steps. It is possible to uncover potential difficulties and places for improvement by studying a company's financial ratios, which may lead to improved financial performance and long-term development if the concerns and improvement areas are addressed.

3.2.1.3.1 Profitability Ratio

Profitability ratios are a kind of financial ratio that compares a firm's sales, assets, or equity in proportion to the amount of profit that the company is able to make. These ratios provide insight into the overall financial health of a firm as well as its potential for long-term development.

Analysts examine the financial performance of a firm using a variety of profitability measures in order to get a better overall picture. The following are some of the most popular types of profitability ratios:

- **Gross Profit Ratio:** The Gross Profit Ratio is a kind of profitability ratio that is used to quantify the percentage of sales revenue that is left over after the cost of goods sold has been subtracted from the total sales revenue (COGS). It reveals the amount of money a business makes through its production and sales of goods or services. Increases in a firm's gross profit ratio show that the company is able to meet its operational expenditures while still producing profits. Here is the equation to calculate this ratio on financial statement:

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \quad (3)$$

$$\text{Gross Profit} = \text{Net Sales} - \text{Cost of Goods Sold} \quad (4)$$

- **Net Profit Ratio:** The Net Profit Ratio, also known as the Net Profit Margin, is a profitability ratio that measures the percentage of sales revenue that is left over after all expenses, such as operating expenses, taxes, interest, and other costs, have been deducted. It is also sometimes referred to as the Net Profit Ratio. It demonstrates how much profit a firm is making in relation to the entire quantity of revenue it generates. A greater capacity to turn a company's revenues into a profit is shown by a larger net profit ratio in the company's financial statements.

$$\text{Net Profit Ratio: } \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 \quad (5)$$

$$\text{Net Profit} = \text{Gross Profit} - \text{Operating Expenses} - \text{Taxes} - \text{Interest} \quad (6)$$

- Return on Equity: Return on Equity (ROE) is a profitability ratio that assesses a company's capacity to create net income relative to the amount of shareholder equity that it has. It demonstrates the effectiveness with which a corporation uses the money invested by its shareholders to create profits. The capacity of a corporation to create greater returns from the investments made by its shareholders is represented by a ROE that is higher.

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholders' Equity}} \times 100 \quad (7)$$

- Return on Assets: The Return on Assets (ROA) is a profitability ratio that determines how much net income a business makes for each dollar of its total assets. This ratio is also known as the return on investment (ROI). It is a measure of how effectively a firm is putting its resources to work in order to earn profits. A greater return on assets (ROA) demonstrates that a corporation is able to create more earnings from the sum of all its assets.

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}} \times 100 \quad (8)$$

- Return on Capital Employed: The Return on Capital Employed (ROCE) is a profitability ratio that quantifies the amount of net income generated by a firm for each dollar of its total capital employed. This total capital employed figure takes into account shareholders' equity as well as non-current liabilities. It reveals how effectively a firm is putting its investments in its capital stock to work in order to create profits. A greater return on total capital employed (ROCE) demonstrates that a corporation is able to create more profits from the use of its whole capital.

$$\text{Return on Capital Employed} = \frac{\text{Net Operating Profit}}{\text{Capital Employed}} \times 100 \quad (9)$$

$$\text{Net Operating Profit} = \text{Operating Profit} - \text{Taxes} \quad (10)$$

$$\text{Capital Employed} = \text{Shareholders' Equity} + \text{Non current Liabilities} \quad (11)$$

3.2.1.3.2 Liquidity Ratio

A company's capacity to satisfy its short-term commitments may be evaluated with the use of liquidity ratios, which are a kind of financial ratio. These ratios are essential for determining whether or not a firm has the financial wherewithal to meet its obligations on schedule and cover its operational costs.

The following are several liquidity ratios that are regularly employed, along with their formulas:

- **Current Ratio:** The current ratio measures a company's ability to pay off its current liabilities with its current assets. The formula is:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (12)$$

- **Quick Ratio:** A company's capacity to pay off its current commitments with its fast assets, which are assets that can be rapidly turned into cash, is evaluated using a metric called the quick ratio, which is also known as the acid-test ratio. The formula is as follows:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} \quad (13)$$

- **Cash Ratio:** The cash ratio is a measurement of a company's capacity to pay off its existing obligations with the cash and cash equivalents that it currently has. The formula is as follows:

$$\text{Cash Ratio} = \frac{\text{Cash and Cash equivalent}}{\text{Current Liabilities}} \quad (14)$$

3.2.2 Financial Statement Frequencies

Financial Reporting can be in three different frequencies due to the law and what law required from the specific business, in below there is a description of the different types of financial statements.

3.2.2.1 Quarterly Financial Statements

It is standard procedure to release a financial statement every three months, known as a "quarterly report." Simply put, it implies that a firm reports its financial results four times a year. A company's financial health and performance can be summarized by releasing such statements. Quarterly financial reports are required by law for most businesses and that can also give an overview of the high-income quarters of each company. (Robinson, et al., 2020)

3.2.2.2 Interim Financial Statements

A financial report that covers a period that is less than a year is called an interim statement. The company's performance can be communicated using interim statements prior to the conclusion of the normal full-year financial reporting cycles. This type of report, the F report, does not require an audit. In addition to improving communication between companies and the public, interim statements offer investors the most recent data that is relevant between the annual reporting periods. (Lightstone, et al., 2012)

3.2.2.3 Annual Financial statements

Annual financial statements are summaries of a company's financial position over the course of a year. The most common type of financial statement is based on the calendar year, but some businesses have their own fiscal year, and the financial statements are based on that.

3.2.3 Financial Statement Types

Financial statements are the reports provided by the company on the management level to demonstrate the financial situation of the company in the specific timeframes. There are different types of these reports which are the balance sheet, income statement, cash flow statement, note to financial statement and shareholders' equity. These reports should all be prepared based on some specific standards so that it will be consistent in all the levels. (Fabozzi, 2015)

In the next parts we will explain each financial statement more in detail.

3.2.3.1 Balance Sheet

The balance sheet, which is also known as the statement of financial position, lists the principal categories and amounts of assets what company generally owns and controls), liabilities (external claims), and stockholders' equity, this report shows the situation of the company at particular points in time.

The firm's creditors and stockholders, either directly or indirectly, fund the assets that are listed on the balance sheet, whether they were acquired by the company outright or produced via operations. This fundamental accounting connection, which is represented by the balance sheet equation, serves as the foundation for documenting all transactions in financial reporting. (O'Hare, 2013)

$$\text{Liabilities (L) + Stockholders' Equity (E) = Assets (A)}$$

3.2.3.2 Income Statement

For investing about the company's performance and situation and other relevant decisions associated with the business, the income statement is a fundamental source of information. The task of measuring income has always been difficult for organizations that establish accounting standards. Investors rely on income disclosed to estimate future income and cash flows. Income statement is mostly concentrated on the revenue the business generates that is the reason it has the alternative name of the profit and loss statement because it shows the revenue generated from selling products or service and it portrays if the company is generating profit or loss in a particular time frame. (Guerard, et al., 2020)

The income statement will often include a number of important components, including the following:

- Total Revenue: The sum total of money that a business has earned as a result of the sale of its goods or services is referred to as the firm's total revenue.
- COGS: The cost of goods sold, often known as COGS, refers to the direct costs that are linked with the manufacturing and sale of a company's goods or services. It takes into account the cost of labor, raw materials, and any other expenditures that are immediately associated with manufacturing.

- **Gross Profit:** Gross profit is the profit that remains after subtracting the cost of goods sold (COGS) from the total revenue of the business. To determine it, take the entire revenue and deduct the cost of goods sold.

- **Operating Expenses:** Expenditures incurred by a firm in the course of operating its business are referred to as operating expenses. Examples of operating expenses include marketing, research and development, as well as general and administrative costs.

- **Net Income:** After taking into account all of the company's revenues and expenditures, the entire profit or loss for the business is referred to as its net income. To get at this number, start by subtracting the whole income from the total costs.

3.2.3.3 Cash Flow Statement

Cash flow statement is a report that analyse all of the cash inflows from different types of the activities. Analysts and other people concerned with the performance of a business rely on the statement of cash flows to judge the financial health of publicly traded companies. The cash flow statement shows how the ending cash balance and the beginning cash balance on the balance sheet are linked by the cash receipts and payments made by a company over the course of an accounting period. (Robinson, et al., 2020)

3.2.3.3.1 Cash Flow from Operating Activities

Transactions that take place in the course of the company's normal operations are included in operating cash flows. (Schweser, 2008) Operating activities include the daily activities of the firm that generate revenue, such as selling inventory and providing services the above mentioned activities can include every c ash inflows that is generated by cash sales and the collection of accounts receivable. Cash receipts from the provision of services, as well as, commissions, and other revenue, are other existing examples of operating cash inflows and outflows examples. Companies generate revenue by doing things like manufacturing inventory, purchasing inventory from suppliers, and paying employees. Cash outflows are caused by cash payments for inventory, salaries, taxes, and other operating-

related expenses, as well as payments for accounts payable. Additionally, cash receipts and payments related to securities held for dealing or trading purposes are included in operating activities. (Robinson, et al., 2020)

3.2.3.3.2 Cash Flow from Investing Activities

Purchasing and selling investments are two of the most common ways to engage in investing. Property, plant, and equipment; intangible assets; long-term assets; and short-term investments in other companies' equity and debt (bonds and loans) are all examples of long-term investments. Equity and debt investments exclude: (a) any securities that are considered cash equivalents (very short-term and highly liquid securities), and (b) dealing or trading securities, the purchase and sale of which are considered operating activities even for companies where this is not their primary business activity. Cash receipts from the sale of non-trading securities; property, plant, and equipment; intangibles; or other long-term assets are included in the investment category. Payments for the acquisition of these assets are included in the cash outflows. (Robinson, et al., 2020)

3.2.3.3.3 Cash Flow from Financing Activities

Finance is the acquisition or repayment of capital, such as equity and long-term debt, that is necessary for a company's success. Shareholders and creditors are the primary sources of capital. To qualify for this category, a company must be able to raise money by issuing stock (common and preferred) or bonds. To repurchase stock (e.g., treasury stock), pay dividends, and repay bonds and other loans are all examples of cash outflows. It is important to keep in mind that borrowing money through accounts payable is not a financing activity, but rather an operating activity. (Robinson, et al., 2020)

3.2.3.4 Statements of Shareholders' equity

In the balance sheet there is a section about the owners' equity and this particular report is exactly the component changes summarized from the statement of the owners' equity. The statement begins with the balance at the beginning of the year and then reports all of the activity that occurred during the year. At the end of the year, the statement will report the ending balance, which will be reported on the balance sheet. There is a wide variety of information that can influence the financial position of a company that is disclosed in the

owners' equity statement. This information ranges from dividends paid to the owners to the number of shares outstanding. (Wahlen, et al., 2017)

3.2.3.5 Note to Financial Statements

Notes to the financial statements are a required component of the external financial statements of a company. Not all relevant financial information can be conveyed by the amounts shown on the financial statements' faces. The notes are also known as disclosures in footnotes. The notes are typically the primary means by which a company complies with the full disclosure principle.

3.2.4 Financial Statement Users

A company's operations can be gleaned from its financial statements. It tells you how much money the company makes, how much it spends, how well it handles its cash flow, and what its assets and liabilities are. The quality of management is clearly reflected in the financial statements. Users of financial statements come from a wide variety of industries and backgrounds, and their information needs can vary widely.

- **Stakeholders:** Stakeholders can be individuals or organizations, and the annual report reaches both. Actual and potential shareholders, creditors, banks and lending institutions, employees, investment analysts, the public, and governmental bodies are all examples of limited company stakeholders. While shareholders and debenture-holders are required by law to be given a copy of the annual report, the rest of the user groups are not required to be given a copy in any particular way. (Stittle, 2003)
- **Lenders:** Lenders can learn a great deal about a company's financial health and potential risks by reviewing its financial statements. Typical creditors aren't privy to the inner workings of a business on a continual basis. Instead, they look at a company's financial statements to see how profitable it is and how much it's worth. Lenders use financial statements to evaluate aspects like liquidity, cash flow, leverage, and overall solvency.
- **Suppliers:** In order to estimate and assess the risk existing in the credit worth, suppliers as banks and lenders need to use financial statement analysis. Suppliers need to

ensure if the company they are opening a new line of credit in is financially healthy and has a good situation, so that they can analyze the history of the business and figure out if the company is paying the debts on time, this method works the best as the suppliers will analyze the real time and up to dated data, in order to gain these data suppliers need to look for signs of controlled growth, healthy financial management and good business practices, so that they can have an extra layer of visibility to the business they are dealing with.

- **Customers:** Potentially large clients will examine a company's financial records to determine whether or not it is secure enough to be a reliable supplier over the long term, or if it has the resources to carry out a certain project on their behalf.
- **Employees:** Workers are interested in this data because they need to know whether they can count on being employed by the firm in the future. Giving employees access to this data may boost their engagement with the company as it gives a sense of improvement as the company grow.
- **Government:** It is possible for the governments of the territories in which a business operates to submit a suggestion for the information and the ability to establish whether or not the company has paid the necessary amount of taxes.
- **Investing Analysts:** Investment analysts could keep an eye on a public firm if they believe it has potential. In such case, these analysts require access to the company's financial information so that they can properly evaluate whether or not the company would be a suitable investment for their respective clientele.
- **Investors:** Investors are interested in examining the facts in order to make judgments on whether or not they should sell off their investment to a third party, depending on whether or not they believe the company will continue to develop and function sufficiently to justify their financial decision.
- **Management Team:** The managers of the listed company require access to the financial information necessary to make operational and financial choices regarding how to improve the company budgetary outcomes, financial condition, and cash

flows. This knowledge is needed for the managers to have to make this vital decisions to make the company keep growing.

- **Rating Agencies:** For the purpose of assigning a credit rating to the organization's different debt instruments, a credit rating agency will examine the company's financial statement. In order for the credit rating agency to assign a ranking to the securities that the issuing firm is selling in order to generate capital, the issuing company is required to provide all necessary details to the institution. Once a rating agency has established a ranking for these securities based on the firm's financials, the investors in these securities are capable of making an intelligent choice about their investment.

4 Practical Part

In the practical part of a thesis, theoretical principles are applied to real-world problems. In this thesis, we will use financial analysis methodologies to assess SAP's financial stability and profitability from 2017 to 2021. SAP is a leading enterprise software corporation. By studying SAP's financial statements and key performance indicators, we want to acquire a better understanding of the company's financial performance and identify possible development areas. In addition, the practical component of this thesis will include the interpretation of our results, the development of suggestions for the company's future growth and sustainability, and the introduction of new information to the area of financial analysis.

4.1 Horizontal Analysis of Financial Statements

Horizontal analysis, which is also known as trend analysis, is a method of analysing financial statements in which the financial statements of a corporation are compared to those of prior periods in order to spot patterns as well as shifts in the firm's position and performance. Another name for this technique is trend analysis. For the purpose of this study, the amounts reported on the financial statements for each period are first expressed as a percentage of the total amount reported for a base period, and then the percentage changes reported for each period are compared. In the case of the data use in this thesis the base year is considered as 2017. (Antayed & Tayeh, 2017)

4.1.1 Horizontal Analysis of Balance Sheet

In this chapter the analysis has been done to examine the trends and spot the patterns in the balance sheet items from 2017 to 2021 using horizontal analysis, this analysis is done in three main sections of balance sheet which is assets, liabilities, and equities section.

4.1.1.1 Horizontal Analysis of Assets

In this part, an analysis of the growth of the company's assets is shown relative to an absolute change using monetary measures and percentage, financial and relative indication. An investigation of the years 2017-2021 is going to be carried out using formula 1.

Table 1: Horizontal Analysis of Balance Sheet (Assets) 2017-2021

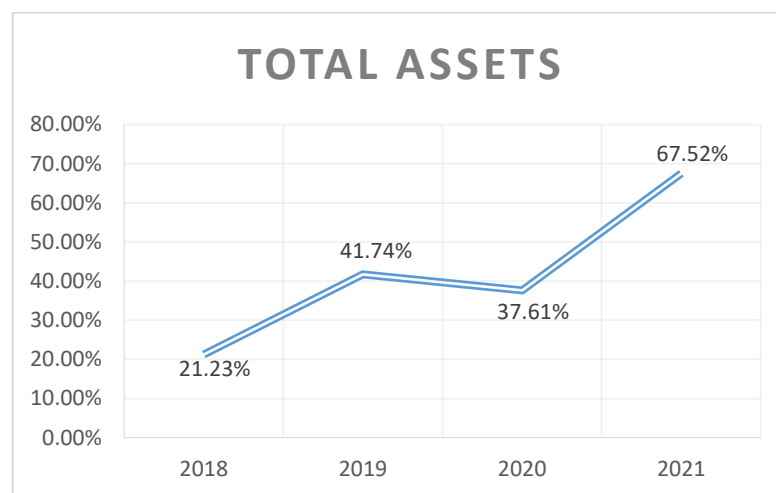
Horizontal Analysis of Balance sheet as end of 2021- Values in Million Euros				
Fiscal year Jan to Dec	2018	2019	2020	2021
Assets				
Cash & Short Term Investments	121.29%	36.82%	69.37%	184.22%
Cash Only	115.08%	32.49%	32.41%	121.84%
Cash & ST Investments / Total Assets	82.59%	-3.42%	23.11%	69.74%
Total Accounts Receivable	7.25%	35.58%	9.64%	8.86%
Other Receivables	19.44%	115.15%	52.53%	119.19%
Total Current Assets	39.31%	27.52%	26.31%	68.01%
Net Property, Plant & Equipment	19.75%	85.24%	69.90%	67.75%
Total Investments and Advances	32.99%	102.25%	204.07%	443.29%
Other Long-Term Investments	32.99%	102.25%	204.07%	443.29%
Intangible Assets	11.24%	38.84%	29.23%	44.63%
Net Goodwill	11.59%	37.10%	29.46%	46.16%
Net Other Intangibles	8.76%	51.37%	27.54%	33.67%
Other Assets	63.43%	105.58%	111.16%	178.25%
Tangible Other Assets	63.43%	105.58%	111.16%	178.25%
Total Assets	21.23%	41.74%	37.61%	67.52%

Source: Own Computation based on Balance Sheet Published by SAP

Table shows horizontal analysis of an asset with the time duration from 2017 to 2021. It consists of the absolute and relative changes. The first thing which is eye-popping is that the amount of Cash & Short-Term Investments has been reduced from 121.29% to 36.82% in 2019. The COVID-19 pandemic had a limited effect on companies' assets in 2019, as the pandemic did not significantly impact the global economy until late in the year. However, some companies like SAP may have seen early impacts in their operations, such as decreased consumer demand or supply chain disruptions, which could have affected their assets to some extent. In the case of SAP SE in 2019, so many companies worldwide stay closed due to covid and they were not yet ready for remote or hybrid working, resulting in so many maintenance of software terminations which lead to a significant decrease in cash in hand

reasoning maintenance of software charges are the first source of cash for SAP. However in 2020 companies worldwide adapted to hybrid or remote way of working and they needed their system to be agile, smart and networked to make it digitalized and be able to work from home, so they either reinstated their maintenances or so many companies started to use ERP systems, this led to an increase from 36 to 69% in cash in hand in 2020, as the demand of standardization and digitalization is an overgrowing demand in the successful corporations the amount increased also as of 2021 to 184.22%.

Figure 1: The total Assets in the years 2017-2021(in mil.\$)



Source: Own work from annual reports 2017-2021

In figure 1 the overall increase in total assets of the company is shown. The starting point is 2018 and the company's total assets is in 21.23% and experience an upward trend in 2019 as the company was growing and covid did not change the total assets until end of the year.

SAP SE, like many companies, faced challenges due to the COVID-19 pandemic in 2020. The pandemic had a significant impact on the global economy and disrupted businesses of all sizes and industries. Companies like SAP faced decreased consumer demand, supply chain disruptions, and temporary closures, leading to decreased revenue and increased expenses. These factors could have contributed to a decrease in SAP's total assets in 2020.

It's also important to note that changes in a company's total assets can be a normal part of its financial cycle and may not necessarily indicate a problem. In the case of SAP, the

decrease in total assets could be part of the company's strategic plan to respond to the challenges posed by the pandemic and realign its resources towards its priorities. That is why the trend is drastically upward as of 2020 and there is an increase from 37% to 67%.

4.1.1.2 Horizontal analysis of Liabilities

This section examines the alterations that have occurred in the company's liabilities between the years 2017 and 2021 horizontal analysis of liabilities is an important tool for financial analysis and decision-making, and can provide valuable insights into a company's financial health and trends.

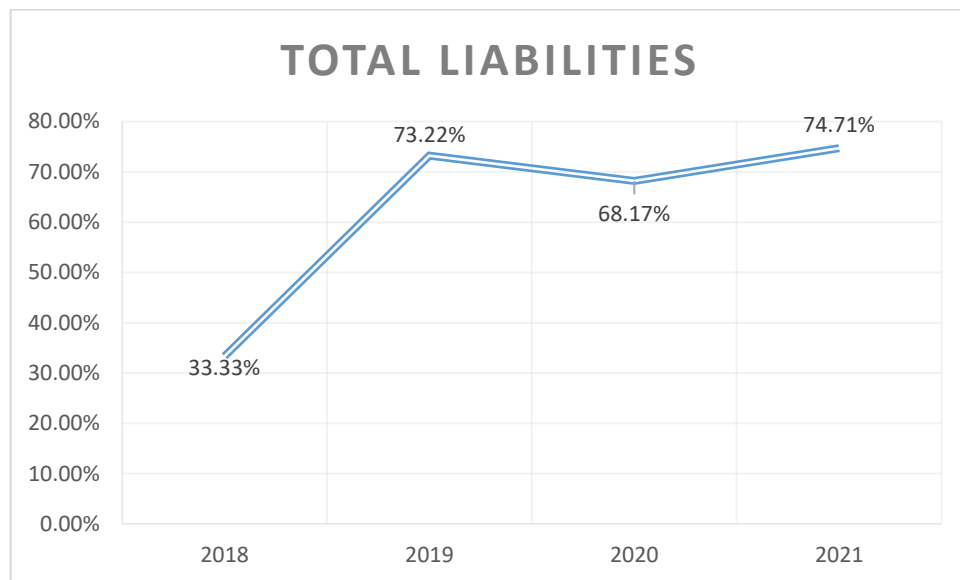
Table 2: Horizontal Analysis of Balance Sheet (Liabilities) 2017-2021

Horizontal Analysis of Balance sheet as end of 2021- Values in Million Euros				
Fiscal year Jan to Dec	2018	2019	2020	2021
Liabilities				
ST Debt & Current Portion LT Debt	-40.83%	124.96%	43.61%	221.03%
Short Term Debt	-40.83%	94.99%	14.33%	189.68%
Accounts Payable	29.54%	37.36%	18.77%	37.27%
Income Tax Payable	2.35%	-57.29%	-30.65%	-49.08%
Other Current Liabilities	6.31%	35.48%	28.38%	40.77%
Total Current Liabilities	2.70%	41.65%	25.78%	58.04%
Long-Term Debt	110.62%	157.90%	171.89%	119.53%
Long-Term Debt excl. Capitalized Leases	110.62%	121.63%	137.11%	84.83%
Non-Convertible Debt	110.62%	121.63%	137.11%	84.83%
Provision for Risks & Charges	-17.68%	45.73%	10.37%	8.23%
Deferred Taxes	16.03%	48.73%	31.04%	89.31%
Other Liabilities	4.58%	24.87%	33.70%	59.85%
Other Liabilities (excl. Deferred Income)	4.09%	25.75%	40.04%	70.15%
Deferred Income	11.39%	12.66%	-54.43%	-83.54%
Total Liabilities	33.33%	73.22%	68.17%	74.71%
Total Liabilities / Total Assets	9.99%	22.21%	22.21%	4.31%

Source: Own Computation based on Balance Sheet Published by SAP

As shown in table 2, there are some negative values in the horizontal analysis of the liabilities, a negative value in horizontal analysis of liabilities can be a positive sign for a company, as it indicates that the company has reduced its debts and liabilities over time

Figure 2: The total Assets in the years 2017-2021(in mil.\$)



Source: Own work from annual reports 2017-2021

As obvious in the Figure 2, the total liabilities of SAP increased as of 2019 from 33.33% to 73.22%, reasoning the company acquired 5 different companies listed as below with a brief explanation about the acquired company's area of expertise;

- **Contextor**
Contextor is the industry pioneer in Europe when it comes to the design and integration of robotic process automation (RPA). Users of business software are saved from having to carry out repetitive operations thanks to the company's RPA, which also enables attended and unattended RPA within and across applications. More than one hundred thousand bots that automate business operations have been deployed by Contextor's customers to this day.
- **Qualtrics**
Experience data is sometimes referred to as X-data™. Qualtrics is a technology platform that companies use to gather, store, and take action on this type of data. The Qualtrics XM Platform™ is a system of action that is used by teams, departments, and entire organizations to manage the four fundamental experiences of business on a single platform. These four core experiences include customer, product, employee,

and brand experiences. Over 9,000 businesses around the world rely on Qualtrics to consistently build products that individuals enjoy, establish more customer loyalty, create a positive employee culture, and establish new brands. This includes more than 75 percent of the Fortune 100 and 99 of the top 100 business schools in the United States.

- Coresystems

Coresystems was one of the first companies to implement crowd service and is now the industry standard for field service management platforms. The system is powered by artificial intelligence (AI), and it offers advanced planning of field service operations in real time, as well as mobile apps that allow field service workers to carry out setup, maintenance, and repair work. Service firms are able to establish and extend their service networks beyond their own personnel thanks to the distinctive capabilities offered by crowd-sourcing.

- Callidus Software

The cloud-based Lead to Money (Quote-to-Cash) solutions provided by CallidusCloud have helped the company become an industry leader around the world. The company creates software that helps businesses in a variety of ways, including determining which leads to pursue, ensuring that territories and quotas are divided appropriately, empowering sales staff, automating configure-price-quote processes, and streamlining sales incentives. In light of SAP's recent acquisition of Callidus Cloud, the company is now in a strong position to continue serving the needs of contemporary sales teams despite the fact that these needs go well beyond basic sales force automation. The acquisition of CallidusCloud is a significant step toward the realization of SAP Customer Experience's vision to provide businesses with an integrated and one-of-a-kind enterprise sales platform that can connect the front and back offices in a seamless manner.

- Recast. AI

Recast. AI delivers a rich environment based on machine learning, which boosts the conversational capabilities of SAP's products. Its technology can handle over 20 different languages, and it can evaluate phrases and deliver data that is accurate and usable. In addition, its collaborative end-to-end platform enables software developers to construct bots, link those bots to a wide variety of channels, and train their comprehension of the information they receive. The purpose of the chatbots is to

either assist customers with the acquisition of goods and services in a more individualized and natural manner or to automate service procedures for businesses such as telecommunications firms, banks, insurance companies, and energy suppliers. Both the digital assistant SAP CoPilot and the chatbots that are used throughout all SAP product categories will make use of the technology and capabilities that are provided by Recast.AI.

4.1.1.3 Horizontal analysis of Equity

Horizontal analysis of equity is a method of financial analysis that involves comparing the equity position of a company over a period of time. It involves taking the equity information from a company's balance sheet at the end of each financial year and comparing it to the previous year. The purpose of this analysis is to identify changes in a company's sources of funding, such as share capital and retained earnings, as well as changes in its use of those funds, such as payment of dividends and stock buybacks. By comparing the equity position of a company over time, horizontal analysis provides valuable insights into the company's financial stability, its ability to generate income and retain earnings, and its overall financial performance.

Table 3: Horizontal Analysis of Balance Sheet (Equity) 2017-2021

Horizontal Analysis of Balance sheet as end of 2021- Values in Million Euros				
Fiscal year Jan to Dec	2018	2019	2020	2021
Equity				
Common Equity (Total)	13.14%	20.65%	16.61%	52.46%
Additional Paid-In Capital/Capital Surplus	-4.74%	-4.39%	-4.39%	236.49%
Retained Earnings	10.65%	16.20%	29.30%	49.47%
Treasury Stock	-0.69%	-0.69%	93.09%	93.09%
Common Equity / Total Assets	-6.67%	-14.87%	-15.26%	-8.99%
Total Shareholders' Equity	13.14%	20.65%	16.61%	52.46%
Total Shareholders' Equity / Total Assets	-6.67%	-14.87%	-15.26%	-8.99%
Accumulated Minority Interest	45.16%	145.16%	580.65%	8512.90%
Total Equity	13.18%	20.80%	17.29%	62.74%
Liabilities & Shareholders' Equity	21.23%	41.74%	37.61%	67.52%

Source: Own Computation based on Balance Sheet Published by SAP

As a result of issuance of new shares in 2019 the Total equity increased as shown in table 3 from 13.18% starting in 2018 to 20.80% in 2019. However due to the market environment and Covid 19 outbreak it decreased to 37.61% but it had a significant increase from 17.209% in 2020 to 62.74% in 2021 also shown in figure 3, which have various reasons as below.

- The new acquisitions of 3 companies as below

1. Emarsys

Emarsys is the industry's preeminent developer of omnichannel consumer interaction platforms. Their products make it possible for businesses to have highly tailored one-on-one interactions with their clients. The addition of Emarsys to SAP's Customer Experience products is very beneficial: Their cutting-edge, cloud-native, SaaS platform comes equipped with built-in AI-based automation and analytics capabilities, making it easier for merchants to provide tailored marketing through email, mobile, social, SMS, websites, and other communication channels.

2. Signavio

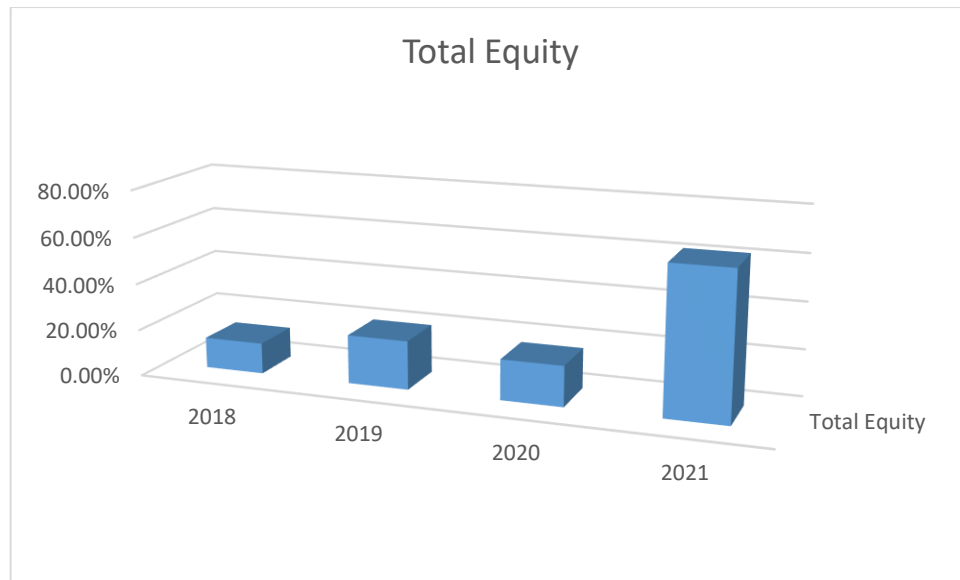
Signavio is the industry leader when it comes to enterprise business process intelligence as well as process management. The complete cloud-native process management suite offered by Signavio is a complementary offering to SAP's already existing business process intelligence software. With the acquisition of Signavio, SAP is now able to offer clients with a comprehensive portfolio of process transformation solutions that are adaptable and can help customers better analyze, enhance, transform, and manage their business processes at scale.

3. AppGyver

AppGyver was one of the first companies to provide a no-code development platform, which allows users with no prior coding experience to create apps for mobile and web usage. Because of the purchase, SAP is now in a better position to assist clients and partners in effectively adapting their information technology systems to their unique requirements and in improving the usability of their applications.

- Retained earnings: SAP has been able to generate consistent profits, and some of these profits may have been retained by the company, which would increase total equity.

Figure3: The Total Equity in the years 2017-2021(in mil.\$)



Source: Own work from annual reports 2017-2021

4.2 Vertical Analysis of Financial Statements

Among effective methods for determining how healthy a company's finances are, vertical analysis of financial statements is a beneficial tool. For the purpose of this kind of analysis, each item on a financial statement is expressed as a percentage of a base figure, which is often the total assets or total sales. This enables a comparison to be made between the relative sizes of several accounts and assists in identifying patterns over the course of time.

The vertical analysis of financial statements is most often used for the following three primary goals: To begin, it enables investors and analysts to have a better knowledge of the financial status of a firm by comparing various accounts on a common basis. This is a significant benefit. Second, it is helpful in identifying major patterns in the operation of a firm over time, such as changes in sales, expenses, or liabilities. This may be done via the use of financial statements. Last but not least, vertical analysis may provide light on a

company's liquidity, solvency, and profitability, all of which are crucial markers of a company's overall financial health. (Zack, 2013)

4.2.1 Why vertical analysis is important?

Vertical analysis of an income statement is important for several reasons:

Identifying the proportion of each line item: Vertical analysis helps in identifying the proportion of each line item in the income statement relative to a base item, usually net sales or total revenue. This provides insights into the company's cost structure, operating expenses, and profitability.

1. Comparing financial statements: Vertical analysis helps in comparing the financial statements of companies of different sizes or with different revenue streams. By expressing each line item as a percentage of a base item, investors and analysts can compare the relative size of each line item across companies.
2. Tracking changes over time: Vertical analysis can be used to track changes in a company's financial performance over time. By comparing the vertical analysis of multiple periods, investors and analysts can identify trends in a company's revenue, cost of goods sold, operating expenses, and profitability.
3. Forecasting future performance: Vertical analysis can also be used to forecast a company's future performance. By analyzing the proportion of each line item in the income statement, investors and analysts can identify areas where a company may need to focus on to improve its profitability.

In summary, vertical analysis of an income statement is important because it provides insights into a company's cost structure, profitability, and financial performance over time. By analyzing the proportion of each line item relative to a base item, investors and analysts can compare financial statements, track changes over time, and forecast future performance.

4.2.2 Vertical Analysis of Income Statement

Vertical analysis of an income statement is a financial analysis technique used to evaluate the relative proportions of different items within the income statement. It involves

expressing each line item in the income statement as a percentage of a base item, typically net sales or total revenue. This technique helps in identifying the proportion of different items within the income statement and provides insights into the company's financial performance. By comparing the vertical analysis of different income statements over time, investors and analysts can track the trends and changes in a company's financial performance. The table below is carried out using formula 2. (Walker, 2009)

Table 4: Vertical Analysis of Income Statement 2017-2021

Vertical Analysis of Income Statement as end of 2021- Values in Million Euros					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Sales/Revenue	100.00%	100.00%	100.00%	100.00%	100.00%
COGS excluding D&A	24.63%	24.69%	23.53%	21.22%	21.37%
Cost of Goods Sold (COGS) incl. D&A	30.05%	30.20%	30.32%	27.92%	27.74%
Depreciation & Amortization Expense	5.42%	5.51%	6.79%	6.70%	6.38%
Gross Income	69.95%	69.80%	69.68%	72.08%	72.26%
SG&A Expense	48.38%	46.56%	49.41%	45.82%	52.89%
Research & Development	14.29%	14.67%	15.58%	16.27%	18.60%
Other SG&A	34.09%	31.89%	33.83%	29.55%	34.29%
Non Operating Income/Expense	-0.15%	-0.31%	-0.20%	3.12%	8.89%
Non-Operating Interest Income	2.03%	1.50%	2.86%	0.41%	0.20%
Interest Expense	1.23%	1.69%	2.14%	1.29%	1.06%
Gross Interest Expense	1.23%	1.69%	2.14%	1.29%	1.06%
Pretax Income	21.44%	22.66%	16.68%	26.41%	24.59%
Income Tax	4.19%	6.12%	4.45%	7.09%	5.28%
Net Income	17.08%	16.53%	12.05%	18.82%	18.88%
EBITDA	26.99%	28.76%	27.06%	32.96%	25.74%

Source: Own work from annual reports 2017-2021

In the table that you can see above, we have represented the total income as 100%, and we have compared all of the other revenues to it using their relative differences.

The direct costs of manufacturing the commodities that a firm sells are referred to as the "Cost of Goods Sold," which is abbreviated as "COGS." The cost of goods sold (COGS) is comprised of the costs of the raw materials, labour, and administrative expenses directly associated with the production of the items.

Depreciation and amortization, sometimes known as D&A, are both examples of non-cash costs that are used to account for the depreciation of assets over time as a result of their usage.

Hence, the direct cost of producing things that a firm sells is referred to as COGS excluding D&A. This cost takes into account any non-cash charges linked to the depreciation and amortization of assets used in the production process but does not include those costs. Investors and analysts often make use of this indicator when evaluating a company's overall operating profitability and operational efficiency.

COGS excluding D&A is typically lower in the software industry than it is in other industries. This is due to the fact that software companies typically have lower direct production costs, such as materials and labor, and rely heavily on intangible assets, such as intellectual property and research and development. Compared to other industries, the software industry and a company like SAP SE generally has lower direct production costs. As a direct consequence of this, software businesses often have better gross profit margins and a lower cost of goods sold as a proportion of total sales. The value of COGS as seen in the table has slight fluctuation over years.

The difference between total revenue and the cost of the goods sold is known as gross income (COGS). It is the amount of money that a firm makes from the sale of its goods or services before any of the company's operational expenditures are deducted from that amount. In the context of vertical analysis, "gross income" is often represented as a percentage of "revenue," which refers to the overall money that a firm brings in through the selling of its goods or services. The software industry typically has higher gross margins and lower cost of goods sold (COGS) compared to other industries, such as manufacturing or retail. As a result, the gross income in vertical analysis standard for the software industry is generally higher than in other industries. As seen in the table the gross income had the increase from 69.95% to 72.26% to its maximum level in 2021. This growth illustrates company's increasing profitability and cost efficiency,

Non-operating income refers to income that a company generates from activities that are not related to its core business operations. This can include items such as interest income, dividends received, gains from the sale of assets, and other miscellaneous income. In vertical analysis, non-operating income is typically expressed as a percentage of total revenue. If a firm's vertical analysis reveals that it has a negative non-operating income, this indicates that the company is generating losses due to activities that are not directly related to its core business, which in turn lowers the company's overall profitability. A company may have negative non-operating income in one period but positive non-operating income in another period, depending on various factors and market condition, in the case of SAP SE the figures

are insignificant and small, and the trend is upward as it is coming from a negative value to positive from -0.15% in 2017 to 18.60% in 2021.

EBITDA is a measure of a company's profitability that shows the earnings before non-cash expenses such as depreciation and amortization, as well as interest and taxes. In vertical analysis, EBITDA is expressed as a percentage of revenue, which is the total income generated by the company from the sale of its products or services. As shown on the above table the value is 26.99% in 2017 but it grows to 32.96% despite the fact that Covid 19 situation was affecting the company, but the trend did not remain upward and in decreased to 25.74% in 2021, reasoning the economic environment which caused inflation after the Covid era.

4.3 Ratio Analysis

Ratio analysis is a method of evaluating a company's financial performance by analyzing various ratios derived from its financial statements. Ratios are calculated by dividing one financial metric by another, and they provide insight into different aspects of a company's financial health. (Drake & Fabozzi, 2012)

In this paper three areas of ratio analysis will be covered, namely, profitability ratio, liquidity ratio and efficiency ratio.

4.3.1 Profitability Ratio

As a financial measure, profitability ratios assist in assessing also analyzing a corporation's earnings potential. The above skills can also be evaluated for a specific timeframe through the income statement, the balance sheet, the shareholder's equity, or the sales process. A company's ability to generate profits and provide value for shareholders can be measured by its profitability ratio. (Warren, et al., 2014)

In addition, the profitability ratio can be used to make a comparison various businesses or spans of time. Any organization wants to achieve a higher ratio, which indicates that the enterprise is doing well in terms of revenue, profits, or cash flow. Most investors and creditors use profitability ratios to evaluate a company's return on investment in relation to its assets. These ratios are also analyzed by company management to improve profitability by establishing changes in the business operational processes. (Husain, et al., 2020)

4.3.1.1 Gross Profit Ratio

The level of a company's efficiency can be evaluated by looking at its gross profit, which also plays a significant role in the overall profitability of the firm. The gross profit formula is:

$$\text{Gross Profit} = \text{Net Sales} - \text{Cost of Goods Sold} \quad (3)$$

The gross profit ratio is a measure of a company's ability to generate gross profit. It is the company's operating expenses that are not deducted from gross profit, the formula is as below:

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \quad (4)$$

Table 5: Gross Profit Ratio of SAP, 2017-2021

Gross Profit Ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Gross Profit	16,410	17,246	19,198	19,705	20,118
Total Revenue	23,461	24,708	27,553	27,338	27,842
Gross Profit Ratio	70%	70%	70%	72%	72%

Source: Own work from annual reports 2017-2021

As shown in the table SAP has a high and growing gross profit margin of 70%, this high value is mainly because of the fact that a software company like SAP SE with software products have relatively low production costs and high value-add, which allows for a high profit margin the other reason for this high gross profit margin is that SAP products are subscription based, in another word, the software of SAP bought might have 17 to 22 percent of the total software value charge for the maintenance yearly. As shown in the **table** SAP was able to keep the margin in a way that it does not fluctuate severely in the years which is a very positive point specially in Covid-19 time.

4.3.1.2 Net Profit Ratio

Net profit, also known as net income or net earnings, is the entire profits or profit of a corporation after deducting all costs, taxes, and other revenue streams. It is determined by deducting from the company's total income all expenditures, including the cost of products

sold, operational expenses, interest, taxes, and any other expenses. (Nariswari & Nugraha, 2020)

Net profit is an essential indicator of a company's financial success, since it reveals the amount of profit retained after all expenditures have been deducted. In addition, it is a crucial aspect in evaluating the overall health and profitability of a business. (Alvian, R. and Munandar A., 2022)

$$\text{Net Profit} = \text{Gross Profit} - \text{Operating Expenses} - \text{Taxes} - \text{Intrest}$$

In order to arrive at the net profit ratio, we need to subtract all operating expenses from the gross profit. The formula to calculate the net profit is:

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 \quad (5)$$

Table 6: Net Profit Ratio of SAP, 2017-2021

Net Profit Ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Net Profit	4,008	4,083	3,321	5,145	5,256
Total Revenue	23,461	24,708	27,553	27,338	27,842
Net Profit Ratio	17%	17%	12%	19%	19%

Source: Own work from annual reports 2017-2021

It is difficult to identify what the "optimal" net profit ratio is for a software firm like SAP SE since this metric is very variable and may change significantly based on the company's size, sector in which it operates, and business style over years. It is commonly accepted that a high net profit ratio is a favorable sign of the financial health and profitability of a firm. A net profit ratio of 10% or more is regarded to be excellent, while a ratio of 10% or higher is considered to be optimal and as shown SAP with net profit margine of 12 to 19 percent is considered as a profitable healthy business, however due to the Covid-19 outspread in 2019 there was a downward trend but the company could revive in the following year and increase the margine from 12 to 19 which is the highest value in the period.

4.3.1.3 Return on Equity

Return on equity (ROE) is calculated by dividing a company's net income by its shareholders' equity. ROE measures a company's profitability as well as how effectively it generates profits. The greater a company's ROE, the stronger it is at transferring equity financing into profits. . It is a critical ratio because it encompasses a wide range of ratios. (De Wet, J.H.V.H. and Du Toit E., 2007)

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholders' Equity}} \times 100 \quad (6)$$

Table 7: Return on Equity of SAP, 2017-2021

Return on Equity of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Net Income	4,008	4,083	3,321	5,145	5,256
Share Holders Equity	25,484	28,832	30,746	29,716	38,853
Return on Equity	15.73%	14.16%	10.80%	17.31%	13.53%

Source: Own work from annual reports 2017-2021

As shown above the ROE in SAP started with around 16% in 2017 and it had a downward trend in 2018 and 2019 due to the Covid-19 pandemic, but the company could increase it properly in 2020 and again in experienced a downward trend in 2021 from 17 to 13 percent, but in general the ROE above 10% is considered good and above 15% is considered very good for a software company in size of SAP SE.

4.3.1.4 Return on Assets

Return on assets (ROA), also known as return on total assets, is a metric that measures how much profit a company generates from its capital. This profitability ratio displays the percentage growth rate in revenue gained by a company's assets.

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}} \times 100 \quad (7)$$

Table 8: Return on Assets of SAP, 2017-2021

Return on Assets of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Net Income	4,008	4,083	3,321	5,145	5,256
Total Assets	42,484	51,502	60,215	58,464	71,169
Return on Assets	9.43%	7.93%	5.52%	8.80%	7.39%

Source: Own work from annual reports 2017-2021

The higher the ROA the more efficient the company is, as shown in Table 7 SAP had ROA of 9.43% on 2017 which increased to 5.52% gradually by 2019, by 2020 the company could increase the ROA after the pandemic and have a 8.8% ROA, however it again experienced a downward in 2021 to 7.39%.

In general, the ROA of the company is considered to be healthy as has been over 5% in all the five years period.

4.3.1.5 Return on Capital Employed

Return on capital employed is determined by how effectively the company uses its capital in day-to-day processes. In order to evaluate a company's ability to generate returns, an investor must consider the ROCE ratio. This measure focuses on capital invested for a longer period of time than the ROE does.

In software companies, ROCE can be influenced by several factors, such as:

- Research and Development (R&D) expenses
- Sales and Marketing expenses
- Product pricing strategies
- Intellectual Property (IP) protection
- Competition and market dynamics

ROCE is calculated by dividing net operating profit by total capital employed

Net operation profit is the EBIT (Earnings Before Interest and Taxes) and Total Capital Employed is Equity + Long-term Debts as the below formula:

$$\text{Return on Capital Employed} = \frac{\text{Net Operating Profit}}{\text{Capital Employed}} \times 100 \quad (8)$$

$$\text{Net Operating Profit} = \text{Operating Profit} - \text{Taxes} \quad (9)$$

$$\text{Capital Employed} = \text{Shareholders' Equity} + \text{Non current Liabilities} \quad (10)$$

Table 9: Return on Capital Employed Ratio SAP, 2017-2021

Return on Capital Employed Ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
EBIT	5,059	5,743	5,584	7,180	5,392
Long term Liabilities + Equity	30,517	39,412	43,722	43,527	52,504
Return on Capital Employed Ratio	17%	15%	13%	16%	10%

Source: Own work from annual reports 2017-2021

There is no standard ROCE (Return on Capital Employed) for software companies, as it varies based on factors such as company size, industry, financial performance, and capital structure. But as stated in the Table 8 SAP SE has a ROCE higher than 10 in 2017-2019, however the trend has been downward due to covid situation but in 2020 the company could increase the ROCE and in 2021 it reached to the lowest point due to the economic environment of the company.

4.3.2 Liquidity Ratio

One of the most important financial ratio called a liquidity ratio is used to assess a business's capacity to settle its short-term debt obligations. The measure aids in figuring out whether a business can use its liquid, or current, assets to pay its current liabilities.

Table 10: Liquidity ratio of SAP, 2017-2021

Liquidity ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Current Ratio	0.93	1.58	1.05	1.17	1.24
Cash Ratio	0.40	0.87	0.39	0.54	0.72
Quick Ratio	2.31	1.83	2.71	2.17	1.72

Source: Own work from annual reports 2017-2021

4.3.2.1 Current Ratio

The current ratio, also referred to as the working capital ratio, analyses a company's ability to pay short-term debt that is due within a year. The weight of total current assets compared to total current liabilities is considered in the ratio. It shows how a company's financial dimension are doing and how it can use its current assets' maximum liquidity to pay off debt and other obligations (Ahrendsen & Katchova, 2012). The liquidity of a company can be easily determined using the current ratio formula stated below:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (11)$$

Table 11: Current ratio of SAP, 2017-2021

Current Ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Current Assets	11,930	16,620	15,213	15,069	20,044
Current Liabilities	10,210	10,486	14,462	12,842	16,136
Current Ratio	0.93	1.58	1.05	1.17	1.24

Source: Own work from annual reports 2017-2021

In case of SAP SE company has an upward trend with small fluctuation to keep current ratio high which shows that the company is healthy. SAP SE's current ratio has varied throughout the years, but has always been around 1. Evidence that the corporation can fulfil its immediate debts and it is a good sign for the company, it started with 0.9 in 2017 peaked to 1.58 in 2018 shows how company progressed over years. In 2019 due to the pandemic situation in decreased to 1.05 which indicated that company's liquidity position has weakened, and company might have some difficulties compared to past year to meet its short term financial obligations using its current assets such as cash and accounts receivable and its inventory. But as shown in 2020 SAP was able to keep the trend upward and also in 2021 increase is shown to 1.24 which is a positive sign for the company to overcome covid and post covid difficulties.

4.3.2.2 Quick Ratio

The Quick Ratio, also known as the Acid-test or Liquidity ratio, is a ratio that evaluates a company's ability to pay its short-term liabilities by determining the percentage of its assets that can be quickly converted into cash. Other names for this ratio include the Liquidity ratio and the Acid-test ratio. Cash on hand, marketable securities, and outstanding invoices are the assets that make up this portfolio. These assets are referred to as "quick" assets because of the ease with which they can be transformed into cash. (Edmister, 1972)

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} \quad (12)$$

As shown in table 8 in year 2017 quick ratio of SAP was high in 2.31 A high quick ratio indicates that a company has enough liquid assets to cover its short-term obligations, in 2018 as a result of rising liabilities the quick ratio of the company decreased in 1.83 however the trend is upward in 2019 as a result of better performance and improvements in account receivable collection, as of 2020 due to the covid 19 economic situation the trend is downward to 2.17 and 1.72 in 2021.

4.3.2.3 Cash Ratio

The cash ratio, also known as the cash asset ratio, is a liquidity metric that indicates a company's capacity to pay off its short-term debt obligations with its cash and cash equivalents. The cash ratio is sometimes referred to as the current asset ratio. The cash ratio is a measure of a company's liquidity that is considered to be stricter and more conservative than other liquidity ratios such as the current ratio and the quick ratio. This is because the cash ratio is calculated using only cash and cash equivalents, which are the most liquid assets that a company possesses.

$$\text{Cash Ratio} = \frac{\text{Cash and Cash equivalent}}{\text{Current Liabilities}} \quad (13)$$

Table 12: Cash ratio of SAP, 2017-2021

Cash Ratio of SAP, 2017-2021					
Fiscal year Jan to Dec	2017	2018	2019	2020	2021
Cash and cash Equivalents	4,101	9,075	5,611	6,946	11,656
Current Liabilities	10,210	10,486	14,462	12,842	16,136
Cash Ratio	0.40	0.87	0.39	0.54	0.72

Source: Own work from annual reports 2017-2021

The ideal cash ratio for software companies can vary depending on the size, business model, and stage of the company. It is possible for the appropriate cash ratio for software firms to change based on the size of the company, its business strategy, and its stage of development. On the other hand, in comparison to businesses operating in other sectors, software firms often have a much higher cash ratio. This is due to the fact that software firms often need less inventory and have smaller capital expenditures, which enables them to create larger amounts of cash. Hence, the software industry has seen an increase in cash generation.

It is usually accepted that software businesses are doing well if they have a cash ratio of 0.5 or greater. Nevertheless, the ideal cash ratio might change based on the individual conditions of the firm, such as its development plan, investment possibilities, and possible hazards. This can cause the optimal cash ratio to shift from one company to another.

However we can see SAP has an upward trend of cash ratio from 2017 to 2018 from 0.40 to 0.87, this slope is downward in 2019 due to the pandemic situation and the fact that many companies terminated their maintainances with SAP which led to direct cut off in the cash, in 2020 when world got used to pandemic situation and companies realised they need to form their hybrid model of working the demand of ERP solutions increased and we see rise from 0.54 to 0.72 as compared to our base year 2017.

4.4 Analysis of SAP ERP with competitors

It is essential for a business to carry out a competitive analysis since this enables the business to get a better understanding of its position in the market, determine its advantages and disadvantages, and develop strategies that will help it remain one step ahead of its rivals. (West, 2001)The following is a list of some of the most important reasons why competitive analysis is so important:

1. Recognize emerging market trends: An organization may recognize emerging market trends, changing consumer requirements and preferences by monitoring its competitors, which can assist the organization in adapting to changing market circumstances.
2. Comprehend the benefits of competitive advantages: A firm may determine both its own strengths and weaknesses, as well as the strengths and weaknesses of its rivals, by conducting an analysis of the companies with whom it competes. This may

assist them in determining the areas in which they can successfully compete as well as the areas in which they need to improve.

3. Studying rivals may help a firm establish successful marketing strategies that separate them from their competitors and appeal to their target audience. These strategies should be developed with the assistance of an analysis of the competitors.
4. Monitor performance: A corporation may uncover possibilities to enhance their own performance and remain ahead of their competition if they monitor the performance of their competitors and compare it to their own performance.

Overall doing a competitive analysis assists a firm in remaining competitive and relevant in their market, determining their distinctive selling propositions, and developing successful strategies to achieve their business objectives.

4.4.1 SAP's Competitors

In the market for corporate software, SAP, a software corporation based in Germany, has competition from a number of other businesses. The following are some of SAP's most significant competitors:

1. Microsoft is a US-based technology firm that offers a variety of corporate software solutions, such as computer operating systems, cloud services, and business applications such as Dynamics 365. Microsoft Corporation is a subsidiary of Microsoft, which was founded in 1975.
2. Oracle is a US-based technology firm that offers a broad variety of corporate software solutions, such as database management systems, cloud services, and business applications. Oracle Corporation is a subsidiary of Oracle, which was founded in 1977
3. Salesforce is a cloud computing firm established in the United States that offers a variety of software solutions for customer relationship management (CRM), sales, and marketing. Salesforce is often known simply as Salesforce.

4. Workday is a software firm located in the United States that offers a variety of cloud-based solutions for the administration of human resources, financial management, and analytics. Workday was founded in 2007.
5. IBM is a US-based technology corporation that offers a variety of corporate software solutions, such as database management systems, cloud services, and business applications. IBM Corporation is a subsidiary of IBM, which was founded in 1911.
6. Infor is a software firm established in the United States that offers a variety of enterprise software solutions, such as those for managing human resources, supply chains, and finances, among other areas of business operation.
7. Epicor: Epicor is a software firm established in the United States that offers a variety of enterprise resource planning (ERP) solutions to businesses in the retail, distribution, and manufacturing sectors.
8. NetSuite is a firm located in the United States that specializes in cloud computing and offers a variety of software solutions for ecommerce, customer relationship management (CRM), and financial management. NetSuite was founded in 1998.

In the market for corporate software, only a few examples of SAP's rivals include the ones listed above. The level of competition in this industry is really high.

4.4.2 Microsoft; a Major Competitor for SAP ERP Solutions

When it comes to enterprise resource planning (ERP), SAP is one of the most well-known and well-established firms in the industry. In this paper SAP is compared to one of the biggest companies in ERP solutions which is Microsoft.

The following are some of the primary reasons why Microsoft is regarded as a major player in the market for Enterprise Resource Planning (ERP) solutions:

- Solid Client Base Microsoft has a substantial and devoted customer base that makes use of its enterprise resource planning (ERP) systems, such as Microsoft Dynamics

365 and Microsoft Dynamics GP. This client base offers a solid basis upon which the ERP products of the firm may be built.

- **Integration with Other Microsoft Products** The fact that Microsoft's ERP systems interact so easily with other Microsoft products, such as Office 365, makes them a favourite option for companies that rely on Microsoft technology.
- **Deployment in the Cloud:** Because Microsoft's ERP systems can be accessed via the cloud, organizations may take advantage of the many advantages offered by cloud computing, including reduced operating expenses and enhanced adaptability.
- **User-Friendly Interface** The ERP solutions provided by Microsoft offer a user-friendly interface that is straightforward to traverse, which makes it simpler for companies to utilize and administer their ERP systems.
- **Strong Partner Ecosystem** Microsoft has what is known as a strong partner ecosystem. This ecosystem consists of a network of certified partners and solution providers that are able to assist organizations in implementing and customizing the ERP systems that Microsoft offers.
- **Financial Management, Supply Chain Management, and Customer Relationship Management Are Just Some of the Areas That Can Be Managed With Microsoft's ERP Solutions** Comprehensive Functionality Microsoft's ERP solutions provide a comprehensive set of features and functionality that can meet the needs of a variety of businesses.
- **The importance of Microsoft in the field of enterprise resource planning solutions may be somewhat attributed to the factors listed above.** Businesses who are searching for an ERP system often go with this one because, among other things, it has a large and loyal client base, it integrates well with other Microsoft products, and it offers choices for deploying it on the cloud

4.4.3 SAP The Market Leader

Although SAP and Microsoft both offer compelling Enterprise Resource Planning (ERP) systems, SAP is generally regarded as being superior to Microsoft in the field of ERP for a number of reasons, including that of the following:

- **Fifty Years of History and Success:** SAP has been around for much longer than Microsoft has. This gives SAP a significant competitive advantage.
- **Different Functionalities: That Is Applied Across an Extensive Spectrum of Business Procedures** SAP's Enterprise Resource Planning (ERP) solutions provide a complete array of features and capabilities that span a broad variety of business activities. These solutions may be found in SAP Business Suite. Management of financial resources, management of supply chains, and management of human capital are all included in these processes. Since a result of this, it is an excellent choice for businesses that are looking for an ERP system that can manage all facets of their operations as it is comprehensive in its scope.
- **Global Footprint:** SAP has a worldwide presence and is used by businesses in a wide range of markets and nations all over the world. This gives the company a global footprint. This not only makes the firm's customer base broader and more diverse, but it also helps the business obtain a better understanding of the needs of other sorts of enterprises. This is a win-win situation.
- **Strong Business Focus:** SAP puts a considerable emphasis on some industries, such as retail and financial services, and has a strong focus on the manufacturing industry. Additionally, SAP focuses a significant emphasis on the healthcare industry. Because of this, the company is able to develop solutions that are specific to various industries and that can be tailored to match the needs of businesses who are active within such sectors.
- **Long Term Customer Connection:** The enterprise software company SAP has been around for a very long time and has a lengthy history of providing ERP solutions. As a direct consequence of this, the firm has established lasting customer connections with a significant portion of its clientele. Because of this, the company is in a position to provide an incredibly high level of customer care and service to its clients.

- **Integration With other SAP's Software: Integration With Other Products Offered By SAP** SAP is able to provide enterprise resource planning (ERP) solutions that can interface well with other SAP products, such as SAP Ariba and SAP SuccessFactors. Because of this, businesses are able to have access to a comprehensive array of integrated solutions.

Because of the advantages it offers in enterprise resource planning (ERP), SAP is often seen as being more advantageous than Microsoft for the reasons that were outlined above. It is vital to bear in mind that the ERP system that is the best match for a certain organization is reliant on a number of factors. This is why it is so important to keep these criteria in mind. The size and nature of the firm, the specific industry, as well as the specific needs and prerequisites of the organization are all aspects that fall under this category of factors.

4.4.4 SWOT analysis

When comparing SAP and Microsoft, a SWOT analysis can be helpful because it provides a structured framework for analyzing the strengths, weaknesses, opportunities, and threats of both companies in a methodical and objective manner. This can shed light on how the two companies stack up against one another. Companies are able to obtain useful insights into the competitive landscape and make educated choices about strategy, investments, and resource allocation if they first identify and analyze the elements that play a role in that environment.

A SWOT analysis of SAP and Microsoft, for instance, may reveal that SAP has a stronger reputation in enterprise software and a more comprehensive suite of industry-specific solutions, whereas Microsoft has a larger user base and a wider range of software solutions. SAP also has a more comprehensive suite of general-purpose solutions. In addition, the investigation can uncover chances for both businesses to broaden their cloud-based solution offerings and leverage on the rising demand for analytics and AI.

Overall, a SWOT analysis can provide valuable insights into the opportunities and threats that both companies face in the competitive landscape, as well as the opportunities and weaknesses that each company possesses. These can be broken down into four categories: strengths, weaknesses, opportunities, and threats. Businesses may better position

themselves to achieve success in the market if they make strategic decisions based on this knowledge and use it to guide those decisions.

Table 13: SWOT Analysis of SAP and Microsoft as a Major Competitor

	SAP	Microsoft
Strength	Established market presence: SAP is one of the biggest and most well-known ERP providers in the world, and it has a proven track record of offering trustworthy software solutions. As a result, SAP has established a strong position in the industry.	Integration: The enterprise resource planning (ERP) software that Microsoft offers, known as Dynamics 365, is capable of integrating with other Microsoft products like as Excel, Word, and Outlook, therefore improving both the user experience and productivity.
	Comprehensive functionality: The enterprise resource planning (ERP) software that SAP provides comes with a large variety of modules and applications that can handle a wide variety of company procedures, including financial transactions.	User-Friendly: Because of the ERP software's user-friendliness, Microsoft makes it available to companies of all sizes and in all kinds of different fields.
	Global reach: Reaching customers all over the world and maintaining offices in more than 180 countries, SAP makes it simpler for companies to compete on a global scale.	Flexibility: The enterprise resource planning (ERP) software offered by Microsoft is highly adaptable, making it possible for organizations to tailor the software to meet their unique requirements without having in-depth expertise of computer programming.
	Robust integration capabilities: Strong integration capabilities: SAP's ERP software connects with a variety of third-party programs, such as Microsoft Office, which boosts	Cost-effective: The Enterprise Resource Planning (ERP) software offered by Microsoft is more reasonably priced than that offered by SAP, making it more accessible to small and medium-sized organizations.

	productivity and enriches the user experience.	
Weakness	Cost: Because of its high cost, the ERP software offered by SAP is inaccessible to a greater number of small and mid-sized companies.	Limited functionality: The Enterprise Resource Planning (ERP) software offered by Microsoft does not provide the same level of extensive capability as that provided by SAP. This makes it less suitable for use in bigger businesses that have more complicated business operations.
	Complexity: The ERP software offered by SAP might be difficult to use due to its sophisticated nature, which necessitates the use of professional knowledge and resources.	Limited global reach: The ERP software offered by Microsoft has a more restricted worldwide footprint than SAP does, which makes it less accessible to companies that operate on a global scale.
	Customization: The process of customizing SAP's ERP software may be time-consuming and expensive, as well as need specific expertise and prior industry experience.	Limited expertise: Since it has a smaller user base than SAP's ERP software, Microsoft's ERP software needs specialized knowledge, which may be more difficult to get than it is with SAP's software.
	Training: The SAP ERP software calls for a significant amount of training, which may be both time-consuming and expensive.	Limited scalability: Because of its limited scalability, the ERP software developed by Microsoft may not be as scalable as that developed by SAP, making it less suited for companies that want to see major expansion.

Opportunities	<p>Cloud adoption: Adoption of the cloud: SAP's cloud products, such as SAP S/4HANA Cloud, are becoming more popular. These offerings provide a method that is both affordable and efficient for companies to shift their ERP systems to the cloud.</p>	<p>Cost-effectiveness:The Enterprise Resource Planning (ERP) software offered by Microsoft does not provide the same level of comprehensive capability as that provided by SAP. As a result, the program's applicability is restricted for use in bigger businesses that have more intricate operational procedures.</p>
	<p>AI and Machine Learning: The ERP software that SAP offers has the ability to harness AI and machine learning capabilities, which would improve automation and decision-making.</p>	<p>Adoption of the cloud: Microsoft's cloud products, such as Dynamics 365 Finance and Operations, are becoming more popular. These offerings provide organizations a solution that is both cost-effective and scalable for migrating their ERP systems to the cloud.</p>
	<p>Internet of Things (IoT): The Internet of Things solutions offered by SAP allow companies to connect with both their customers and their suppliers, therefore enhancing both their operational efficiency and the quality of the customer experience.</p>	<p>Integration with Microsoft products: Integration with other Microsoft products The ERP software that Microsoft offers is capable of integrating with other Microsoft products such as Excel, Word, and Outlook. This feature improves both the user experience and the amount of work that can be accomplished by companies that are already utilizing these applications.</p>
	<p>Developing markets: SAP is in a position to capitalize on the chance to grow into emerging markets by delivering ERP solutions to companies</p>	<p>User-friendliness: The ERP software developed by Microsoft is typically regarded to be more user-friendly and simpler to use than that developed by</p>

	that are eager to embrace modern technology.	SAP. This makes the software more accessible to companies of all sizes and in all types of industries.
Threats	Competition: SAP is up against fierce competition from other ERP suppliers like as Oracle and Microsoft, both of which provide systems that are similar to SAP's own.	Competition: Microsoft is up against tough competition from other ERP suppliers like as SAP and Oracle, both of which provide solutions that are similar to Microsoft's own ERP offerings.
	Cybersecurity: As cyber threats grow more widespread, SAP's ERP software may become susceptible to data breaches, putting the sensitive data of its clients at jeopardy.	Cybersecurity: As cyber threats grow more widespread, it is possible that Microsoft's ERP software might be susceptible to data breaches, putting the sensitive data of Microsoft's clients at jeopardy.
	Economic downturns: When the economy is in a downturn, firms may choose to reduce expenditures, which may result in a reduction in their IT spending. This may have a negative influence on SAP's sales.	Economic downturns: When the economy is in a downturn, companies may choose to reduce expenditures, which may result in a reduction in their IT spending. This may have a negative influence on Microsoft's sales.
	The progression of technology: As technology progresses, SAP may be compelled to innovate and stay up with the most recent developments in order to remain competitive. This may need a large expenditure of time and resources.	The progression of technology: As technology progresses, Microsoft may be compelled to innovate and stay up with the most recent trends in order to keep up with the competition. This may take a large expenditure of both time and resources.

Source: Own Analysis

5 Results and Discussion

SAP SE, headquartered in Germany, is a global software corporation that specializes in customer relationship management and business analytics software for large organizations. Its headquarters are in Walldorf, Germany, although it was formed in 1972 in the United States. Modules of SAP's suite of business software cover a wide range of functions, from accounting to HR to logistics to CRM. Manufacturers, retailers, financiers, and healthcare providers are just some of the many sectors that this corporation, which ranks among the world's top software suppliers, provides services to. In addition to its on-premises products, SAP also provides cloud-based services, analytics, and AI.

SAP's financial analysis, which included vertical and horizontal analysis, ratio analysis, and a SWOT analysis of the company's competitors, uncovered key information about the business. The numbers demonstrated that SAP is in a solid financial position and doing well in comparison to its software sector rivals. The firm has shown via its liquidity, profitability, and solvency ratios that it can satisfy its short-term commitments and sustain its long-term financial stability.

Finally, this study's results presented a holistic perspective of SAP's financial performance, enabling stakeholders to make well-informed choices. According to the results, SAP is a prosperous business that has a respectable rank among software giants, but it can always do better. In sum, the results of this research highlighted the significance of financial analysis in gauging a business's financial well-being and guiding strategic choices.

The analysis of SAP SE's assets using horizontal analysis reveals interesting insights into the company's financial performance. The data shows that there was a significant decrease in Cash & Short-Term Investments from 121.29% to 36.82% in 2019, which may have been due to the impact of COVID-19 on the global economy. In 2020, there was a rebound in Cash & Short-Term Investments as many companies adapted to hybrid or remote working and needed digitalized systems. This led to an increase from 36% to 69% in cash in hand. Furthermore, the overall trend in total assets of SAP SE shows an upward trend since 2018, with an increase in total assets from 21.23% in 2018 to 67% in 2021. It's important to note that changes in total assets can be a normal part of a company's financial cycle and may not necessarily indicate a problem. Overall, these findings provide valuable insights into the financial performance of SAP SE and its response to the challenges posed by the COVID-19 pandemic.

In gross profit ratio analysis it is shown the comparatively cheap manufacturing costs and significant value-add of software products are largely responsible for SAP SE's high and expanding gross profit margin of 70%. The annual maintenance fee for SAP systems accounts for 17–22% of the entire software value, contributing to the company's high gross profit margin. It's encouraging that the margin has been steady throughout the years, particularly in light of the recent epidemic caused by the Covid.

As shown above, SAP's ROE started at around 16% in 2017 and had a downward trend in 2018 and 2019 due to the COVID-19 pandemic, but the company was able to increase it properly in 2020 and again in 2021 from 17 to 13%. For a software company like SAP SE, a ROE above 10% is good and above 15% is very good.

As indicated in return of assets ratio analysis, SAP's ROA was 9.43% in 2017, 5.52% in 2019, 8.8% following the pandemic, and 7.39% in 2021. The greater the ROA, the more efficient the firm. The company's ROA has been above 5% for five years, making it healthy.

Software firm ROCE depends on company size, industry, financial performance, and capital structure. As shown in ROEC analysis, SAP SE had a ROCE more than 10 in 2017–2019, but the trend has been negative owing to covid scenario. In 2020, the firm increased ROCE, but in 2021, it reached its lowest point due to the company's economic environment.

SAP SE has maintained a current ratio of around 1 throughout the years, indicating that the company is financially healthy and capable of meeting its short-term financial obligations using its current assets. There has been an upward trend with small fluctuations to keep the current ratio high, showing positive progress over the years. However, due to the pandemic situation in 2019, the current ratio decreased to 1.05, indicating weakened liquidity. But in 2020, SAP was able to keep the trend upward, and in 2021, the current ratio increased to 1.24, which is a positive sign for the company to overcome post-covid difficulties.

In 2017, SAP SE's quick ratio was 2.31, which indicates that the firm has sufficient liquid assets to meet its short-term commitments. Nevertheless, 2018 saw a decline in the quick ratio to 1.83 as a result of expanding liabilities. As a result of enhanced performance and faster account receivable collection in 2019, the trend changed tack. The COVID-19 pandemic, however, reversed that upward trend, causing the number to drop to 2.17 in 2020 and 1.72 in 2021.

A cash ratio of 0.5 or more is considered healthy for software firms, however it depends on their size, business strategy, and stage. SAP's cash ratio rose from 2017 to 2018,

but the pandemic and maintenance contract terminations lowered it in 2019. In 2020, ERP demand rose again. Investment opportunities and hazards might affect a company's ideal cash ratio.

In order to analyse SAP with its competitors also a comparative analysis has been done, SWOT analysis shows that SAP's market dominance, brand, and enterprise software portfolio are key strengths. Its customers are loyal and it prioritizes innovation and sustainability. Its drawbacks include expensive prices, delayed cloud adoption, and dependency on its ERP software.

Microsoft's resources, brand, and diversification into cloud computing and other sectors are its assets. It prioritizes client happiness and innovation. Its limitations include its lesser enterprise software market share than SAP and its image as a generalist rather than an industry expert.

Cloud-based solutions and developing markets are prospects for both firms. But, tough rivalry, fast-changing technology, and economic downturns threaten them all. SAP and Microsoft are well-positioned in enterprise software, but they confront substantial challenges and possibilities as they innovate and develop.

SAP's financial research uncovered some intriguing details about the company's financial status and performance. The company's sales and profits have both increased steadily over the previous several years, pointing to its solid financial health. Nonetheless, the company's liquidity and debt levels have been highlighted as potential trouble spots.

Now in answer to the question of if SAP is financially healthy and profitable or not the below points can be pointed out.

SAP's current and quick ratios have changed throughout the years, with a major decline in 2019 owing to the pandemic crisis. A current ratio greater than 1 indicates that a corporation has sufficient liquid assets to fulfil its immediate liabilities, and the firm was able to recover in subsequent years. Notwithstanding the economic difficulties brought on by the pandemic, the quick ratio increased in recent years. Findings point to SAP's healthy liquidity, crucial for any business but more so in difficult times.

High net profit margins are an indication of strong financial success, and SAP has maintained them regularly. SAP has a very respectable net profit ratio (between 12 and 19 percent) that places it among the best software companies in the world. It's important to remember, however, that this statistic may shift, and there's no one-size-fits-all method for

finding the best net profit ratio for each given business. The SAP financial analysis indicates that the firm is in a very good financial situation, both in terms of profitability and liquidity.

How the financial position of SAP has been changed in this 5 time period is also explained in this thesis which will be briefly explained here, There have been notable changes in SAP's financial outlook between 2017 and 2021.

SAP's financial performance throughout this time frame has been consistently strong. With an estimated 16.5% annual growth rate, SAP's revenue of €23.46 billion in 2017 is projected to rise to €27.34 billion in 2021. Increased demand for cloud services, greater software licensing income, and increasing client acceptance of SAP's products and services all played a role in this expansion.

SAP's net income performance, on the other hand, was more inconsistent over the time frame. The €4.06 billion in net income that SAP reported in 2017 fell to the €3.44 billion it reported in 2018. The company's net income, however, is expected to increase to €3.26 billion in 2019 and €6.47 billion in 2020. Net income for SAP in 2021 was €4.24 billion, down from €4.26 billion in 2020. Expenditures on R&D, the price of making acquisitions, and the price of implementing organizational changes all have a role in the cyclical nature of net income.

The financial outlook for SAP between 2017 and 2021 is mixed, with sales growth but inconsistent profitability. SAP has maintained its investment in cloud services, AI, and machine learning, which should continue to fuel the company's future revenue and profit growth.

5.1 Recommendation

The operating margin should be increased since a vertical analysis of SAP's cash flow statement revealed a negative value. The organization may enhance this indicator by focusing on lowering operational costs, enhancing productivity, and expanding revenue. SAP may consider options including outsourcing, simplifying, and automating processes to attain these goals at a lower cost.

SAP's revenue growth has remained relatively flat over the last several years, but it is expected to accelerate between 2017 and 2021. The company's goal should be to improve revenue growth by activities including entering new markets, creating and releasing new goods and services, and improving methods for keeping existing customers.

This thesis analyzes data from 2017 and projects that SAP's R&D spending will rise from its current level of 14.29% to a projected level of 18.60% by 2021. SAP, like many other software businesses, invests heavily in research and development, but it's crucial that this spending really pays off in the form of increased profits. The following are some suggestions for SAP to improve profitability while maintaining R&D spending levels:

Invest in high-potential areas of research and development. SAP should put the bulk of its R&D budget into projects that will bring in the most money, such as creating in-demand features or products that can be sold at a premium. This will guarantee that money spent on research and development really leads to increased sales and profits.

SAP could use its relationships and cooperation with other businesses, educational institutions, and research labs to reduce the amount of money and time spent on R&D. This has the potential to lower SAP's R&D expenditures without compromising the company's innovative prowess.

SAP should prioritize enhancing the effectiveness of its research and development processes by doing things like adopting agile development approaches and fostering better inter-team communication. Profitability may increase as a result of the decreased time and money needed to introduce new features or items to the market.

SAP should evaluate the performance of new product releases and analyze consumer feedback as a means of measuring the efficacy of its R&D efforts. This may give valuable information for future R&D spending and guarantee that current expenditures are having the desired effect on revenue growth and profitability.

Overall, SAP should make sure that its R&D efforts are contributing to profitability by concentrating spending on high-potential areas, making the most of partnerships and collaborations, improving the efficiency of R&D processes, and monitoring and assessing R&D spending. Sustainable long-term development and profitability may be achieved by implementing these suggestions with other growth and optimization tactics.

6 Conclusion

The financial study of SAP, a worldwide software firm with its headquarters in Germany that provides enterprise resource planning (ERP) software to organizations, serves as the primary focus of this thesis. Via an examination of the company's financial statements—including income statements, balance sheets, and cash flow statements—the purpose of this analysis is to provide an assessment of the company's overall financial performance. This study will give insight into the company's financial health, profitability, liquidity, and general performance, which is essential information for investors, shareholders, and management to have.

It is impossible to place enough emphasis on the significance of financial analysis for businesses. It gives information that is essential for making decisions and may assist in identifying areas for improvement, possible dangers, and chances for development. The evaluation of SAP's financial data is of utmost significance since the firm is so significant and has such a huge influence on the international software industry. The financial statistics of SAP, which is the market leader in the ERP software sector, may provide insights into trends and developments in the market, as well as the company's position and performance in comparison to other businesses in the industry.

It is impossible to underestimate the significance of SAP as a business. SAP is now one of the most successful and well-known software companies in the world. The company was established in 1972. Since companies of different sizes and in a wide variety of fields make use of its goods and services, the company is an essential component of the economy of the whole world. Investors, analysts, and researchers who are interested in gaining a better understanding of the company's financial status, growth prospects, and market trends will find the company's financial data to be of great value. In addition, the management team at SAP uses the company's financial data to help guide decision-making, identify areas of development, and efficiently allocate resources.

The purpose of this thesis was to determine the factors that have the most important impact on the success of a business over a period of five years. The researchers devised a list of particular research aims in order to accomplish this purpose. First and foremost, the purpose of the research was to undertake a financial analysis of SAP's annual reports from 2017 through 2021 and evaluate the findings. In the second part of the thesis, an investigation of SAP's financial state, the general economic environment, and performance was conducted

over the course of a five-year period. The third objective of the study was to investigate SAP's financial performance as well as the company's overall financial steadiness and stability. Eventually, the purpose of the thesis was to provide some ideas for how the financial administration of the organization may be improved. This thesis accomplishes these goals, which gives useful insights into SAP's financial performance. These insights may help investors, shareholders, and management make more informed decisions.

After an examination of SAP's financial performance between the years 2017 and 2021, it has become clear that the expansion of the company's revenue has been very stable throughout the course of these years. The fact that the firm has been able to sustain this level of growth despite the presence of new competitors is evidence that the company has been successful in maintaining its position in the market. Nevertheless, it is vital to note that SAP has been investing a substantial amount of money on research and development (R&D), which is necessary for software businesses to stay competitive. R&D is required in order for software firms to produce new products. As a result, it is essential to keep close tabs on expenditure on R&D to ensure that it is making a positive contribution to profits.

In order to address these challenges and enhance profitability, one of the solutions that has been made is to increase the operating margins. SAP has the ability to improve its operating margins by lowering its operational expenditures, enhancing its cash flow management, and enhancing the efficiency of its capital structure. This may be accomplished by streamlining procedures and implementing improved monitoring and assessment of investment in R&D spending. In addition, SAP is able to concentrate its research and development investment on high-potential sectors, R&D partnerships, and collaborations, all of which have the potential to result in improved innovation and enhanced profitability.

In addition, SAP can solve possible problems and ensure its continued development in the long future with the assistance of the solutions presented in the thesis. Long term, SAP's ability to raise revenues and maintain its competitiveness depends on how well it focuses on these areas. It is vital to keep in mind, however, that the market is in a state of ongoing evolution, and in order for SAP to continue to be competitive and profitable, the company must consistently adapt to changing customer tastes and the conditions of the market.

In conclusion, the financial analysis that was carried out for the purpose of this thesis offers insightful comprehension into the financial performance of SAP between the years 2017 and 2021. The study's recommendations may assist SAP in addressing future problems and increasing profitability thanks to their application. Nonetheless, in order to preserve its

ability to compete effectively and generate profits throughout the course of the business's lifetime, it is essential that the firm regularly assess and adjust its financial performance.

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8.4 List of abbreviations

AI: Artificial Intelligence

AI: Artificial Intelligence

AP: Accounts Payable

CEO: Chief Executive Officer

CFO: Chief Financial Officer

COGS: Cost of Goods Sold

CoPilot: Conversational AI digital assistant for SAP products

CRM: Customer Relationship Management
EBIT: Earnings Before Interest and Taxes
EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization
EPS: Earnings Per Share
ERP: Enterprise Resource Planning
GAAP: Generally Accepted Accounting Principles
GDP: Gross Domestic Product
GRC: Governance, Risk, Compliance
HR: Human Resource
IBM: International Business Machines
IFRS: International Financial Reporting Standards
IoT: Internet of Things
IT: Information Technology
KPIs: Key Performance Indicators
R&D: Research and Development
ROA: Return on Assets
ROC: Return on Capital
ROCE: Return on Capital Employed
ROE: Return on Equity
RPA: Robotic Process Automation
SAP SE: Systems, Applications, and Products in Data Processing Societas Europaea
SEC: Securities and Exchange Commission
SME: Small and Midsize Enterprises
SWOT: Strengths, Weaknesses, Opportunities, and Threats
XM: Experience Management