**Business Intelligence Report of SAP’s Financial Performance Analysis**

Table of Contents

[1. Introduction 1](#_Toc184591084)

[1.1 Introduction of SAP: Seizing Demands of Cloud, ERPs and Analytics 1](#_Toc184591085)

[1.2 Implications of Financial Performance Analysis on SAP’s Growth 2](#_Toc184591086)

[1.3 Objective of Report 2](#_Toc184591087)

[2. Relevant Theoretical Frameworks in Financial Analytics 2](#_Toc184591088)

[2.1 Predictive Data Analytics Model 3](#_Toc184591089)

[2.2 Porter’s Value Chain Framework 3](#_Toc184591090)

[2.3 Statistical Process Control (SPC) 3](#_Toc184591091)

[2.4 Requirements Analysis and Modelling 3](#_Toc184591092)

[2.5 Data Visualization Principles 4](#_Toc184591093)

[2.6 Key Performance Indicators (KPIs) 4](#_Toc184591094)

[2.7 Data Mining Model 4](#_Toc184591095)

[2.8 Decision Support System (DSS) 5](#_Toc184591096)

[3. Conceptualizing Data Analytics and Power BI Solutions 5](#_Toc184591097)

[4. Financial Performance of SAP: A Data-driven Analysis 6](#_Toc184591098)

[4.1 Data Sourcing, Cleaning, Transforming and Modelling 6](#_Toc184591099)

[4.2 Data Visualization in Power BI and Analysis 8](#_Toc184591100)

[4.3 Revenue, Profit and Expenditure: Trends Analysis 8](#_Toc184591101)

[4.4 Comparative Examination of KPIs or Key Financial Ratios 9](#_Toc184591102)

[4.5 Corelation Analysis of Operating Profit, Liquidity and Cloud Backlog 10](#_Toc184591103)

[4.6 Products Segments Revenue: A Critical Review 11](#_Toc184591104)

[5. Implementation Recommendations 12](#_Toc184591105)

[6. Conclusion 13](#_Toc184591106)

[Reference List 14](#_Toc184591107)

# 1. Introduction

## 1.1 Introduction of SAP: Seizing Demands of Cloud, ERPs and Analytics

SAP SE is a German multinational corporation specializing in providing integrated IT infrastructure solutions to run business operations. Founded in 1972, currently, it operates in over 180 countries with over 105,000 employees (SAP SE, 2024). Headquartered in Germany, firm’s business model includes selling Enterprise Resource Planning (ERP) software solutions. Its robust product portfolio encompasses business-tailored ERPs like SAP S/4HANA for cloud computing and financial management, SAP SuccessFactors for human resources management, SAP Ariba for supply chain and SAP CX for customer relationship management. SAP reported total revenues of €31.2 billion in 2023 (SAP SE, 2023).

## 1.2 Implications of Financial Performance Analysis on SAP’s Growth

The global market for cloud ERP and data analytics is projected to reach $57.17 billion in 2024, growing at an annual rate of 15.5% (Fortune Business Insights, 2024). SAP’s popular S/4HANA ERP software has over 20,000 subscriptions, serving major clients like Microsoft, Coca-Cola, BMW, Nestlé, and Unilever (Statista, 2024). To meet increasing demand, SAP must invest heavily in cloud and AI technologies. Analysing its financial performance will provide insights to sustain financial stability providing resources to fund these emerging technologies.

Analysing SAP's financial performance can significantly enhance its future growth opening door to potential opportunities. Enterprises increasingly seek agility, scalability, and real-time data-driven insights to stay competitive in AI-disrupted digital business landscape (The Economist, 2024). According to research by Deloitte UK (2022), there has been alarming demands for firm’s management to lower operational costs, increase profitability and provide more accurate financials leveraging data analytics through efficient Internal Controls over Financial Reporting (ICFR). Understanding financial data is crucial for strategic decision-making, enabling SAP to optimize operations, reduce risks, and capitalize on emerging market trends competing industry rivals like Oracle, Microsoft, Sage and IFS.

## 1.3 Objective of Report

This is a Business Intelligence (BI) report aims to include the design and a deployment plan for BI system using Power BI tool aiming to provide data-driven business insights to SAP management from the external consultant perspective.

The specific objective of this BI report is to analyse SAP’s financial data and provide data-driven actionable insights to examine its current financial position and take strategic actions to sustain and excel its financial performance in future. The rationale of report shall be achieved by visualising and analysing SAP’s financial data, KPIs and their trends over past five years employing Power BI and critical analysis approach.

# 2. Relevant Theoretical Frameworks in Financial Analytics

Exploring and understanding relevant data analytics research, particularly in financial performance, is critical as it provides foundational knowledge for leveraging data-driven insights. This understanding helps in optimizing decision-making, improving financial forecasting, and enhancing strategic planning. By grounding analysis in proven theories and methodologies, firms can better interpret financial data, mitigate risks, and drive sustainable growth. Major relevant theories and models have been reviewed below; providing brief introduction and justification of its connection in context of financial performance analytics.

## 2.1 Predictive Data Analytics Model

Predictive Data Analytics uses historical data and machine learning models to forecast future outcomes often employed by financial firms, tech firms and retailers. Its tools include Python libraries (e.g., Scikit-learn) and predictive modelling software (Nafizza, Mukilan and Krishnan, 2023). Predictive models forecast financial trends, aiding in risk management and strategic planning. Techniques like regression analysis are crucial for SAP’s financial examination enhancing predictive accuracy and decision-making (Jones et al., 2024)

## 2.2 Porter’s Value Chain Framework

Porter's Value Chain model provides a framework for analysing the specific activities within a business that contribute to competitive advantage and, ultimately, financial performance (Porter, 1985; Hill, 2021). The model divides company's activities into two broad categories: primary activities and support/secondary activities; both essential for financial stability. Primary activities include logistics, operations, sales/marketing and service whereas secondary activities include firm’s infrastructure, procurement, HRM and technology development (Hill, 2021).

## 2.3 Statistical Process Control (SPC)

SPC monitors process consistency using control charts and statistical methods with tools for example, Control Charts, Minitab, Excel. This model intends to improve quality and efficiency in organization utilized by manufacturers like Toyota and Ford (Wisniewski, 2010; Cambridge University, 2024). SPC ensures consistent quality, impacting financial metrics such as cost reduction and profitability.

## 2.4 Requirements Analysis and Modelling

Requirements Analysis involves gathering and modelling system requirements with its tools, for instance, UML and CASE tools. Its objective is to align software system with strategic business goals and needs often employed by tech firms like IBM, SAP, Oracle (Cadle, Paul and Turner, 2014; IIBA, 2023). Accurate requirement analysis ensures that financial systems meet business needs. Tools like UML aid in designing SAP modules that handle financial data effectively, ensuring proper alignment with business goals.

## 2.5 Data Visualization Principles

Data Visualization Principles primarily involve in creating visual representations for effective understanding of data critical for business stakeholders (ONS UK, 2021). Its widely used tools include Tableau and Power BI, the latter has been used to visualize financial data of SAP in this BI project (Eckerson, 2006). Effective data visualization is directly linked to interpreting financial data and trends. Under this model, Microsoft Power BI tool has been employed deriving data-driven insights to drive better financial decisions to leverage opportunities.

## 2.6 Key Performance Indicators (KPIs)

KPIs measure organizational performance against strategic goals with tools including KPI dashboards and analytics software. Applied by companies like Coca-Cola and Walmart, it aims to track and improve organizational performance (Eckerson, 2006; Hennigan, 2023). KPIs model is most relevant here as it tracks financial health and performance metrics. Key performance indicators have been selected and utilized to monitor and analyse financial results of SAP over last five years providing actionable insights for better financial management (Pooja et al., 2024).

## 2.7 Data Mining Model

Data Mining extracts patterns and insights from large datasets with tools including RapidMiner and Weka. Data Mining includes data cleaning, modelling, transforming large datasets integrating from diverse sources. Data Mining aims to uncover hidden insights effectively leveraged by companies like Netflix and Target (Mast and Lokkerbol, 2024). Data mining uncovers patterns that can predict financial trends and customer behaviours. Tools like RapidMiner are used with SAP to enhance financial forecasting and strategic planning, offering critical business insights.

## 2.8 Decision Support System (DSS)

DSS assists in decision-making using data analysis tools and models with tools like Microsoft Access and SAP BI. Leveraged by firms like IBM and Siemens, DSS supports in complex decision-making processes offering competitive edge over rivals (Sharda, Turban, and Delen, 2014; Oxford University, 2020). DSS helps analyse financial data and simulate outcomes, enhancing data-driven decision-making. Integration with SAP provides a robust framework for analysing financial performance and making informed decisions, crucial for effective financial management.

# 3. Conceptualizing Data Analytics and Power BI Solutions

*Understanding Data Analytics and BI Report/Dashboard Solutions*

Business Business Data Analytics is defined as an analytical process involving tools and techniques for interpreting data to make informed decisions, from traditional techniques to AI and machine learning models (Cadle, Paul & Turner, 2014; Pooja et al., 2024). Business Intelligence (BI) encompasses technologies and practices for data collection, integration (ETL), analysis, visualization, reporting, and decision support (Salesforce, 2019; Teittinen & Bovellan, 2023; Wahyudi & Widyasari, 2022).

*Justifying Application of Power BI and Its Dashboard/Report*

Power BI is a widely applied BI tool developed by Microsoft enabling user to group, gather and process datasets from most of the data sources and present the whole picture of business data analytics in one single view (Cotten, 2023; Microsoft, 2024).

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Figure 1. Power BI SAP financial performance analytics dashboard

Power BI is most efficient BI tool in financial reporting and forecasting due to its advanced features (Sri Vardan et al., 2024). Its dashboards and BI reports use visual methods to simplify complex financial data (Microsoft, 2024). Users can interact with and update reports online via Power BI Service. The financial analytics dashboard helps track SAP’s financial performance, including revenue and profitability by product segment (Alshehadeh et al., 2023). Power BI's capabilities have enabled tracking of SAP’s financial KPIs, uncovering actionable insights to seize financial opportunities.

# 4. Financial Performance of SAP: A Data-driven Analysis

## 4.1 Data Sourcing, Cleaning, Transforming and Modelling

Analyst has retrieved publicly available financial data, the annual integrated report from official website of SAP in excel format. Due to limitations of power query in analyst’s MacBook and Power BI service online, data cleaning has been conducted in excel database itself (see figure 2,3,4). Different features of excel have been utilised to sort, filter, arrange and transpose datasets cleaning and selecting required dataset from vast integrated report of SAP to analyse financial performance over last five years.

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Figure 2. Original data from SAP before cleaning (SAP SE, 2023)

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Figure 3. Data after cleaning in excel

**A table with numbers and a few lines

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Figure 4. Data after cleaning in excel

Star Scheme, a dimensional modelling technique, reduces joins and data redundancy, preferred over snowflake in business management (Bharath, 2023). Data modelling used a star schema, with the 'SAP Revenue, Profit, and Expenses' fact table surrounded by dimension tables (see Figure 5).

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Figure 5. Data Modelling

## 4.2 Data Visualization in Power BI and Analysis

Skilled data visualization uncovers hidden business insights. Utilizing Power BI, financial performance analytics were meticulously designed for clarity and interactivity. The visualized data, analysed for actionable insights, aligns with current and future financial performance goals.

## 4.3 Revenue, Profit and Expenditure: Trends Analysis

*Bar graph with trendlines* is most appropriate graphical visualization technique to demonstrate the trends of key financial data as reflected below. This technique has explicitly visualised SAP’s total revenue, operating expenses and operating profit in trendlines whereas gross profit has been presented bar columns.

**A graph with different colored squares

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Figure 6. Total Revenue, Gross Profit, Operating Profit and Operating Expenses of SAP by year

**Data Overview:**

From 2019 to 2023, gross profit increased significantly from around €12K million in 2019 to €21K million in 2023. Similarly, total revenue reached to nearly €34K million in 2023 growing consistently. Even though operating expenses rose from €17K million to €22K by 2023, operating profit stayed consistent at around €12K over the period.

**Analysis and Actionable Insights:**

The data shows consistent growth in gross profit, total revenue, and operating expenses from 2019 to 2023. The steady rise in revenue and profit indicates strong financial health, while the increasing operating expenses suggest need for cost management. Strategies like price negotiating in bulk agreements leveraging economies of scale and lean process optimization can be rewarding. SAP must identify and eliminate non-value-adding activities adopting lean process optimization methods (Goyal, 2022).

## 4.4 Comparative Examination of KPIs or Key Financial Ratios

*Stacked bar graph* is most relevant to compare the relative sizes of different components across multiple categories or different years as reflected below. This makes it easier to spot trends, such as an increase or decrease in percentage certain KPIs.

**Data Overview:**

From 2019 to 2023, SAP’s equity ratio increased from 51% to 64%, debt ratio decreased to 36%, gross margin rose to 72.2%, but operating margin fell to 28%.

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Figure 7. SAP’s equity ratio, debt ratio, gross margin and operating margin ratios by year.

**Analysis and Actionable Insights:**

Equity ratio measures the proportion of assets financed by equity, while a higher debt ratio indicates reliance on borrowed funds, increasing financial risk (ICBA, 2021). SAP's equity ratio improved, and debt ratio decreased, signalling stronger stability. However, SAP should leverage tax-free debt for AI and cloud investments with high ROI. Gross margin remained stable, but operating margin dropped in 2023 (Corporate Finance Institute, 2022). SAP should manage costs strategically across primary and secondary value chain activities (Hill, 2021).

## 4.5 Corelation Analysis of Operating Profit, Liquidity and Cloud Backlog

*Stacked area chart* is particularly effective for displaying data changes over time, making it easy to track the evolution of multiple data series simultaneously over the years as reflected below.

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Figure 8. SAP’s liquidity, operating profit and cloud backlog by year

**Data Overview:**

From 2019 to 2023, SAP's cloud backlog rose from €9K million to €14K million, liquidity increased from €3K million to €9K million, while operating profit peaked at €9K million.

**Discussion and Actionable Insights:**

Cloud backlog, representing future revenue, showed robust growth, highlighting rising demand for SAP's cloud services. Liquidity improved, enhancing SAP's investment capacity and ability to meet obligations (SAP, 2023). However, operating profit remained volatile, recovering only in 2023. The key takeaway is for SAP to continue expanding cloud offerings while maintaining strong liquidity to minimize risks and boost financial performance.

## 4.6 Products Segments Revenue: A Critical Review

It is essential to analyse revenue from different product segment to gauge the financial performance of SAP. *Donut chart* has been found most effective to visualise percentage of total revenue represented by each product segment as displayed below.

**Data Overview:**

A review of SAP's product segments shows that in 2023, cloud revenue accounted for 80% of total revenue, reflecting strong growth in this area. Meanwhile, software licenses and support revenue declined from 12% in 2021 to 5% in 2023.

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Figure 9. SAP’s revenue by segments

**Analysis and Actionable Insights:**

Cloud revenue's robust growth highlights SAP's strategic shift toward cloud-based ERP solutions, while declining software licenses indicate a move away from traditional deployments. SAP's acquisitions, like Qualtrics, and partnerships with Microsoft Azure have expanded its cloud reach (SAP, 2023; Microsoft, 2024). Despite these efforts, SAP should increase investments in AI and cloud, as rivals like Oracle saw an 11% equity share growth compared to SAP's 6.6% (CNBC, 2024; Financial Times, 2024). This further investment is crucial to maintaining competitive advantage in the evolving market.

# 5. Implementation Recommendations

These actionable recommendations, supported by detailed data insights from Power BI, aim to strengthen the firm's financial position and drive sustained growth. Below, they are presented in four areas of improvement identified during the analysis.

1. **Revenue Growth and Profitability:**

* *Expand High-Margin Cloud Services*: With cloud revenue now at 80% of total revenue, further expansion in this high-margin segment is critical.
* *Innovate Product Offerings*: Continue innovating ERP solutions for specific industries, sustaining profitability as gross profit increased from €12K million to €21K million.
* *Target Emerging Markets*: Enter high-growth markets like India, China, and Africa to drive revenue beyond €34K million.

1. **Cost Reduction and Efficiency in Operations Management:**

* *Leverage Economies of Scale:* Negotiate bulk cloud/business agreements to reduce costs, addressing the €5K million rise in operating expenses.
* *Implement Lean Process Optimization:* Eliminate non-value-adding activities, reducing expenses from €17K million to €22K million. For example, cut ongoing retraining and restructuring costs of €2.2 billion.
* *Automate and Outsource:* Use AI and robotics for automation and outsource non-core tasks to reduce the total cost of ownership (TCO).

1. **AI and Cloud Investments:**

* *Increase AI, Cloud, and R&D Spending*: Boost R&D investments in AI by at least 10% annually to address unprecedented potentials.
* *Collaborate with Tech Giants*: Strengthen partnerships, like with Microsoft Azure, to expand cloud reach and integrate advanced AI technologies.

1. **Financial Risk Management:**

* *Strengthen Liquidity Management*: Maintain a strong liquidity ratio, which rose from €3K million to €9K million, to ensure SAP can cover obligations amid monetary uncertainties (The Economist, 2024).
* *Optimize Debt Utilization:* Although the debt ratio fell from 49% to 36%, SAP should strategically leverage debt for high-ROI investments in AI and cloud technologies.

# 6. Conclusion

Critical analysis of SAP’s financial data and KPIs with DA tools and techniques revealed strong year-over-year revenue growth and profitability driven by cloud segments. However, as reflected in recommendations above, strategic improvements in cost management, innovation, and risk management are assessed essential for sustaining SAP’s financial performance.

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