

Czech University of Life Sciences Prague
Faculty of Economics and Management



Bachelor Thesis

**Financial Analysis of
The International Business Machines**

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Nikita Lychko

Economics and Management

Thesis title

Financial Analysis of IBM

Objectives of thesis

This Thesis will provide a detailed overview of IBM. (Technical analysis, Financials, Stocks and etc.). This overview will also provide the start of the Company and their current status Worldwide and on the market. The additional correlation analysis between other American and Asian technological companies will be shown as well as the stock price from the point it began being publicly traded.

Methodology

In this thesis there will be two main parts: theoretical and practical.

Theoretical part: Technological advance and history of IBM. Theoretical aspects of business analysis that examine the concepts of analysis and the information base for analysis.

Practical part: Correlation analysis, Bollinger Bands, RSI, SMA, gross margin, net margin, Technical analysis and evaluation of the operation of Dell and its comparison with competitors.

The proposed extent of the thesis

40 pages

Keywords

Financial analysis, ROI, ROE, Profitability Ratio, Liquidity Ratio, Activity Ratio, Debt Ratio, Correlation Analysis, Fundamental Analysis, Technical Analysis

Recommended information sources

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Treloar, A., 1949. Correlation analysis. Minneapolis, Minn.: Burgess Pub. Co.

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Declaration

Hereby I, Nikita Lychko, confirm that I have written this Bachelor thesis myself without breaking any copyright. As well as I have not used someone's intellectual proreprty without according rules of citation.

In Prague on date of submission

Financial Analysis of chosen company – International Business Machines

Abstract

The Bachelor thesis dives into a thorough exploration of International Business Machines (IBM), specifically focusing on dissecting its financial standing and overall well-being. To accurately assess its data, the thesis employs a range of financial indicators like activity ratios, liquidity ratios, and profitability ratios. It also delves into concepts such as simple and exponential moving averages, Bollinger Bands, relative strength index, and correlation.

In the theoretical section, the thesis unpacks and clarifies the commonalities between Fundamental and Technical analyses. It then takes a closer look at elements like balance sheets, ratio analyses, stock price charts, correlations, and external factors.

Moving to the practical side, the thesis conducts an in-depth examination of IBM's future potential and financial statements. This involves applying the earlier discussed theories and presenting the findings in financial terms.

Keywords: Financial analysis, Fundamental analysis, Technical analysis, ROI, ROE, ROA, Profitability Ratios, Liquidity Ratios, Activity Ratios, Debt Ratios, Correlation Analysis, Bollinger Bands, Relative Strength Index, Simple Moving Average, Exponential Moving average, Income statement, Balance Sheet, Assets, Debt, Liquidity.

Finanční analýza zvolené společnosti – International Business Machines

Abstrakt

Bakalářská práce se zabývá důkladným zkoumáním společnosti International Business Machines (IBM), zejména se zaměřením na její finanční situaci a celkovou prosperitu. K přesnému posouzení jejích údajů práce využívá řadu finančních ukazatelů, jako jsou ukazatele aktivity, ukazatele likvidity a ukazatele rentability. Zabývá se také pojmy, jako jsou jednoduché a exponenciální klouzavé průměry, Bollingerova pásma, index relativní síly a korelace.

V teoretické části práce rozkrývá a objasňuje společné rysy fundamentální a technické analýzy. Poté se blíže zabývá prvky, jako jsou rozvahy, poměrové analýzy, grafy cen akcií, korelace a vnější faktory.

Při přechodu k praktické stránce práce provádí hloubkové zkoumání budoucího potenciálu a finančních výkazů společnosti IBM. To zahrnuje aplikaci dříve diskutovaných teorií a prezentaci zjištění ve finančním vyjádření.

Klíčová slova: Klíčová slova: Finanční analýza, fundamentální analýza, technická analýza, ROI, ROE, ROA, ukazatele ziskovosti, ukazatele likvidity, ukazatele aktivity, ukazatele zadluženosti, korelační analýza, Bollingerova pásma, index relativní síly, jednoduchý klouzavý průměr, exponenciální klouzavý průměr, výkaz zisku a ztráty, rozvaha, aktiva, dluh, likvidita.

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1 Introduction

The multinational company with a long and rich history famous for inventing the floppy disc, the hard drive and relational database. The company, that has been there for more than a century. The company, that has survived through many fluctuations impaled to it by ever changing world. The “Big Blue” or International Business Machines, with its shorter version IBM.

The company has presence in over 170 countries and is a famous producer and provider for many manufacturing sectors such as finance, manufacturing, and health service. It provides solutions in hardware, software, and services. The structures are divided into 5 different sectors, they are: Cloud and cognitive software, Global technology services, Global financing, Global business services and Systems.

The cloud and cognitive software structure specializes in creating data collection, management, and process as well as AI and algorithms for it. The Global technology services structure provides structures, facilities, and platforms. Whereas Global Business structure offers consultation and managerial services. The Systems structure is a provider of physical goods, such as: servers, storage facilities and software-defined systems. Lastly, the Global financing structure offers financing solutions for the clients of the company.

These structure offers a variety of options for a company of any size, capitalizations, and final goal to achieve any kind of operational transformation or as simple as assistance for optimizing certain tasks.

With assistance of indicators, ratios, and financial information we can evaluate the performance of a business or a company. It a common instrument or a tool for anyone who is willing to invest money, evaluate the risks of making a big commitment, deal or closing a contract. Alongside it is a great instrument for any competitor and external observer to comprehend the situation and making assumptions.

2 Objectives and Methodology

Objectives

This thesis will follow objectives of assessment of the financial situation of the company. It will discover the prospect for the future of development and investing as well as the company's efficiency. Additionally, correlation analysis will be conducted with a colleague industry colossus.

The investigation will utilize the whole arsenal of humongous economical armoury. The research and evaluation will be based on ratios of leverage, liquidity and activity alongside with parts of Technical analysis such as SMA (simple moving average), RSI (relative strength index) and Bollinger Bands. With Balance sheet, income statements and inner politics of management and company's vision taken into consideration.

Hypotheses

H1: The financial situation at IBM has begun to improve since the COVID-19 period.

H2: There is a strong correlation between IBM and Microsoft stock prices

H3: IBM's total assets are decreasing.

Methodology

The base of methodology will lean on IBM's annual report. Most of the data, as per the fact, that the analyses have been conducted before, will rely on secondary data (33). Nonetheless, this secondary and external information will still be based on the annual reports. The quantitative methodologies will enhance the understanding of IBM's financial positions and situation throughout the years. The main data for this thesis will be provided by form 10-K of the U.S Securities and Exchange commission for the period between 2019 and 2023. As well the stock prices on New York Stock Exchange will be taken into consideration.

For conducting analysis, both Technical and Fundamental analyses will be addressed. The use of Fundamental analysis will facilitate the understanding of IBM's business components. The following indicators and analyses will be conducted and examined: Debt ratios, Liquidity ratios, Profitability ratios and Activity ratios.

To compare the stock prices of Microsoft and IBM, correlation analysis will be conducted using Microsoft Excel.

The conclusion of this thesis will answer whether the International Business Machines managed to regain its position after the COVID-19 crisis. Furthermore, it will provide an answer to the hypotheses question, and whether it will be rejected or not

3 Theoretical part

Financial analysis is used to assess the economic performance of companies relying on its financial statements. The main components of these statements are income statement, balance sheet and cash flow statement. Data acquired through this analysis helps a company establish its strategy and formulate its future goals, objectives, and targets. Additionally, it provides a further insight on investment opportunities and determines the size of the last.

The financial analysis is performed mostly in corporate finance. As stated above, it is used to formulate goals and objectives. The process is a cooperation between two departments: management and accounting. Accounting used indicators as Net Present value (NPS) and Internal Rate of Return (IRR) and then communicates the results with the management to make the decision if the project has the potential and is worth implementing (Klarman, 1991).

Next, the crucial role is played by extrapolation of past company's data and its economic performance over a certain timeframe (Fisher, 1984). For instance, Christmas period peaks in interest of products may trace that the inventory and budgets must be reviewed and considered.

There are two approaches on how the analysis can be formulated. First, it may consider the macroeconomic variables such as GDP or major world events and sort the companies based on their performance (Klarman, 1991). This analysis can indeed save time for investors, yet it may miss on smaller enterprises and the financial indicators. However, if the company is operating within one region or even better, a niche, this approach may prove to be effective.

The second approach, on the contrary, paves its way from the financial indicator. It may neglect the major world events and takes into consideration the financial indicators of the company (Kotane, Kuzmina-Merlino, 2012). Continuing its way with competitive analysis, general market conditions it may, finally, consider the macroeconomic factors at the end.

3.1 Financial Analysis

Financial analysis involves understanding a business's products, services, and operating characteristics to interpret data like turnover, profitability, and working capital (Gowthorpe, 2008). The financial analysis requires variables. Most commonly they are financial statements and ratios. The statements follow standardized pattern and comply with certain rules which makes it the most primary tool and standardized representation.

This data is later used as an indicator to evaluate the performance and further planning and organization of the company (16).

3.2 Balance sheet or the Statement of Financial Position

A Balance sheet is a report on 3 main variables a company has: assets, liabilities, and equity (Fernando, 2024). It's a plain representation of what is owed and owned by a company as well as what invested by stakeholders. Its main goal is to represent the overall balance. In order for a company to get a new asset, it will need to leverage either its liabilities or take a loan in simple terms or access the retained earnings or shareholder's equity (Revsine, L. et al, 2021).

The way of making a proper analysis of a company starts at examining its indicators. In the same fashion as ratios of profitability, leverage, and liquidity Balance Sheet's influence on making analysis and judgement is invaluable. Moreover, it may be presented and determined on any day, meaning it can be prepared and can change every day. Even though such option is excessive, and it is usually combined with other metrics, such as income statement and cash flow statement. As well as the balance sheet us usually compared with another one after a timeframe of a year.

The key to the balance sheet comes from the name. It is used to balance out assets and liabilities with shareholders' equity.

$$\text{Assets} = \text{Liabilities} + \text{Shareholders' Equity}$$

3.2.1 Assets

An asset is a resource whether human or object that are aimed to yield advantages for the company (15). Whether by adding an actual physical piece of equipment or providing an

ephemeral right or idea. It is represented at the balance sheet and the asset that has a physical appearance is called tangible (Revsine, L. et al, 2021).

3.2.2 Current Assets

The current assets are a type of assets that is highly liquid and that can be converted in lesser timeframe than a year. Utilized in current ratio and can be presented in the simplest forms like cash or marketable securities like stock and bonds. As well as by inventory (Kirkpatrick, 2016).

3.2.3 Fixed Assets

Fixed asset is an asset that main goal is not to be sold. This asset is used in active process of creation or production and have an estimated life cycle. This type of assets is usually physical, e.g. cars, factory equipment, buildings. With social networks growing certain strategy, filter or even a point of view can be utilized as a fixed asset.

3.2.4 Financial Asset

The financial asset like the most previous assets mentioned to do not hold a physical or tangible form. However, it is a liquid asset as it can be quickly transformed. The right of owning a marketable security can be sold by selling the stock. The bank deposits can be withdrawn and added to the cash at hand. These entities or intangible assets cannot be fully classified and therefore their sole price is dictated by supply and demand, market conditions and danger connected to it.

3.2.5 Intangible Asset

An intangible asset as an ephemeral understanding of an asset that still can benefit the bearer. For instance, the sole idea of Red Bull empty cans near the night clubs that brought the idea about the drink's effectiveness didn't acquire its physical form. Yet, the legacy of the energy drink had been formed right after the idea was executed in 1980's.

This type of assets cannot be measured or estimated yet can be a strong foundation of companies and brands. For instance, intellectual property, trademarks, and copyrights

3.3 Shareholders' Equity or Equity

Equity is another metric that might be found on a balance sheet alongside with assets and debt. It represents the total value of the company that would be paid off in case the firm were to be sold (17). Equity can be found on balance sheet and in case it cannot be identified, calculated by subtracting Total Liabilities from Total assets.

$$\text{Shareholders' Equity} = \text{Total Assets} - \text{Total Liabilities}$$

As per previous part equity is a representation of what percentage is owned in a certain initiative. And equity can be a leverage and represented in many ways.

The best and simplest of equity's form is common stock. It is a representation of an investment from shareholder or stakeholder that allows to have a claim on company's assets and a say in managing a company (Revsine, L. et al, 2021). The common stock should not be confused with proffered stock where stockholders have lesser responsibilities and a fixed dividend.

Retained earnings or retention ration/surplus is earnings that are not paid out to shareholders immediately. Instead, these earning are used to cover company's debt or for future business reinvestment.

The equity may be a conceived plan on how to acquire control over certain assets, whether human or technical. For instance, partners equity is a representation on how much control one party has. Or the employee equity where stock options are used as additional form of compensation and therefore influence or even maintain the morale.

3.4 Liabilities

A liability is an obligation the enterprise is faced along the way and represent the share of assets that have been claimed by company's stakeholders and shareholders (Klarman, 1991). The liabilities arise as per the business activities, such as obtaining assets and real estate through buying. Certain commission, for instance, brokers' charge. An

obligation per loan or mortgage. A liability is divided into 2 types: short term, due under 12 months and longer, due after 12 months.

Current liabilities or a short-term debt that is due under 12 months or the process of obtaining, selling, and collecting from inventory, known as Operating cycle (Hayes, 2023).

Current liabilities are usually derived from operating activities and expected to be paid with current assets. The ability of the company to pay off its current liabilities is examined with current ratio. Again, a quick glance at current liabilities may define the effectiveness of the management and the ability to pay off debt, based on its amount.

The key word in this definition is "expectation," as a liability may not always result in a value outflow, but it must reasonably be expected to result from accepting the liability.

The current liabilities may be identified as:

- Accounts payable (short-term debt or the payment that is due on the long-term debt)
- Interest payable
- Dividends payable
- Taxes

3.5 Income Statement or Profit and Loss statement

The starting point of any research on the company, the Income statement that bears many names, such as: earnings statement, profit and loss statement and statement of operations (Krishan, 2021). It is an essential report that shows whether the company is operating in the green or red sector. To deduct this, the examiner must subtract the entrances related to spendings from revenue (Revsine, L. et al, 2021).

Along with balance sheet the income statement is a must for any publicly traded company. The standard timeframe for income statement is considered annually. However, a company can prepare it monthly and quarterly as long as it meets the GAAP requirements (Schilit, 2018)

3.6 Profitability Ratios

Whilst the Leverage ratios are more concerned about risk management and debt management, the Profitability ratios examine the company's ability to generate profit. These ratios see more detailed overview on how the assets, equity, the amount of goods or services sold and the overall profitability. This indicator is mostly used as an effectiveness representation of the company (Gowthorpe, 2008).

3.6.1 Gross Profit Margin

This indicator is used to assess the effectiveness and overall enterprises stability. The GPM can be found by subtracting the cost of activities or cost of the goods sold (COGS) from profit.

Naturally, the greater the GPM – the better. For the investor to see the median around the market, the comparison of GPMs would be a way to go. However, if there are any type of fluctuations the situation must be examined further. There can always be a management issue or other cost-related situation which may eventually be contra-intuitive and signalize about qualitative and quantitative changes in the company (Klarman, 1991).

3.6.2 Operating Profit Margin

Similarly with the previous indicator Operating profit margin follows the same rule. The bigger the OPM – the better. The operating profit margin or sometimes a Return on Sales (ROS) shows the ability of an enterprise to pay variable costs of production such as costs of raw material and labor along with. It can be found by executing division of EBIT (Earnings before interest and taxes) by revenue. It is essential for strong Operating profit margin to pay off fixed costs and commit to interest payments. Basically, the bigger the OPM, the more the company earns per dollar of products or services provided. The most important note about the Operating Profit Margin would be to identify whether the profit is generated from investing or the core of operations providing certain product or service. (Klarman, 1991).

Equivalently, the operating profit margin cannot be used as standardized tool for making one big assumption. Indeed, this instrument can be a great representation of tendencies inside one industry a benchmark, even. Yet, this indicator shall only be compared

inside of one industry and preferably one commercial model. As well as the fact that we should consider the model itself. Some enterprises may invest considerable resources in developing a major product and live off its sales for this product or service for the years to come only investing in its maintenance. Generally, we may state that the OPM of such company may be higher to the one of physical goods manufacturer. Yet, the initial OPM of company with a major product development would fluctuate from low to higher, whereas the OPM of the company producer would remain relatively stable affected by the cost of Variable costs.

The Operating Profit Margin is found by the following calculation = Operating Earnings / Sales Revenue

Operating earnings or the EBIT (Earnings before interests and taxes) can be found by subtracting COGS (costs of goods sold) from revenue.

3.6.3 Net Profit Margin

Often referred to as Profit margin, the Net Profit Margin is another metric for evaluating financial health of a company. It helps the observer to make two of the most important actions. First, is to see whether the current model approaches are applicable or trace an impact of adjusted standard operations of protocol. Second, is to set certain anticipations of profit. As well as most of the publicly traded companies include Net Profit Margin into their both annual and quarterly reports, which again marks the importance of that indicator (Baltova, 2023).

This Net Profit Margin can be represented in both percentage and decimal form. It exhibits how much profit is collected from one dollar. The positive side of this metric is of course providing the illustration of company's profitability by considering all expenditures like taxes, interest payments, one-time charges, and operational expenses. Simultaneously considering metrics of income like revenue and income from various investments. Hence, with all things considered the Net profit margin is a great tool to compare the enterprises due to its reflection in percentage (Landsburg, 1993).

There are a few ways on how we can approach its calculation. Firstly, identifying it at the end of income statement

$$\text{Net Profit Margin} = (\text{Net Income} / \text{Revenue}) \times 100$$

However, if the Net Income is not stated it can be calculated manually with the following formula:

$$\text{Net Profit} = \text{Revenue} - \text{COGS (Cost of Goods Sold)} - \text{Operating Expenses} - \text{Interest} - \text{Taxes}$$

3.6.4 Return on Assets or ROA

Return on Assets or ROA is a measurement tool identifying how efficiently the assets are used. The main goal of ROA is to provide discerning perspective into utilization of assets to generate income. This metric is usually expressed as a percentage, allowing to use it as a benchmark inside of one industry. As well as many metrics, it represents the number of cents generated per dollar of assets.

Rationally, investors seek for the bigger ratio and number of ROA. However, if the ratio is relatively low, this might indicate several reasons. First, would be low incentive or poor performance of management on utilizing its current assets. This indicator may be of use not only for the investors, but for the higher management as well. Second, heavy reliability on assets. This means the company requires more investment into equipment to maintain and generate future profits.

As a result, the main flaw of this indicator would be its inflexibility between areas of enterprise. The ROA must be considered with similar companies of business field or with the past performances of the company (Revsine, L. et al, 2021).

$$\text{The general formula of ROA (Return on Assets)} = \text{Net Income} / \text{Total Assets}$$

3.6.5 Return on Equity or ROE

The Return on Equity or ROE is another tool is the arsenal of Economist and Investor and shows how efficiently the company generates its profits or how efficiently the equity is utilized to generate profit, representing how much is gained for each dollar invested. Generally, relatively high ROE means the good ability of business to generate profits.

However, the ROE has a standard range which is considered to be excellent. This range is set at 15% to 20%. Nonetheless, this indicator contains one exception.

The indicators of ROA and ROE bear a significant similarity. The difference, however, lies in ROE not considering company's debt. Hence, by not taking into consideration the debt, ROE can be "manipulated" to grow by relying on debt and therefore increasing the Net Income. Investors react accordingly by giving preferences to companies whose ROE has showed sustainable growth over a certain period of time (Furhmann, 2022).

The ROE is found by the following way: $ROE = \text{Net Income} / \text{Shareholders' Equity}$

Shareholders equity can be explained as total assets minus total liabilities. That part variable represents what percentage of company's assets are owned by the shareholders.

3.7 Leverage ratios or Debt ratios

The leverage ratio can be understood as one of the many accounting metrics. Their main variables of research are debt and equity (23). By using this variable, the investor or the researcher can understand how operations and assets are financed. Most commonly the 2 ratios play the major role: debt to equity and debt to capital. Consequently, the amount of debt in equity and capita (Dilallo, 2024). The more the amount, the harder it is for the company to fulfil its financial obligations, which may signalise a decrease in the overall financial health or on the contrary a possibility to grow and invest into new projects.

3.7.1 Debt-to-Equity ratio

This ratio examines the balance between debt and equity. By addressing it, we may discover how much debt is to shareholder equity. Subsequently, the more heavily the company relies on debt financing, the more it is leveraged. This ratio may signalize that the company is a big risk to invest in (23).

Nonetheless, the company may use the debt to potentially increase the earnings, where the main benefiter would be shareholders. However, the market conditions must be examined closely as there numerous factors that influence servicing the debt (Klarman, 1991).

The Debt-to-Equity can be calculated by the next formula:

Debt to Equity Ratio = (short term debt + long term debt + fixed payment obligations) ÷
Shareholders' Equity

3.7.2 Debt-to-Capital

The debt-to-capital ratio is another measurement approach. It considers the company's financial leverage and what percentage of equity and debt it uses to finance its operations. The higher this ratio is, the more uncertain and more susceptible to bankruptcy is the company. The formula considers interest bearing debt, long and short-term liabilities and divided by interest bearing debt + shareholders' equity.

It is calculated by the following formula: Debt to Capital Ratio=Debt ÷ Debt +
Shareholders' Equity

3.7.3 Debt-to-Assets

Continuing with another indicator: debt-to-assets ratio. This one represent how much of its assets are funded by debt. In accordance with previous indicators – the higher the ratio, the more risk company imposes for both investors and management.

However, this indicator may also be used to gauge the solvency of the company or the ability of the company to meet its long-term obligations. The likelihood of securing future funding tends to decrease as a company's debt load increases.

The debt-to-assets can be acquired by the next formula: Debt ÷ Asset = (Short-term Debt +
Long-term Debt) ÷ Total Assets

3.7.4 Interest Coverage Ratio

The interest coverage ratio is another measurement often utilized by investors or banks to assess the influence of company's debts yet again. It weights the company's ability to pay off debts on time. The lower the ability of the company to cover interest payments on time – the riskier is the investment.

Consequently, the minimal ratio below 1.5 signalizes a greater risk for creditors. Next, the ratio of 1 signalizes that the enterprise is having difficulties with its earnings or is simply in stagnation. And finally, the ratio lesser than 1.0 is at extreme risk of defaulting, going bankrupt or a cease of operations (Furhmann, 2022).

The ratio is acquired with following formula: Interest Coverage Ratio = EBIT ÷ Interest Expense
EBIT (Earnings Before Interest and Taxes) or the company's operating income is found as
= Revenue - Expenses (with taxes and interest payments included)

3.8 Liquidity Ratios or Short-term solvency ratios

Liquidity ratios represent the ability of company to pay off its short-term liabilities. Alongside the process is usually checks how fast the enterprise can transform its assets into fast and accessible funds. The following components of Liquidity ratios exist: Current ratio, Quick ratio, Cash ratio, and Activity ratio. This metric can be applied to compare the companies between different fields, yet the effectiveness will gradually decline with each variable of business, field and geography changed. This analysis can be utilized both by outside researchers and inside management to see the current state compared to the historical data. Generally, the Liquidity ratios have set range of variables. The ratio of 2 or higher is considered that company has enough liquid assets to cover its liabilities on a repeated basis. The ratio of 1 is an indication that company can cover all its current liabilities. Any ratio below 0 might signalize the potential or full insolvency of the company in case of negative variables (Revsine, L. et al., 2021).

3.8.1 Current Ratio or the Working capital ratio

The current ratio examines the capacity of the company to pay off obligation within period of one year (Qasim Saleem, 2015). The forecast signalizes to investors and creditors how well the current assets are utilized. The higher ratio is always anticipated. However, the ratio too high may signalize a poor distribution of assets or mistakes of management. Typically, the ratio is set within the industry and compared historically for the better representation of the situation, but the common variable is 1.5 to 2.0.

Current ratio is found by = Current assets / Current liabilities

3.8.2 Quick Ratio or Acid-Test ratio

A firm's cash or cash equivalents add a great deal of value. Quick ratio or Acid test ratio is a measurement that in essence measures the liquidity value to immediate debt (within 1 year). As a current ratio is more focused on the total assets, the advantage with a quick ratio is that it is defined by liquidity. Cash or cash equivalents have greater value because of the speed they can be applied to debt. As stated before, all previous ratios show the amount over or below 1 USD that the company can either cover or not (Qasim Saleem, 2015).

Quick Ratio = Quickly accessible assets (Accounts Receivables + Cash + Marketable Securities) / Current Liabilities

3.8.3 Cash Ratio or Cash asset ratio

Another measure of liquidity is the cash ratio. It shows how much of the company's debts can be paid off given its current assets. As a measure of the company's liquidity, the Cash Ratio may show how much debt the business might pay down in an emergency.. The use of this metric should be considered if the short-term of company's stability examined. As for its value, the same rule applies with 1.0 being the most desired value (Šarlija, Harc, 2012). Of course, the proper logistic examination approach should be taken. Some companies may have a strong supply lines and strictly stated day of customer payoffs, along with reasonably leveraged debts. In this case, excessive amounts of cash may on the contrary, be more of a burden than an active asset.

Cash Ratio is found the following way = (Marketable Securities + Cash) / Current Liabilities

3.9 Activity or Efficiency ratios

Activity or sometimes Efficiency or Turnover ratio is a ratio that provides understanding of company's efficiency with its operations and activities (26). These ratios shall only be compared within one industry to provide more accurate data. Main interest of investors is of

course a higher Activity ratio. The higher ratio represents efficient usage of enterprise's assets.

3.9.1 Receivables Turnover or Accounts receivable turnover ratio

The Receivable turnover ratio is a representation on how fast the company can collect and obtain accounts receivables from its clients. Classically, the higher number of this ratio is desired. The bigger the value, the faster the company can collect the money, the more efficiently the company can use its assets and safer it is for investors.

However, if the collection deadlines are too strict or too short, it can potentially deter the potential customer. Therefore, the indicator and its value must be examined as per the situation. As well as it can be used to compare the performance of the companies to see if this ratio is acceptable or below the industry's benchmark (Revsine, L. et al., 2021).

Receivables Turnover are found this way = Revenue / Average Receivables

3.9.2 Inventory Turnover or Inventory Turnover ratio

The inventory turnover ratio is a measurement of how efficiently the inventory is managed (25). Following example of previous indicators, the main factor that should be taken into consideration is the field the business operates in. A comparison of grocery store and automobile manufacturer would be inappropriate.

A high inventory turnover may indicate that the demand for a certain product is great, and sales might be drastically above desirable. Yet, it may also indicate poor management estimations and stocking orders (Plewa, Friedlob, 1995). If the latter is in effect, the repercussion may include lost opportunity or opportunity cost along with lost sales and potential short and long term revenue.

A low inventory may on the contrary indicate the excessive amount of inventory stockings or poor sales. The excessive inventory stockings may again pinpoint the weakness of management decisions. As well as the stockings may come with extra storage and housing expenses. The fact that inventory age, depending on the industry, might create a stock that

will not be able to meet the demand of the customer or simply will be outdated, for instance, in its functions.

The formula of Inventory Turnover = $\text{COGS (Cost of Goods Sold)} / \text{Average Inventory}$

3.9.3 Payables Turnover or Accounts payables turnover ratio

The payables Turnover ratio represent on how fast the company settles its payment obligations with suppliers. One of the main criteria for investors is, of course, the company's stability and ability to meet both long- and short-term obligations.

Logically, the higher the ratio the better and deemed more stable for investors. However, the excessive conservativeness may reduce company's investment opportunities which may potentially generate alternative sources of income in the future. Conversely, the low ratios are an opposite indicator. This may signalize that the longer terms are longer or company suffering from tight economic situation and declining sales.

The Payables Turnover are found the following way = $\text{COGS (Cost of Goods Sold)} / \text{Average Payables}$

3.9.4 Fixed Asset Turnover or Property, Plant and Equipment (PPE) turnover ratio

The Fixed Assets Turnover ratio is a measurement of company's effectiveness utilization of its fixed assets (24). The higher the ratio, the more money company earns per each dollar. For example, a ratio of 5 would indicate that company earns 5 dollars over 1 dollar invested into its fixed assets. The lower ratio may indicate a surplus of inventory or a poor allocation of resources by management.

The industry of the company should be also taken into consideration, the service company which provides insurance policies may have much bigger FAT ratio than for instance an airplane manufacturing company, Boeing. Yet, the Boeing is an international giant and insurance company may only have a few branches inside of one country. The sole indicator does not represent the ability of the company to generate income like the profitability ratios do and therefore, should be combined with over to provide broader overview.

Fixed Asset Turnover = Net Sales /Average Net Fixed Assets

3.9.5 Total Asset Turnover or Asset turnover ratio

The Total Asset Turnover or the Asset turnover measure the efficiency of a company to generate revenue using its total assets (25). It represents how much money the company has generated for every dollar in its assets. Logically, the higher ratio is deemed desirable by the investors.

Total Assets Turnover can be found by = Total Sales / Average Total Assets or ((Total assets for current year) + (Total assets for previous year)/2)

3.10 Technical analysis

Technical analysis is yet another school of thought that approaches evaluation of price from another angle. Whilst the Fundamental analysis is targeted at examining the aspects of the company like management and financial statements as well as examining the overall market and economy situation, the Technical Analysis finds itself examining the trends of the graph (Kirkpatrick, Dahlquist, 2016). The core idea of technical analysis is that the price is a reflection of all matters combined together, making its main research goal the study of price and volume (27).

This goal is to find pattern from the data which is acquired from the past operations and activities of a company(Kirkpatrick, Dahlquist, 2016). Based on this derived information the statistics is formed using its own techniques and technical instruments.

The difference of these two approaches would be employment and usage. The Fundamental analysis includes qualitative analysis of a model and an impact of a world event that might influence the future yield from the company. This presumption with a reinforcement from business activity may solidify the believe in growth or fall in company's prices in the long term. On the contrary, the studies of pattern and activities may provide the researcher with upcoming fluctuations in a short-term and compare the strength relatively to the others on

graphs, charts, trends and resistance levels which proves itself most effective in short-term deals and actions (Schwager, 1995).

3.10.1 Simple and Exponential Moving Average

The Simple Moving Average or SMA and Exponential Moving Average or EMA are tools used to evaluate price movements. In essence, its data collected over certain period and converted into graph. These tools are along the most popular instruments in technical analysis and considered easy to calculate. The data from the data points or entries is collected and merged to introduce average price movement over that timeframe (Kirkpatrick, Dahlquist, 2016).

The difference between SMA and EMA would be that the most recent entries and information bear more influence and weight on the graph, making it more sensitive toward the recent fluctuations.

The purpose of both SMA and EMA would be to form a certain line with fluctuations over it as a signs of price trends. Where price lower the line is a sign of selling pressure and pessimism while the price over the line would be a sign of optimism and rising prices.

3.10.2 Relative Strength Index

The purpose of the Relative Strength Index (RSI) is to determine if a company's stock has been oversold or overbought. The range of values is 0 to 100, and the period of analysis typically encompasses fourteen days. In the event that the value is less than 30, this would signify an oversold environment. However, at the same token, in the event that the value is over 70, this indicates a high chance of being in an overbought market.

3.10.3 Bollinger Bands

The Bollinger bands is a part of technical analysis, that can be applied to many securities. It consists of 3 lines: lower, middle, and upper, where the middle line is usually Simple Moving Average or SMA. Essentially, other two lines create the indicator of securities volatility expand or contracting. When the prices are volatile the lines are expanding and when they contract – the price is less volatile (28). Of course, such fluctuations are measured with

standard deviation. The number of standard deviations are set by the trader and signalize how far are the upper and lower bands from the middle band.

Oftentimes the traders look for a pattern of long-term contraction and expansion, which in its part may signalize a trading opportunity. As well as its position may signalize how strong or weak the prices levels will be in the future.

3.10.4 Correlation Analysis

The correlation analysis is used to measure the relationship between two variables. In analysis, the correlation analysis measures the movement of two securities (Treloar, 1949) The range is represented with two variables, where -1 is the negative coefficient, that means the securities are moving in completely different directions and 1 where the movement is identical at the same direction (Hayes, 2023). As well as 0 would represent no relationship whatsoever.

In terms of securities, the positive or negative correlation may play a huge role in choosing the stock to invest at. For instance, the Research and Development sector of healthcare has benefited majorly during the vaccine research, whilst the common health providing services took a hit due to heavy taxation on mental health of the workers and hence increased spendings on salaries and wages.

For experiences investors it is essential to maintain a diversified portfolio. And the correlation analysis may further secure the positions and ensure the positions during crises.

4 Practical part

4.1 Description of IBM

The International Business Machines has a rich and long history throughout past decade. During 60s and 70s the company dominated the world with its computers. By the end of 70s roughly 70% of computers worldwide were produced by IBM.

It began its history back in twentieth years of the past century with punch-card tabulating system which stayed, perhaps, at the dawn of binary systems. Fast forwarding 70 years, the IBM saw its downfall. Whether it was a major mistake of management or the overconfidence border lining with arrogance, the fact remains the same that its computer producing division had been sold to Lenovo in 2005. After that deal, the Chinese company seen a major rise and been dominating the market of personal computer production ever since 2013.

Even after a strong decline in economic aspects in the begging of the 90s and selling its computer manufacturing wing, it shifted its focus towards services and software. With ambitious projects like IBM Watson that was in fact, a precursor of AI in the way we understand it now.

However, even with illustrious records and rich history, the most searched question on search engines is mostly of regard whether the IBM is still operational as a company.

4.2 Assortment of products

With its gaze shifted towards services and streamline of blockchains and new age of information exchange, the IBM chose its path with its products.

With products like Cloud and Blockchain, IBM can provide more secure communication withing companies, their intranets and further means of communication.

However, once a pioneer hasn't forgotten about computer as well. Only this time the computers has received a prefix of super and have two respectful names of Sierra and Summit. With both of its supercomputer's operation from 2018 the IBM Quantum has received a new boost with its utility in healthcare, physics, energy-limitations questions and of course, the pathway for AI.

With the way open and strong tools like supercomputers IBM has created products like IBM watsonx™ and IBM Research with providing businesses with reliable instruments of AI assistance and data management and procession protocols.

4.2.1 Financial records of IBM

Table 1 IBM's Revenue, 2021 - 2023

Year	Annual Revnue in Million of USD	
2023	US\$	61 860,00
2022	US\$	60 530,00
2021	US\$	57 350,00
2020	US\$	55 179,00
2019	US\$	57 714,00
2018	US\$	79 591,00

Source: (<https://www.macrotrends.net/stocks/charts/IBM/ibm/revenue>, 2024)

Throughout years IBM has experienced major shifts in its structure and business approach. One of the hardest impacts over the last 5 year was a major drop in stock prices in 2018 when investors were not satisfied with IBM's financial performance and consequently started selling its positions with IBM. Such approach caused a chain-reaction of mass negativity and pessimism around investors. Along with acquisition of Red Hat, which was one of the largest technical acquisitions deals lead to IBM loosing almost 25% of its price stock. Along with hard blow from pessimism the COVID crises came, forcing even further potential problems above IBM's future.

Nevertheless, the newly chosen CEO IBM, Arvind Krishna, was a positive breaking point for the company too. With his experience as company man for more than 30 years the new vector of IBM's evolution came. His fist company-wide email set a course on further development of cloud computing and artificial intelligence managed to win investors sentiments back along with stating IBM's future focus.

Table 2 IBM's Gross profit (2018-2023)

Year	Gross Profit (in millions USD)	
2023	\$	34 300,00
2022	\$	32 688,00
2021	\$	31 485,00
2020	\$	30 865,00
2019	\$	31 534,00
2018	\$	36 937,00

Source: (<https://www.macrotrends.net/stocks/charts/IBM/ibm/revenue>, 2024)

4.2.2 Potential field of interest for Investors

With everchanging field of IT technologies and times of uncertainty, every investor looks for a way to diversify their portfolio and IBM might be an ideal candidate for what is called haven of investment.

With its strong and long presence on the market IBM offers a variety of diversified products but at the same token strays to the future of cloud computing. Whilst the primary goal is set clear, the research and further innovations in cloud computing, IBM retains large contracts with big enterprises and Government agencies.

Another captivating factor is the legacy of IBM. Five employees of IBM have received the Nobel Prize. As well as Employee Resource Groups have been established to help broaden the employees' engagement within organization. Such groups have proven to be effective as it brings various backgrounds, experiences, cultural awareness and most importantly, mentorship. The structure of IBM implies solid hierarchy, and each employee knows where to report to and clarify details, which cannot help but affect the effectiveness in a positive way. Finally, another addition to IBM's initiatives is CSR or Corporate (to) Social Responsibility. CSR encourages activities aimed at improving social conditions even outside of working space with a help of IBM Volunteers, which might be crucial for

Lastly, IBM's financial statements and financial performance overall would be a key indicator the investor are looking at. The company has shown constant revenue growth and earnings per share are a considerable addition which IBM is taking thorough care of.

4.3 Financial analysis of IBM

The financial analysis will be based upon form 10-K in annual format. The latest annual update available is of year 2023.

4.3.1 Balance sheet or the Statement of Financial Position

4.3.1.1 Assets

Table 3 Financial Performance of IBM

US\$ in millions

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Cash and cash equivalents	13 068	7 886	6 650	13 212	8 172
Restricted cash	21	103	307	463	141
Marketable securities	373	852	600	600	696
Notes and accounts receivable, trade, net of allowances	7 214	6 541	6 754	7 132	7 870
Short-term financing receivables, held for investment, net of allowances	6 102	6 851	7 221	10 892	14 192

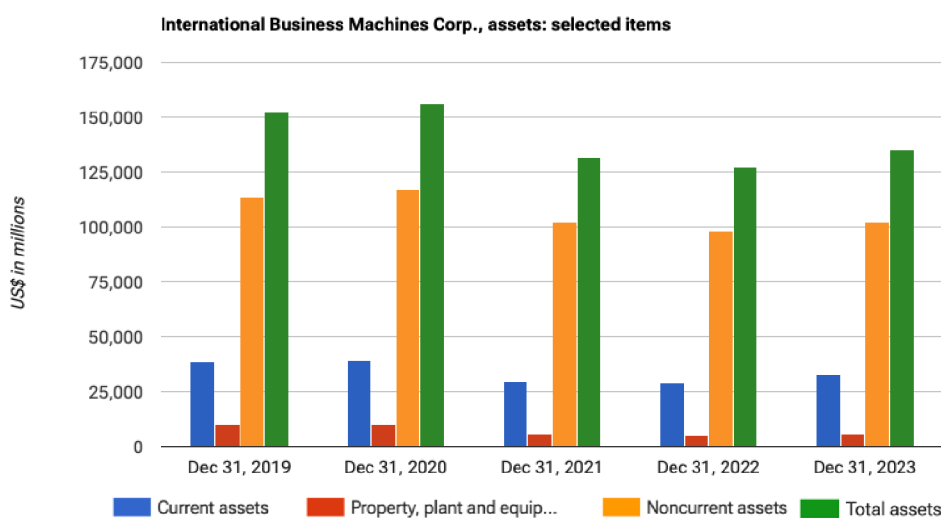
Short-term financing receivables, held for sale	692	939	793	—	—
Other accounts receivable, net of allowances	640	817	1 002	714	1 733
Inventory	1 161	1 552	1 649	1 839	1 619
Deferred costs	998	967	1 097	2 107	1 896
Prepaid expenses and other current assets	2 639	2 610	3 466	2 206	2 101
Current assets	32 908	29 118	29 539	39 165	38 420
Property, plant and equipment, net	5 501	5 334	5 694	10 040	10 010
Operating right-of-use assets, net	3 220	2 878	3 222	4 686	4 996
Long-term financing receivables, net of allowances	5 766	5 806	5 425	7 086	8 712
Prepaid pension assets	7 506	8 236	9 850	7 610	6 865
Deferred costs	842	866	924	2 449	2 472
Deferred taxes	6 656	6 256	7 370	9 241	5 182
Goodwill	60 178	55 949	55 643	59 617	58 222

Intangible assets, net	11 036	11 184	12 511	13 796	15 235
Investments and sundry assets	1 628	1 616	1 823	2 281	2 072
Noncurrent assets	102 333	98 125	102 462	116 806	113 766
Total assets	135 241	127 243	132 001	155 971	152 186

Source: (<https://www.sec.gov/Archives/edgar/data/51143/000155837023002376/ibm-20221231xex13.htm>)

Current assets are a type of assets that has high liquidity and can be converted in lesser timeframe than a year. Can be presented in the simplest forms like cash and cash or marketable securities, stocks, bonds as well as by inventory. These assets are crucial as it signalizes the ability of the company to pay off its current liabilities.

Figure 1 IBM's Assets representation (2019 - 2023)



Source: Own calculations (<https://www.stock-analysis-on.net>, 2024)

Non-current assets are a contrary of current assets. They represent the assets the company possess which will be utilized in activities in a period longer than fiscal or calendar year. Usually, these assets are represented by real estate, long depreciating inventory and investments.

Total assets are a full extent of company's control over current and non-current assets.

The form represented above demonstrates that company had taken a major hit in the period of COVID losing almost 30% of its all-current assets. As well as almost cutting in half its property. The heavy hit on with COVID was maintained but at the cost of serious loss in total assets, almost throwing back IBM to its position at the end of 2018.

4.3.1.2 Shareholders' equity and Liabilities

Table 4 Equity and Liability of IBM

US\$ in millions	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Taxes	2 270	2 196	2 289	3 301	2 839
Short-term debt	6 426	4 760	6 787	7 183	8 797
Accounts payable	4 132	4 051	3 955	4 908	4 896
Compensation and benefits	3 501	3 481	3 204	3 440	3 406
Deferred income	13 451	12 032	12 518	12 833	12 026
Current operating lease liabilities	820	874	974	1 357	1 380
Other accrued expenses and liabilities	3 522	4 111	3 892	6 847	4 357
Current liabilities	34 122	31 505	33 619	39 869	37 701

Long-term debt, excluding current maturities	50 121	46 189	44 917	54 355	54 102
Retirement and nonpension postretirement benefit obligations	10 808	9 596	14 435	18 248	17 142
Deferred income	3 533	3 499	3 577	4 301	3 851
Noncurrent operating lease liabilities	2 568	2 190	2 462	3 574	3 879
Income tax reserves	6 916	6 404	6 179	5 274	5 118
Deferred taxes	1 146	2 292	3 956	5 472	5 230
Excess 401(k) Plus Plan	1 437	1 307	1 686	1 635	1 521
Disability benefits	308	303	359	452	478
Derivative liabilities	299	488	103	40	506
Workforce reductions	526	524	752	956	725
Environmental accruals	206	243	224	246	254
Other	638	682	736	822	695
Other liabilities	11 476	12 243	13 995	14 897	14 527
Noncurrent liabilities	78 506	73 717	79 386	95 375	93 501
Total liabilities	112 628	105 222	113 005	135 244	131 202

Common stock, par value \$.20 per share, and additional paid-in capital	59 643	58 343	57 319	56 556	55 895
Retained earnings	151 275	149 825	154 209	162 717	162 954
Treasury stock, at cost	(169 624)	(169 484)	(169 393)	(169 339)	(169 413)
Accumulated other comprehensive loss	(18 761)	(16 740)	(23 234)	(29 337)	(28 595)
Total IBM stockholders' equity	22 533	21 944	18 901	20 597	20 841
Noncontrolling interests	80	77	95	130	144
Total equity	22 613	22 021	18 996	20 727	20 985
Total liabilities and equity	135 241	127 243	132 001	155 971	152 187

Source: (<https://www.stock-analysis-on.net/>, 2024)

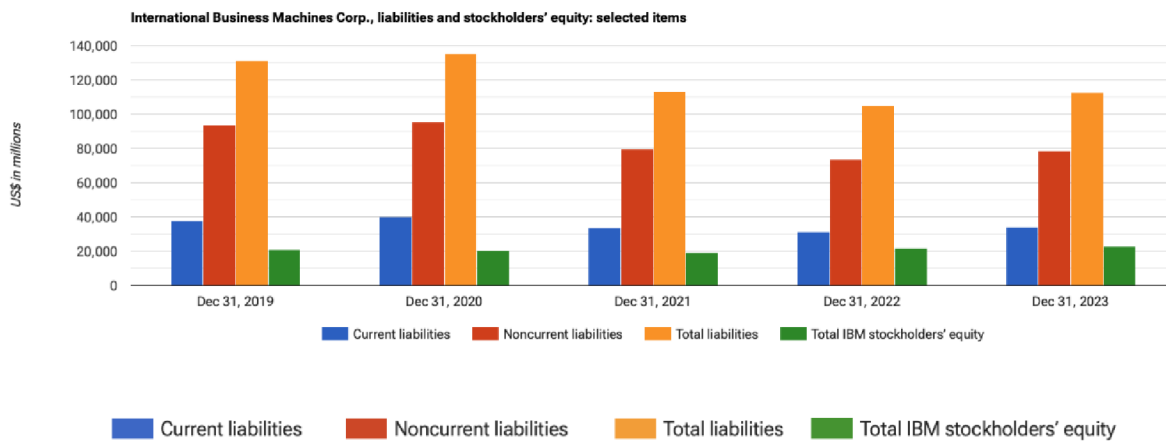
The same logic may be traced along with Liabilities which are divided in short-and long-term liabilities.

Current liabilities are a debt that is expected to be covered during under one-year annual accounting period no longer than year. The common example is loans, taxes, salaries, and deferred revenue.

The long-term liabilities or **Noncurrent liabilities** alternatively give insight into future liabilities of the company. The common example of these liabilities are long-term loans, 401k obligations, financing activities and noncurrent lease operate liabilities.

In this case we can see tendency which continues from the past analysis. The noncurrent liabilities have decreased due to the loss of total assets. However, the most curious fact would be the stockholders' equity that represent the strong believe in IBM's recuperation from heavy hit in 2021 and 2022. With continuing growth and increase in 2023.

Figure 2 Liabilities with comparison to Stockholder's equity.



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

The final aggregation of current and noncurrent liabilities is the **Total liabilities** that represent the debts or obligations of IBM. The understanding of Total liabilities is crucial as it gives understanding of how leveraged the company is.

In case of IBM the company is highly leveraged as its focus is investment in research and development of a product, which later is supposed to bring in the revenue without further investments and relatively low maintenance costs. Hence, the high leverage of IBM.

Nonetheless, the total liabilities and current liabilities has decreased. This may relate to the strategy of selling hardware division and both acquiring funds and getting rid of extra maintenance course. In terms for investors, this strategy is a long and controlled change that Stockholders were anticipating that can be confirmed with increasing stockholders' equity and relatively low decrease in it even in times of COVID-19.

4.4 Income statement

Second important instrument that is used to gauge and study the wellbeing of a company is the Income Statement. It represents the company's gains and losses over a designated time. To compute this, overall expenses must be subtracted from the total revenue.

Figure 3 IBM's Income Statement or Profit and Loss Statement, 2019 - 2023

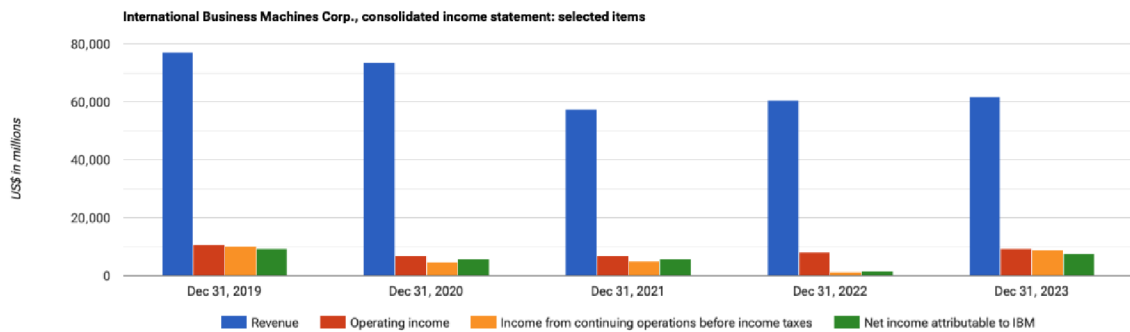
US\$ in millions						
	12 months ended:	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Services		30 378	30 206	29 225	45 004	47 493
Sales		30 745	29 673	27 346	27 484	28 252
Financing		737	651	779	1 132	1 402
Revenue		61 860	60 530	57 350	73 620	77 147
Services		(21 051)	(21 062)	(19 147)	(30 404)	(32 491)
Sales		(6 127)	(6 374)	(6 184)	(6 934)	(7 263)
Financing		(382)	(407)	(533)	(707)	(905)
Cost		(27 560)	(27 843)	(25 864)	(38 045)	(40 659)
Gross profit		34 300	32 687	31 486	35 575	36 488
Selling, general and administrative		(19 003)	(18 609)	(18 745)	(23 082)	(20 604)
Research, development and engineering		(6 775)	(6 567)	(6 488)	(6 333)	(5 989)
Intellectual property and custom development income		860	663	612	626	648
Operating income		9 382	8 174	6 865	6 786	10 543
Foreign currency transaction gains (losses)		(116)	643	204	(114)	279
Gains (losses) on derivative instruments		17	(225)	(205)	101	(15)
Interest income		670	162	52	105	349
Net gains (losses) from securities and investment assets		39	(278)	133	22	32
Retirement-related income (costs)		39	(6 548)	(1 282)	(1 123)	(615)
Other		282	464	244	170	962
Other income and (expense)		931	(5 782)	(854)	(839)	992
Interest expense		(1 607)	(1 216)	(1 155)	(1 288)	(1 344)
Income from continuing operations before income taxes		8 706	1 176	4 856	4 659	10 191
(Provision for) benefit from income taxes		(1 176)	626	(125)	864	(731)
Income from continuing operations		7 530	1 802	4 731	5 523	9 460
Income (loss) from discontinued operations, net of tax		(12)	(143)	1 031	89	(4)
Net income		7 518	1 659	5 762	5 612	9 456
Net income attributable to noncontrolling interest		(16)	(20)	(19)	(22)	(25)
Net income attributable to IBM		7 502	1 639	5 743	5 590	9 431

Source: (<https://www.stock-analysis-on.net/>, 2024)

Operating Income is one of the most critical measurements. It demonstrates, on a basic level, that the company has the financial foundations to be profitable or at least the potential.

The further examination may provide IBM's approach shift focus on more beneficial sectors through critical years of COVID-19. Increasing operating income may signalize stabilization of the situation in the company as well of the management success who took serious care with assigning staff to crucial projects.

Figure 4 Profit and loss statement, IBM 2019 - 2023



Source: Own calculations (<https://www.stock-analysis-on.net>, 2024)

The most concerning and interesting indicator for investor is without a doubt is **Net Income**. It can be found at the end of the income statement and thus always referred to as the bottom line. The Net Income is the subtraction of every expense from all revenues received.

4.4.1 Profitability

Ratios of Profitability indicate how efficiently and effectively a firm creates profit. These ratios give a more thorough overview on the amount of goods or services sold, assets, equity, and the overall profitability, hence adding value to the company, as well as investors.

The significant ratios are as follows: Net Profit margin, Gross profit margin, Operating profit margin. In addition are Return on Investment ratios that include ROA and ROE.

Figure 5. Profit Ratios, for the years 2019-2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Return on Sales					
Gross profit margin	55,45%	54,00%	54,90%	48,32%	47,30%
Operating profit margin	15,17%	13,50%	11,97%	9,22%	13,67%
Net profit margin	12,13%	2,71%	10,01%	7,59%	12,22%
Return on Investment					
Return on equity (ROE)	33,29%	7,47%	30,38%	27,14%	45,25%
Return on assets (ROA)	5,55%	1,29%	4,35%	3,58%	6,20%

Source: (<https://www.stock-analysis-on.net/>, 2024)

To begin, is the Gross profit margin. This measurement is utilized for firms to assess their efficacy and general stability. In order to compute this calculation, the cost of activities or cost of goods sold (COGS) is subtracted from profit (3, p. 228).

In the event that the gross profit margin demonstrates growth, it may be viewed positively as it shows management can adapt even through difficult periods. This resolve is ability to arrange pricing policy and staff in a way that would benefit the company.

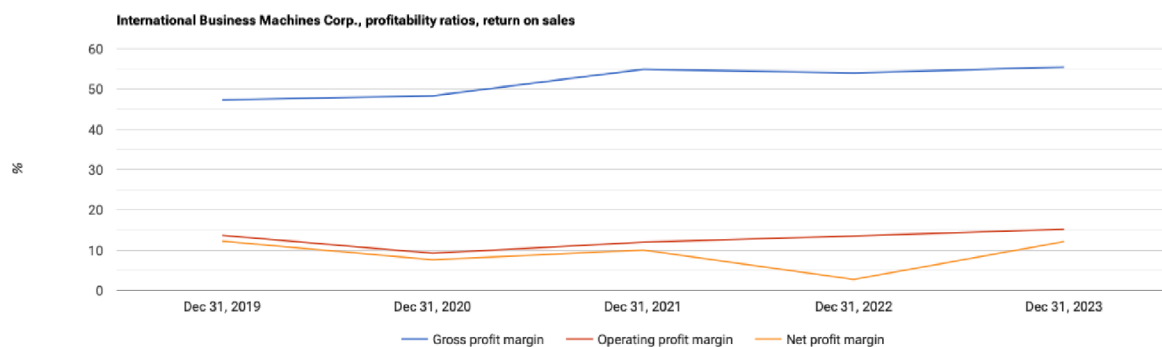
Second is the operating profit margin. It denotes the proportion of revenue that is left after deducting operational expenditures from gross income.

Overall, the bounce-back of Operating Profit Margin is yet another indicator that management is doing its job well considering the COVID crisis, by cutting the costs, improving quality of business processes and most importantly, allocating resources to the more promising projects.

Third is the **Net profit margin**. It considers how efficient company transforms its sales into profits after considering all expenses. These expenses includes taxes and other miscellaneous expenditures.

The year 2022 saw a significant decline of 2.71% for IBM in net profit margin and this was seen as a negative indicator. Although this decrease was not good, IBM managed to increase its Net profit margin to 12.13% in the following year.

Figure 6 Profit Margins, for the years 2019-2023-IBM



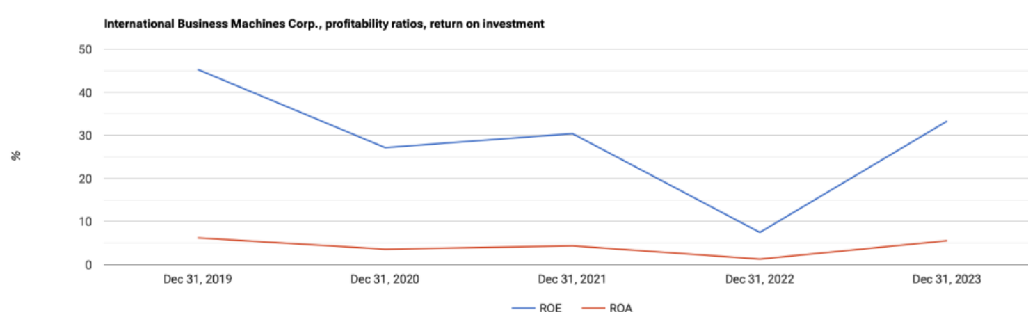
Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

Return on Equity and Return on Assets represents an additional critical measurement that can further evaluate the profitability.

ROE or Return on Equity focuses on Shareholders' equity ability to create profitability efficiently. In order to calculate ROE, you simply divide the Net income by shareholders' equity. IBM's ROE has decreased considerably. And now generating 33.29 cents per every dollar investors contributed. This metric might scare the investors as the ROE has decreased for almost 44.5% back in 2022 along with revenue fall. However, it may also create further incentives with appropriate actions of management.

The return on assets is a metric that examines how well the company utilizes its assets to generate profit. The IBM's ROA has decreased as well in 2022, down to 1.29%, meaning assets generate 1.29 cents per every dollar. And it's likely fashion growing back to 5.55% which can be considered a good development.

Figure 7 Return on Equity, for the years 2019 – 2023-IBM



Source: (<https://www.stock-analysis-on.net>, 2024)

4.4.1.1 Gross profit margin

Table 5 Gross Profit Margin, for the years 2019-2023-IBM

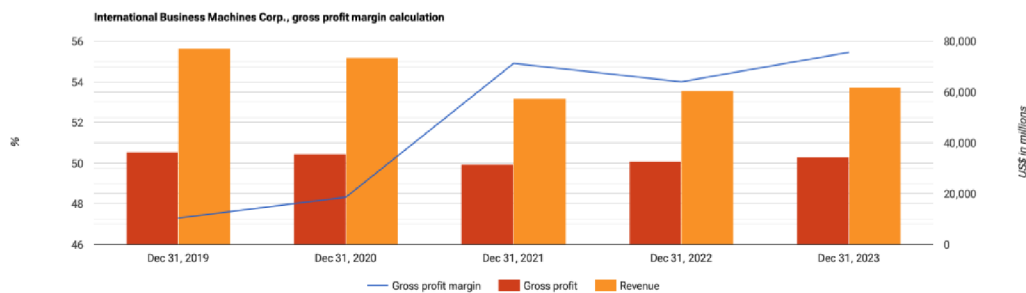
	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Gross profit	34 300	32 687	31 486	35 575	36 488
Revenue	61 860	60 530	57 350	73 620	77 147
Profitability Ratio					
Gross profit margin	55,45%	54,00%	54,90%	48,32%	47,30%
Benchmarks					
Gross Profit Margin, Competitors					
Microsoft Corp.	68,92%	68,40%	68,93%	67,78%	65,90%

Source: (<https://www.stock-analysis-on.net>, 2024)

The **gross profit margin** evaluates financial position of the company after accounting for the COGS, labour, and materials. Generally, the ratio between 50% and 70% considered to be good. The gross profit margin is calculated followingly: $100 \times 34,300 \div 61,860 = 55.45\%$

Indirectly, the IBM's strategy finds its representation here. This metric may signalize that IBM is enhancing its competitive position. As well as showing managements effectiveness in acquisitions and making processes more automated.

Table 6 IBM, Gross profit margin representation for the years 2019-2023-IBM



Source: (<https://www.stock-analysis-on.net/>, 2024)

4.4.1.2 Operating profit margin

Figure 8 Operating Profit Margin, for the years 2019 – 2023-IBM

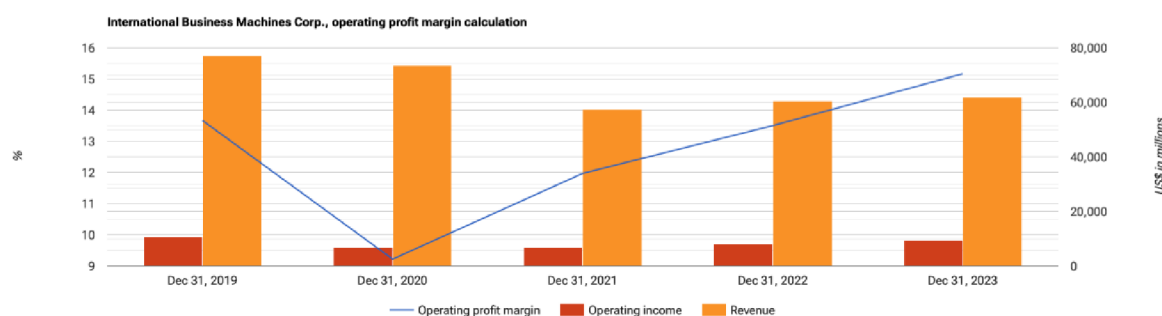
	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Operating income	9 382	8 174	6 865	6 786	10 543
Revenue	61 860	60 530	57 350	73 620	77 147
Profitability Ratio					
Operating profit margin	15,17%	13,50%	11,97%	9,22%	13,67%
Benchmarks					
Operating Profit Margin, Competitors					
Microsoft Corp.	41,77%	42,06%	41,59%	37,03%	34,14%
Operating Profit Margin, Sector					
Software & Services	28,03%	27,98%	28,89%	25,05%	24,34%
Operating Profit Margin, Industry					
Information Technology	26,31%	28,45%	28,75%	24,95%	25,41%

Source: (<https://www.stock-analysis-on.net/>, 2024)

The operating profit margin is calculated by subtracting operational expenses from gross income.

Operating profit margin is found by this formula: $\text{Operating profit margin} = 100 \times \text{Operating income} \div \text{Revenue}$, resulting in calculations = $100 \times 9382 \div 61860 = 15.17\%$, for the year of 2023.

Figure 9 Operating Profit Margins, for the years 2019 to 2023-IBM



Source: (<https://www.stock-analysis-on.net/>, 2024)

The operating profit margin decline reinforces that IBM was clearly affected negatively by COVID-19 and its economic impacts. However, the management competence can be obliquely confirmed by ability to face complications with adaptation to new market conditions.

4.4.1.3 Net profit margin

Figure 10 Net Profit Margin, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Net income attributable to IBM	7 502	1 639	5 743	5 590	9 431
Revenue	61 860	60 530	57 350	73 620	77 147
Profitability Ratio					
Net profit margin	12,13%	2,71%	10,01%	7,59%	12,22%
Benchmarks					
Net Profit Margin, Competitors					
Microsoft Corp.	34,15%	36,69%	36,45%	30,96%	31,18%
Net Profit Margin, Sector					
Software & Services	22,47%	22,24%	25,99%	20,85%	21,80%
Net Profit Margin, Industry					
Information Technology	22,13%	24,06%	25,54%	21,37%	22,17%

Source: Own Calculations (<https://www.stock-analysis-on.net/>, 2024)

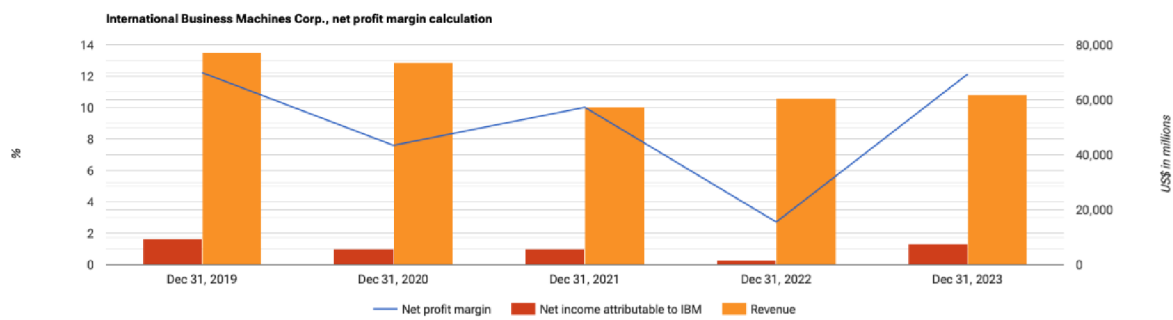
Net profit margin considers how efficiently a firm can convert sales into profitability after taking into consideration every expenditure. These expenditures consist of corporate taxes and other expenses.

As the table above demonstrates, the net profit margin dramatically declined to 2.71%. The net profit margin is calculated utilizing the following equation:

$$\text{Net profit margin} = 100 \times \text{Net income} \div \text{Revenue, resulting in:}$$

$$= 100 \times 1639 \div 60530 = 2.71\%, \text{ for the year of 2022 and } = 100 \times 7502 \div 61860 = 12,13\% \text{ with evident growth.}$$

Figure 11 Net Profit Margin, for the years 2019 to 2023-IBM



Source: Own Calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.1.4 Return on Equity or ROE

Table 7 Return on Equity, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Net income attributable to IBM	7 502	1 639	5 743	5 590	9 431
Total IBM stockholders' equity	22 533	21 944	18 901	20 597	20 841
Profitability Ratio					
ROE	33,29%	7,47%	30,38%	27,14%	45,25%
Benchmarks					
ROE, Competitors					
Microsoft Corp.	35,09%	43,68%	43,15%	37,43%	38,35%
ROE, Sector					
Software & Services	29,37%	32,03%	37,53%	31,80%	36,15%
ROE, Industry					
Information Technology	31,94%	38,70%	42,55%	35,28%	36,69%

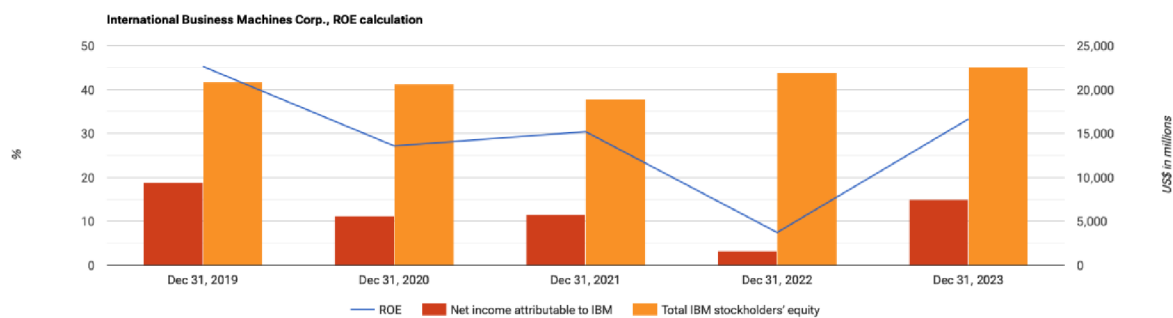
Source: (<https://www.stock-analysis-on.net/>, 2024)

Return on Equity evaluates how effective shareholders' equity is utilized. As the graph demonstrates, ROE significantly decreased for the timeframe examined. Meaning, at its final number of 33.29% it generates 33.29 cents per every dollar invested.

$$\text{ROE} = 100 \times 7502 \text{ (Net Income)} \div 22533 \text{ (Stockholders' equity)} = 33.29\%$$

The growth compared to the other years is evident, however, not fully reaching its full potential before the crisis and acquisition of RedHat.

Figure 12 Return on Equity, for the years 2019-2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net>, 2024)

4.4.1.5 Return on Assets or ROA

Table 8, Return on Assets (ROA), for the years 2019 to 2023-IBM

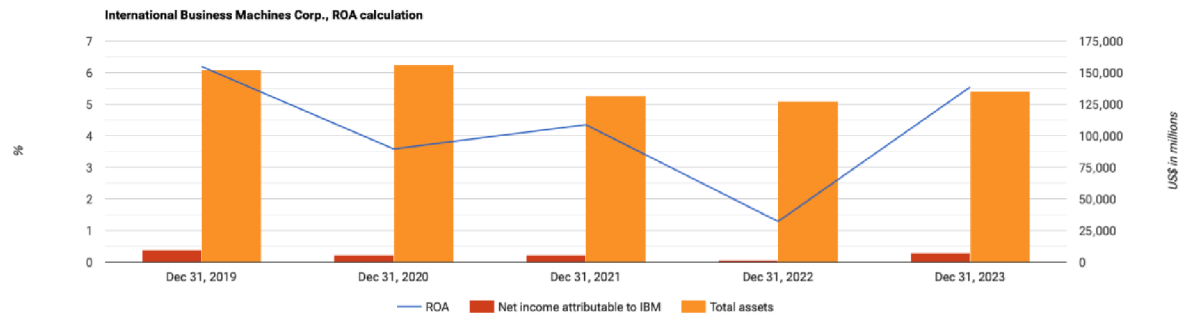
	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Net income attributable to IBM	7 502	1 639	5 743	5 590	9 431
Total assets	135 241	127 243	132 001	155 971	152 186
Profitability Ratio					
ROA	5,55%	1,29%	4,35%	3,58%	6,20%
Benchmarks					
ROA, Competitors					
Microsoft Corp.	17,56%	19,94%	18,36%	14,70%	13,69%
ROA, Sector					
Software & Services	11,45%	11,67%	12,60%	10,03%	10,89%
ROA, Industry					
Information Technology	13,10%	15,14%	15,64%	12,15%	12,81%

Source: Own Calculations (<https://www.stock-analysis-on.net>, 2024)

The return on assets or ROA, measures how effectively the firm utilizes or leverages their assets to create profit. From the years 2018 to 2022 IBM's Return on Assets have decreased gradually.

The ROA of IBM for 2023 = 100×7502 (Net income) \div 135241 (Total Assets) = 5.55%. With this number the IBM continues its growth and shows increasing operating performance.

Figure 13 Return on Assets, for the years 2019 to 2023-IBM



Source: Own Calculations (<https://www.stock-analysis-on.net>, 2024)

4.4.2 Liquidity or Short term solvency ratios

To evaluate how solvent a firm is in the immediate or short-term, Liquidity ratios are utilized. The three primary metrics are: Current ratio, Quick ratio and Cash ratio.

Table 9 Liquidity Ratios representation, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Current ratio	0.96	0.92	0.88	0.98	1.02
Quick ratio	0.80	0.73	0.67	0.83	0.87
Cash ratio	0.39	0.28	0.22	0.36	0.24

Source: (<https://www.stock-analysis-on.net>, 2023)

Essentially, bigger ratio is desired or expected by investors. Usually, the ratio of 2 is consider ideal. But anything above 1 is also acceptable for companies in certain fields of production of service provision.

As per the data, IBM’s liquidity ratios signalize that assets are insufficient to cover its basic liabilities. It is not necessarily means that company is highly leveraged, yet there may lay a correlation. According to the data, company has seen a decline, with big dive in the year 2020.

4.4.2.1 Current ratio or the Working capital ratio

Table 10 Current Ratio with sectors comparisons, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Current assets	32 908	29 118	29 539	39 165	38 420
Current liabilities	34 122	31 505	33 619	39 869	37 701
Current ratio	0,96	0,92	0,88	0,98	1,02
Current Ratio, Competitors					
Microsoft Corp.	1,77	1,78	2,08	2,52	2,53
Current Ratio, Sector					
Software & Services	1,37	1,42	1,67	1,92	1,85
Current Ratio, Industry					
Information Technology	1,46	1,44	1,64	1,85	1,77

Source: (<https://www.stock-analysis-on.net>, 2024)

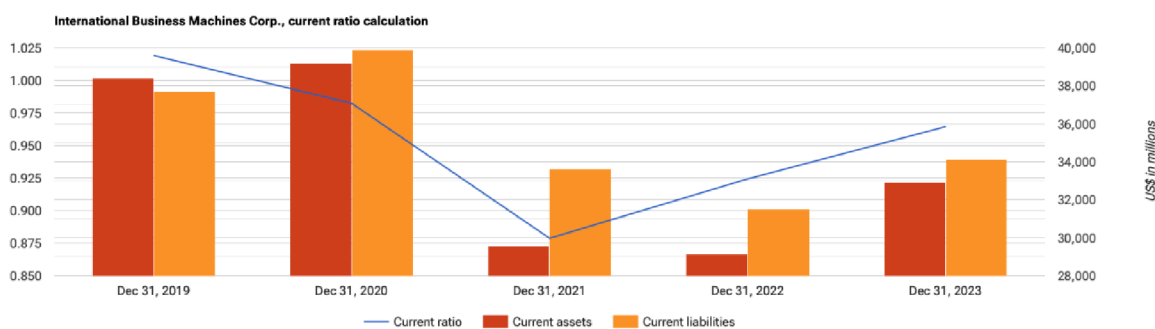
The current ratio examines the capacity of the company to pay off its obligation within period of one year. The current ratio of IBM has seen a decline since 2019. However, it has been improving since 2021.

The **Current ratio** for the year of 2023 is found = $32908 \div 34122 = 0.96$

The main concern of investors of low Current ratio may relate to low cash flow or lack of financial flexibility. In that case the overall strategy and distribution model of the company should be examined thoroughly.

However, in the event of big acquisition of RedHad for 34 billion USD such lower performance and potential risk must be considered by investors themselves.

Figure 14 Current ratio along with Current assets and liabilities, 2019 to 2023-IBM



Source: Own calculation (<https://www.stock-analysis-on.net>, 2024)

4.4.2.2 Quick ratio or Acid Test

Table 11 Quick Ratio or Acid Test, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Cash and cash equivalents	13 068	7 886	6 650	13 212	8 172
Restricted cash	21	103	307	463	141
Marketable securities	373	852	600	600	696
Notes and accounts receivable, trade, net of allowances	7 214	6 541	6 754	7 132	7 870
Short-term financing receivables, held for investment, net of allowances	6 102	6 851	7 221	10 892	14 192
Other accounts receivable, net of allowances	640	817	1 002	714	1 733
Total quick assets	27 418	23 050	22 534	33 013	32 804
Current liabilities	34 122	31 505	33 619	39 869	37 701
Quick ratio	0,80	0,73	0,67	0,83	0,87
Quick Ratio, Competitors					
Microsoft Corp.	1,54	1,57	1,90	2,33	2,35
Quick Ratio, Sector					
Software & Services	1,19	1,25	1,51	1,76	1,69
Quick Ratio, Industry					
Information Technology	1,17	1,15	1,38	1,60	1,55

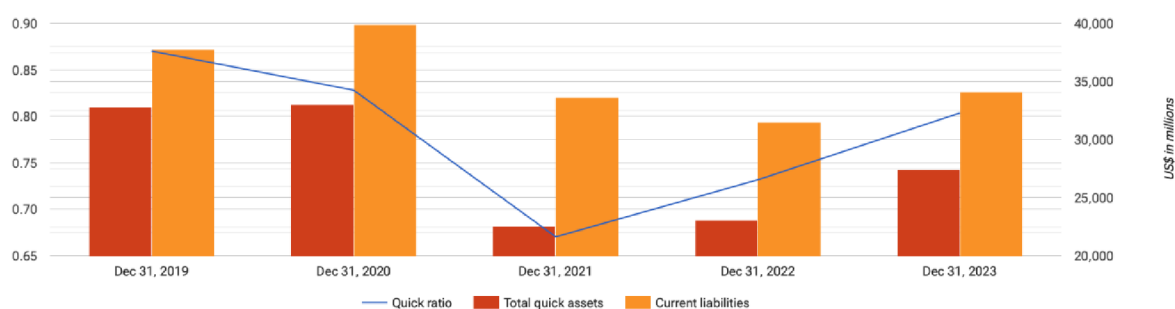
Source: (<https://www.stock-analysis-on.net/>, 2024)

Quick ratio also known as Acid test, is another liquidity metric which examines what part over or under 1 USD can be covered with its liquid assets. IBM's current ratio of 0.80 is insufficient per expected value of 1 or above, meaning it can only cover 80 cents of debt per each dollar. As well as it is underperformance in terms of overall industry tends to be an alarming sign for any investor involved.

The **Quick ratio** for the year 2023 may be identified by dividing its Total Quick Assets by Current liabilities and = $27,418 \div 34,122 = 0.80$

Nonetheless, all things considered the IBM has improved its position over the course of 2022 and 2023.

Figure 15 Quick Ratio/Acid Test, for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.2.3 Cash ratio or the Cash asset ratio

Table 12 Cash Ratio, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Cash and cash equivalents	13 068	7 886	6 650	13 212	8 172
Restricted cash	21	103	307	463	141
Marketable securities	373	852	600	600	696
Total cash assets	13 462	8 841	7 557	14 275	9 009
Current liabilities	34 122	31 505	33 619	39 869	37 701
Cash ratio	0,39	0,28	0,22	0,36	0,24
Competitor					
Microsoft Corp.	1,07	1,10	1,47	1,89	1,93
Cash Ratio, Sector					
Software & Services	0,75	0,81	1,10	1,33	1,23
Cash Ratio, Industry					
Information Technology	0,75	0,72	0,96	1,19	1,11

Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

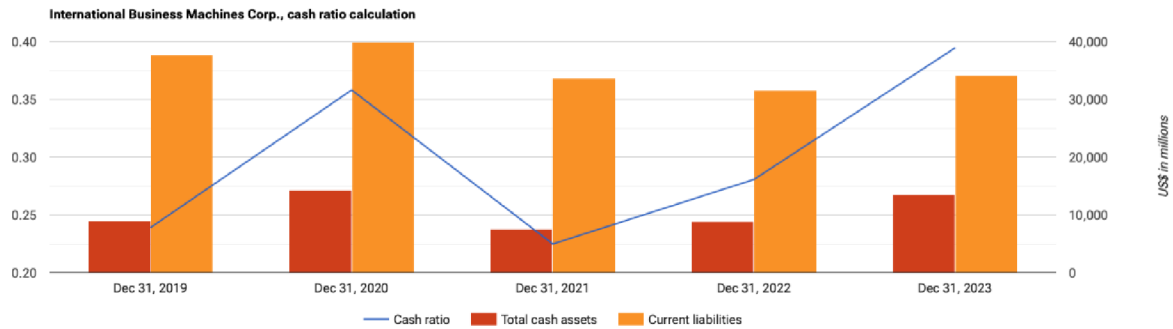
The cash ratio examines ability of the company to pay off its current liabilities with cash. In case of analysis, this metric shouldn't bear to much weight as IT sector is not popular for maintaining too much cash, especially with service and program-based portfolio of products.

IBM's recovery may be seen throughout statistics, with a bit atypical dive in the year 2021 and its correction in 2022 further improving in 2023.

As for its meaning, the 0.39 signify that the firm is able to meet 39% of its existing debt load with its current cash or cash equivalents.

The **Cash ratio** is found by dividing its Total Cash Assets by its total Current Liabilities = $13462 \div 34122 = 0.39$

Figure 16 Cash Ratio, for the years 2019 to 2023-IBM



Source: Own Calculations (<https://www.stock-analysis-on.net>, 2024)

4.4.3 Leverage ratios or Solvency ratios

After Profitability ratios, Leverage ratios are possibly the most critical measurement for the firm. Leverage ratios evaluate the grade of a firm's dependence on debt financing of the assets. They differ from other ratios, in that having a lower leverage ratio is typically a positive indicator.

The most commonly utilized Leverage ratios are Debt to Equity, Debt to Capital, Debt to Assets and Interest Coverage Ratio.

Table 13 Leverage Ratio, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Debt Ratios					
Debt to equity	2,51	2,32	2,74	2,99	3,02
Debt to capital	0,72	0,70	0,73	0,75	0,75
Debt to assets	0,42	0,40	0,39	0,39	0,41
Financial leverage	6,00	5,80	6,98	7,57	7,30
Coverage Ratios					
Interest coverage	6,42	1,97	5,20	4,62	8,58
Fixed charge coverage	4,32	1,52	3,13	2,62	4,41

Source: (<https://www.stock-analysis-on.net>, 2024)

4.4.3.1 Debt-to-equity

Debt to equity is a leverage ratio that considers how much debt is leveraged to finance its projects and activities. In addition, it looks at the relationship towards Shareholder's equity and how dependent a company is on each.

Table 14 Debt to Equity, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Short-term debt	6 426	4 760	6 787	7 183	8 797
Long-term debt, excluding current maturities	50 121	46 189	44 917	54 355	54 102
Total debt	56 547	50 949	51 704	61 538	62 899
Total IBM stockholders' equity	22 533	21 944	18 901	20 597	20 841
Solvency Ratio					
Debt to equity	2,51	2,32	2,74	2,99	3,02
Benchmarks					
Debt to Equity, Competitors					
Microsoft Corp.	0,31	0,39	0,50	0,62	0,77
Debt to Equity, Sector					
Software & Services	0,65	0,72	0,84	0,97	1,06
Debt to Equity, Industry					
Information Technology	0,63	0,67	0,77	0,88	0,88

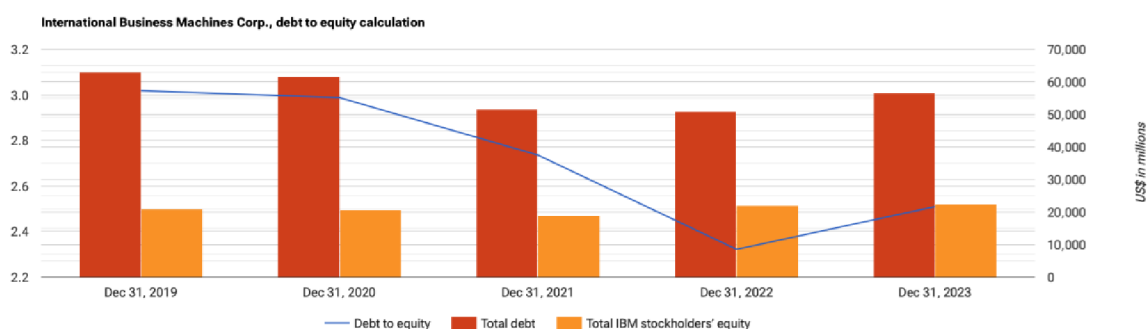
Source: (<https://www.stock-analysis-on.net>, 2024)

The **Debt-to-Equity** is calculated by using the following formula: $56547 \text{ (Total Debt)} \div 22533 \text{ (Total Stockholder's Equity)} = 2.51$

The ratio of 2.51 signals that IBM is considerably more dependent on debt financing, rather than equity. Usually, the ratio below 1.0 – 1.5 deemed desirable, however, if the company is in the process of financing big projects, for instance, IBM's watsonx, it may require considerable funds which are acquired from debt financing.

Nonetheless, for every dollar of equity IBM has 2.51 USD of debt. This is very concerning, and it may deter possible investors from investing in IBM.

Figure 17 Debt to equity, for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net>, 2024)

4.4.3.2 Debt-to-capital

Table 15 Debt-to-capital, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Short-term debt	6 426	4 760	6 787	7 183	8 797
Long-term debt, excluding current maturities	50 121	46 189	44 917	54 355	54 102
Total debt	56 547	50 949	51 704	61 538	62 899
Total IBM stockholders' equity	22 533	21 944	18 901	20 597	20 841
Total capital	79 080	72 893	70 605	82 135	83 740
Solvency Ratio					
Debt to capital	0,72	0,70	0,73	0,75	0,75
Benchmarks					
Debt to Capital, Competitors					
Microsoft Corp.	0,24	0,28	0,33	0,38	0,43
Debt to Capital, Sector					
Software & Services	0,39	0,42	0,46	0,49	0,51
Debt to Capital, Industry					
Information Technology	0,39	0,40	0,43	0,47	0,47

Source: (<https://www.stock-analysis-on.net>, 2024)

Debt-to-capital ratio is an additional tool within leverage ratios. Debt-to-capital ratio measures a company's debt and equity utilization when financing its own operations. If a firm has a decreased Debt-to-capital ratio, it means that the firm is more dependent on equity and has a smaller financial risk. In the face of unexpected economical and geopolitical events, having a lower level could indicate better resilience and even more stability for the firm. This would then give more credibility with possible creditors, who may possibly need to analyze the risk by reviewing the existing leverage level of the firm.

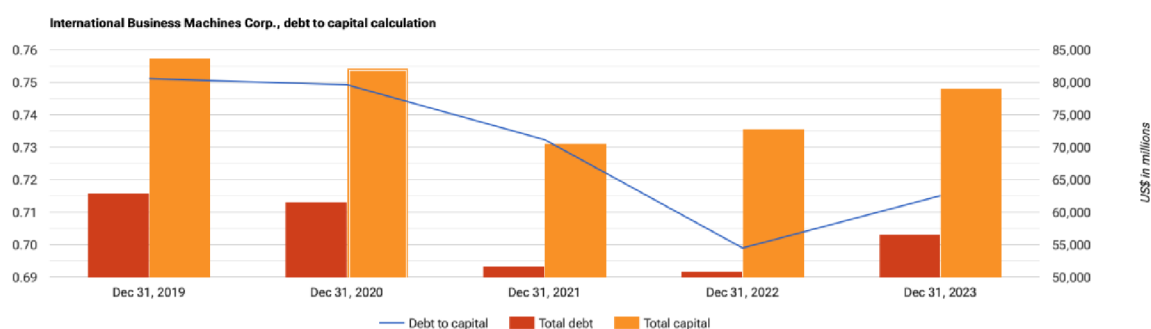
IBM's Debt to capital has seen a decrease over period of 2021 and 2022. Such decrease may be explained with increase of shareholders' equity and overall raising interest in IBM's product as, for instance watsonx, the continuing improvement of Watson, the first

AI of IBM in times of pandemics which has showed its effectiveness in assisting medical specialists.

Nonetheless, IBM's Debt-to-capital is at high positions, signifying potential risk for further investors. However, the mitigating factor in this equation is the possession of two supercomputers, which are in top 10 of the world best supercomputers.

$$\text{The Debt-to-Capital is equal to: } = 56547 \div 79080 = 0.72$$

Figure 18 Debt-to-capital, for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.3.3 Debt-to-assets

Table 16 Debt-to-Assets, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Short-term debt	6 426	4 760	6 787	7 183	8 797
Long-term debt, excluding current maturities	50 121	46 189	44 917	54 355	54 102
Total debt	56 547	50 949	51 704	61 538	62 899
Total assets	135 241	127 243	132 001	155 971	152 186
Solvency Ratio					
Debt to assets	0,42	0,40	0,39	0,39	0,41
Benchmarks					
Debt to Assets, Competitors					
Microsoft Corp.	0,16	0,18	0,21	0,24	0,27
Debt to Assets, Sector					
Software & Services	0,25	0,26	0,28	0,31	0,32
Debt to Assets, Industry					
Information Technology	0,26	0,26	0,28	0,30	0,31

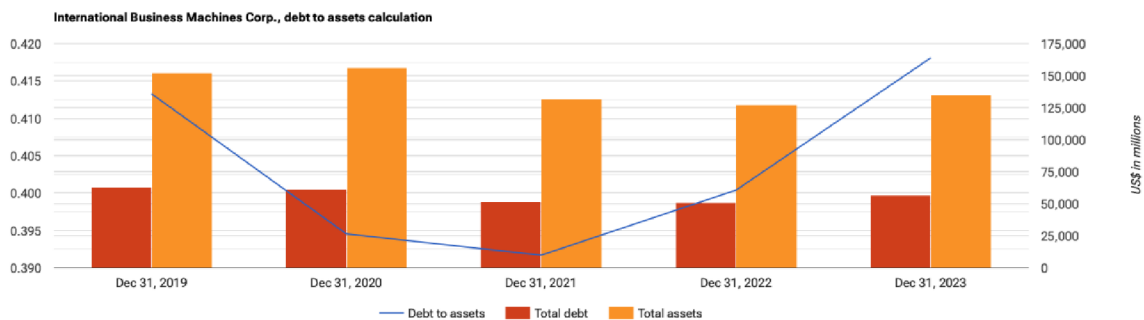
Source: (<https://www.stock-analysis-on.net/>, 2024)

Debt-to-assets represents how heavily company relies on debt financing of its Assets. There is no fixed preferable range of Debt-to assets ratio, however, anything below 50% is considered to be acceptable. In essence, the lower this ratio, the more company relies on equity financing.

IBM sustains conservative Debt-to-assets ratio. Considering the company has two supercomputers at its disposal, this metric might not fully reflect the situation, as it may be problematic to calculate the total value to assets.

Debt to assets is calculated by dividing total debt by total assets = $56547 \div 135241 = 0.42$

Figure 19 Debt-to-assets, for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.3.4 Interest Coverage Ratio

The Interest Coverage Ratio is very important for an investor to utilize for the purposes of analysing a firm's ability to meet its debt obligations.

Table 17 Interest Coverage Ratio, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Net income attributable to IBM	7 502	1 639	5 743	5 590	9 431
Add: Net income attributable to noncontrolling interest	16	20	19	22	25
Less: Income (loss) from discontinued operations, net of tax	(12)	(143)	1 031	89	(4)
Add: Income tax expense	1 176	(626)	125	(864)	731
Add: Interest expense	1 607	1 216	1 155	1 288	1 344
Earnings before interest and tax (EBIT)	10 313	2 392	6 011	5 947	11 535
Solvency Ratio					
Interest coverage	6,42	1,97	5,20	4,62	8,58
Benchmarks					
Interest Coverage, Competitors					
Microsoft Corp.	46,38	41,58	31,31	21,47	17,27
Interest Coverage, Sector					
Software & Services	17,58	18,31	17,65	14,44	13,06
Interest Coverage, Industry					
Information Technology	18,93	24,78	22,87	16,68	15,79

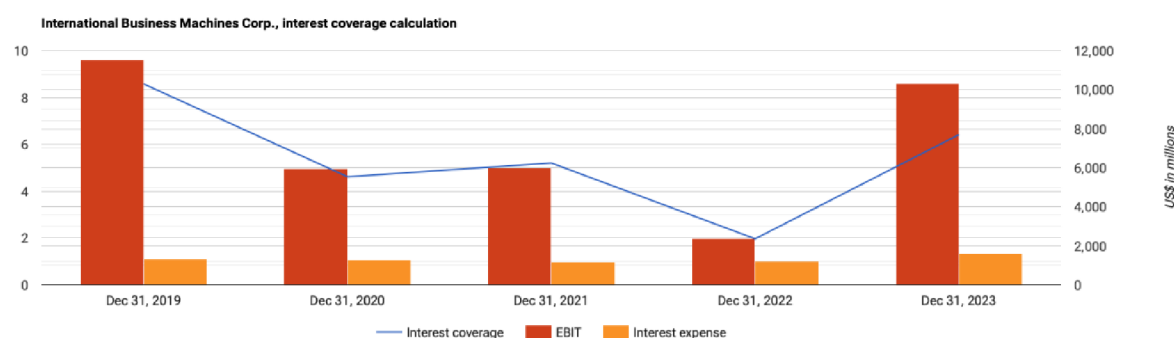
Source: (<https://www.stock-analysis-on.net/>, 2024)

Interest coverage is found by dividing Earnings before interest and taxes (EBIT) by Interest expense = $10313 \div 1607 = 6.42$

Generally, the ratio of 1.97 in 2022 is considered acceptable as it is above ratio of 1.5. However, in case of IBM this number is an alarming, considering history where this indicator reached 16.71. The main contributor to this chain is decreasing Net Income. With such swift downfall the 1.97 ICR may signalize a stabilized situation, yet, with less room for error in comparison to the past.

In 2023 the situation is drastically different. IBM has managed to overhaul its competitiveness and increase its revenue along with increased earnings. The ICR of 6.42 is a clear signal that company recovers and overcomes challenges.

Figure 20 Interest Coverage ratio (ICR), for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.4 Activity or Efficiency ratios

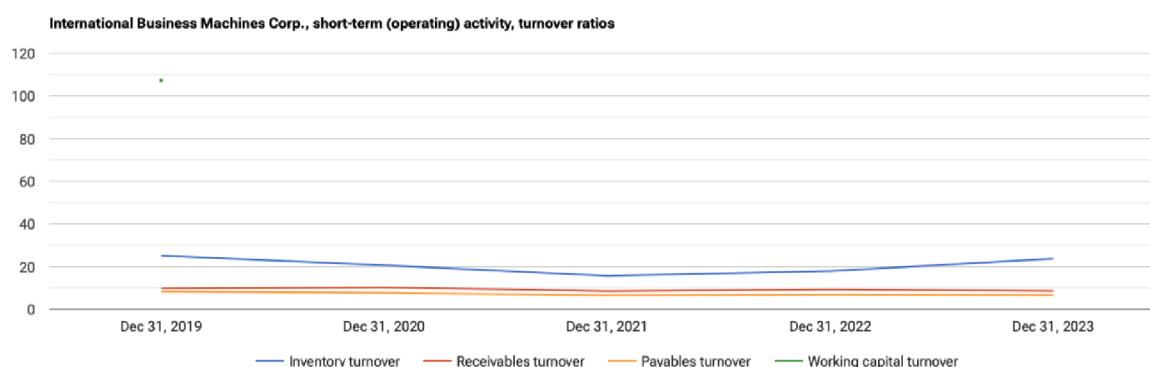
Table 18 Activity/Efficiency ratios, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Turnover Ratios					
Inventory turnover	23,74	17,94	15,68	20,69	25,11
Receivables turnover	8,57	9,25	8,49	10,32	9,80
Payables turnover	6,67	6,87	6,54	7,75	8,30
Working capital turnover	—	—	—	—	107,30
Average No. Days					
Average inventory processing period	15	20	23	18	15
Add: Average receivable collection period	43	39	43	35	37
Operating cycle	58	59	66	53	52
Less: Average payables payment period	55	53	56	47	44
Cash conversion cycle	3	6	10	6	8

Source: (<https://www.stock-analysis-on.net/>, 2024)

The efficiency or activity ratio is a set of metrics that evaluate capacity of the company to produce revenue. They are best utilized in one field for the adequate results.

Figure 21 Activity/Efficiency ratios, for the years 2019 to 2023-IBM



Source: (<https://www.stock-analysis-on.net/>, 2024)

4.4.4.1 Inventory Turnover

The Inventory Turnover rate shows how often company replenishes its inventory during business activities. It may indirectly showcase the interest in the product in the scope of past years, as well as management’s effectiveness in managing the inventory.

Table 19 Inventory turnover, for the years 2019 to 2023-IBM

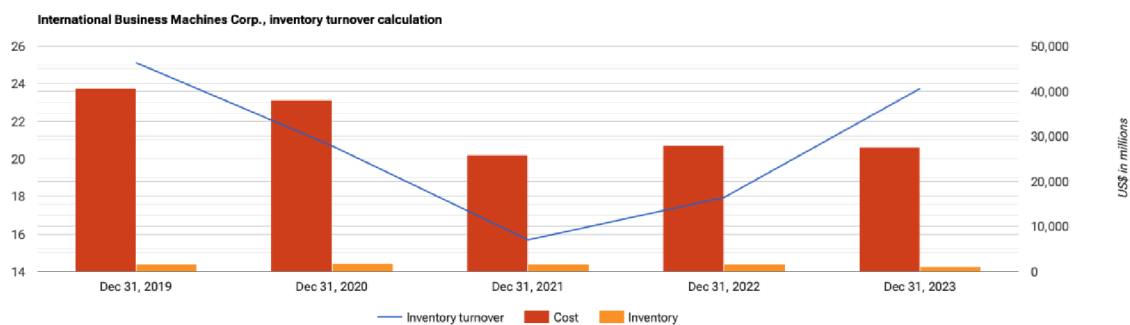
	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Cost	27 560	27 843	25 864	38 045	40 659
Inventory	1 161	1 552	1 649	1 839	1 619
Short-term Activity Ratio					
Inventory turnover	23,74	17,94	15,68	20,69	25,11
Benchmarks					
Inventory Turnover, Competitors					
Microsoft Corp.	26,35	16,74	19,81	24,32	20,80
Oracle Corp.	45,52	28,27	55,32	37,62	24,98
Synopsys Inc.	3,75	5,02	3,76	4,13	5,32
Inventory Turnover, Sector					
Software & Services	39,51	27,01	28,48	32,03	31,40
Inventory Turnover, Industry					
Information Technology	7,30	8,07	9,69	10,29	10,44

Source: (<https://www.stock-analysis-on.net/>, 2024)

The inventory turnover is found by dividing Cost by Inventory = $27,560 \div 1,161 = 23.74$

This number demonstrates that a firm can renew its stock roughly 24 times per year. This ratio typically indicates that management is taking action to reduce costs and additionally maintains good inventory control.

Figure 22 Inventory turnover with Cost and Inventory, for the years 2019 to 2023-IBM



Source: Own Calculation (<https://www.stock-analysis-on.net/>, 2024)

4.4.4.2 Receivables turnover

Table 20 Receivables turnover, for the years 2019 to 2023-IBM

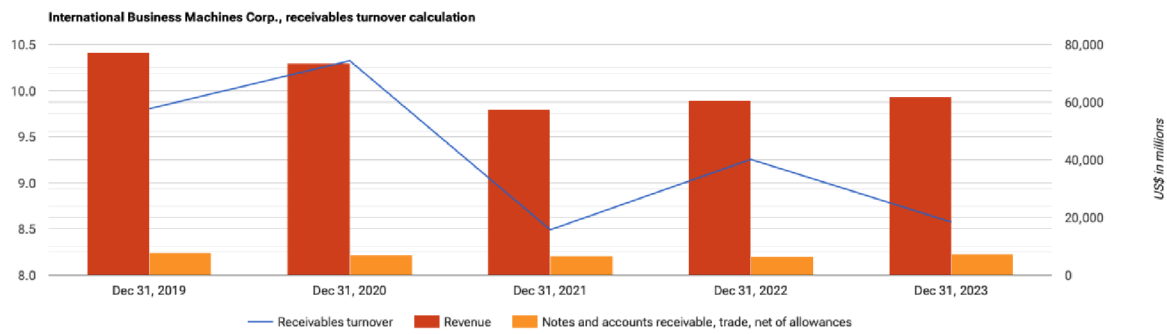
	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Revenue	61 860	60 530	57 350	73 620	77 147
Notes and accounts receivable, trade, net of allowances	7 214	6 541	6 754	7 132	7 870
Short-term Activity Ratio					
Receivables turnover	8,57	9,25	8,49	10,32	9,80
Benchmarks					
Receivables Turnover, Competitors					
Microsoft Corp.	4,35	4,48	4,42	4,47	4,26
Receivables Turnover, Sector					
Software & Services	5,14	5,20	5,22	5,59	5,58
Receivables Turnover, Industry					
Information Technology	7,40	7,43	7,56	8,01	7,60

Source: (<https://www.stock-analysis-on.net/>, 2024)

Receivables turnover is figure that demonstrates how frequently the firm collect accounts payable from its customers during a specific time. Higher value results in quicker cash collection, more effective asset use, and more safety for investors.

$$\begin{aligned} \text{Receivables turnover} &= \text{Revenue} \div \text{Notes and accounts receivable, trade, net of allowances} \\ &= 61860 \div 7214 = 8.57 \end{aligned}$$

Figure 23 Receivables turnover, for the years 2019 to 2023-IBM



Source: (<https://www.stock-analysis-on.net/>, 2024)

4.4.4.3 Payables turnover

Table 21 Payables Turnover, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Cost	27 560	27 843	25 864	38 045	40 659
Accounts payable	4 132	4 051	3 955	4 908	4 896
Short-term Activity Ratio					
Payables turnover	6,67	6,87	6,54	7,75	8,30
Benchmarks					
Payables Turnover, Competitors					
Microsoft Corp.	3,64	3,30	3,44	3,68	4,57
Payables Turnover, Sector					
Software & Services	6,20	5,52	5,70	6,57	7,59
Payables Turnover, Industry					
Information Technology	4,87	4,54	4,99	5,34	5,26

Source: (<https://www.stock-analysis-on.net/>, 2024)

Payables turnover is figure that demonstrates how many time the firm can pay its debt obligations. A higher measurement typically indicates a more rapid process of payment. However, if the process is too quick, company may miss out on opportunities on using available funds for its own improvement.

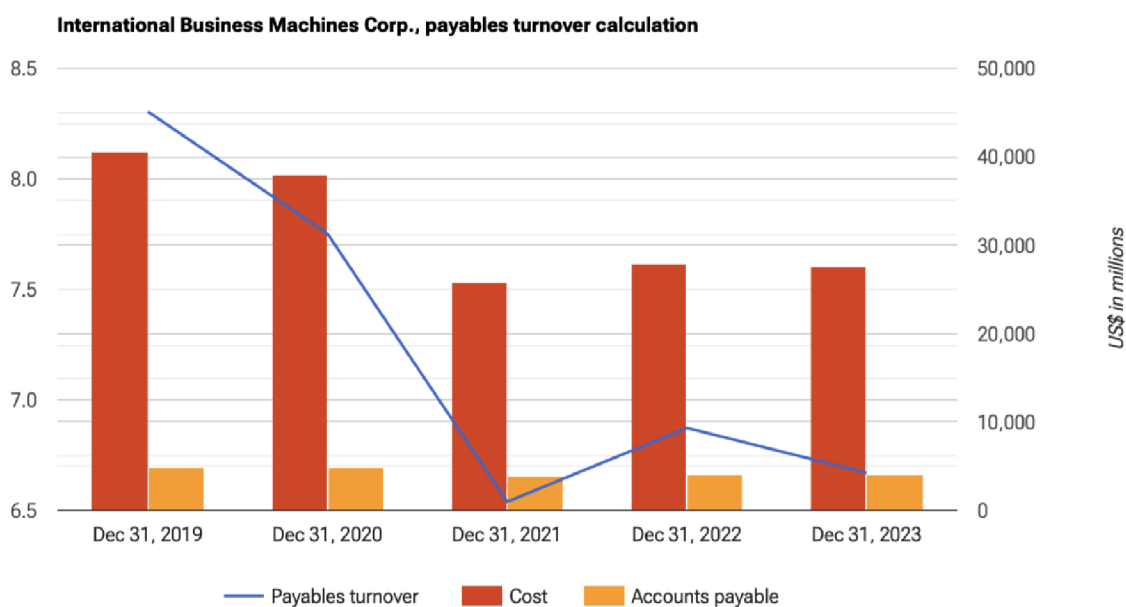
Payables turnover represent how fast enterprise fulfils its obligations with payments.

$$\text{Payables turnover} \text{ are found by following equation} = \text{Cost} \div \text{Accounts payable} = 27560 \div 4132 = 6.67$$

With this indicator IBM covers its payment obligations time. The company maintains its payables turnover which maintains its status of old and reliable customers with

their lenders and suppliers. The decline had continued over period of 2020 to 2021 with the lowest point, with curve improving.

Figure 24 Payables turnover, for the years 2019 to 2023-IBM



Source: Own calculations (<https://www.stock-analysis-on.net/>, 2024)

4.4.4.4 Total Asset Turnover

Table 22 Total Asset Turnover, for the years 2019 to 2023-IBM

	Dec 31, 2023	Dec 31, 2022	Dec 31, 2021	Dec 31, 2020	Dec 31, 2019
Selected Financial Data (US\$ in millions)					
Revenue	61 860	60 530	57 350	73 620	77 147
Total assets	135 241	127 243	132 001	155 971	152 186
Long-term Activity Ratio					
Total asset turnover	0,46	0,48	0,43	0,47	0,51
Benchmarks					
Total Asset Turnover, Competitors					
Microsoft Corp.	0,51	0,54	0,50	0,47	0,44
Total Asset Turnover, Sector					
Software & Services	0,51	0,52	0,48	0,48	0,50
Total Asset Turnover, Industry					
Information Technology	0,59	0,63	0,61	0,57	0,58

Source: (<https://www.stock-analysis-on.net/>, 2024)

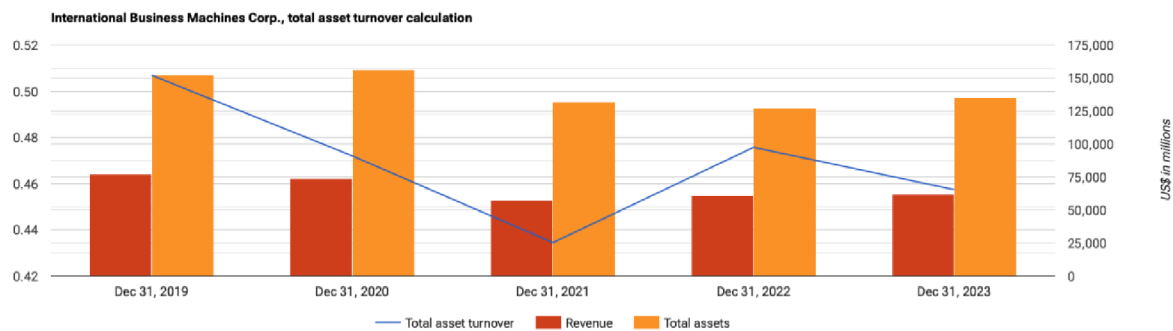
The Total Assets turnover is a metric which indicates company's ability to create revenue relatively to its assets. Consequently, this ratio shows revenue per dollar of its assets.

IBM had lost considerable 22% of its revenue from 2020 to 2021. As well as it has stabilized its Total Assets Turnover by reducing its assets. This tendency may find its proof in balance sheet.

Overall, there are signs of IBM’s management taking action on resolving the crisis which fits into company’s strategic plan of transitioning into a more service focused model.

Total asset turnover = Revenue ÷ Total assets = 601860 ÷ 135241 = 0.46. The result signalizes that IBM generates 46 cents per 1 dollar of its assets.

Figure 25 Total Asset Turnover, Revenue and Total assets, for the years 2019 to 2023-IBM



Source: (<https://www.stock-analysis-on.net>, 2024)

4.5 Technical Analysis

A Technical Analysis is comprised of an analysis of the historical data and then potentially predicting outcomes. The Simple Moving Average, Relative Strength Index and Bollinger Bands re among the most common. These indicators examine prices and volumes of trades to make a forecast on important signals like support and resistance levels and forthcoming price fluctuations. The core philosophy of Technical Analysis is that price can be traced based on past data and that the price of commodity is already included in price fluctuations as well as idea that historical patterns tend to repeat themselves.

4.5.1 Simple moving average (30 days)

The SMA or Simple Moving Average is a simple representation data which collects and displays data inputs to facilitate understanding of constantly moving price points. Consequently, price influxes may influence the curve more (30).

SMA's closest alternative is EMA or Exponential moving average, which has higher sensitivity is often used by traders who follow certain trend and short-term signals in order to generate revenue faster. In terms of this analysis, this metric will be disregarded for terms of thorough and long-term evaluation.

Figure 26 Simple moving average (SMA), for the years 2019 to 2023-IBM



Source: (<https://www.marketwatch.com/investing/stock/ibm/charts>, 2024)

The chart above shows the simple Moving average in terms of 50 days is shown for the years 2020 to 2023. The SMA's primary function is to smooth ever changing trend by presenting clearer price trend.

With rising interest in AI starting its trend in 2020 the price pattern can be observed to raise. As well as with representation of world's sensation ChatGPT in November 2022 a massive increase in stock price for any company which is related with AI.

Nonetheless, the SMA's fluctuations do not fully represent drastic shift in IBM's stock prices. However, it does represent the average stock prices increase starting in September of 2022.

4.5.2 Relative Strength Index

An additional tool of Technical Analysis is the Relative Strength Index or RSI. This instrument assists investors and traders in identifying which stocks have been oversold or overbought. This increases the scope of potential of investment and trade opportunities.

The Relative Strength Index is typically analyzed over time interval of fourteen days, with measurement outliers of between 0 and 100. In the event the number is below 30, it signifies an oversold environment and with a number above 70 it signifies an overbought environment. If the Relative Strength Index does not go above the previous peak, when the price reaches this peak, it typically indicates that the trend is going to change.

The Relative Strength Index is an instrument that follows the price of a particular security relative to its historical performance in an attempt to measure its internal strength. It gauges values between 100 and 0. The upper boundary usually indicates an overbought market. The primary advantage of this method is its capability to compare price.

The graph *Figure 27*, demonstrates IBM's Relative Strength Index over the previous 12 months. The mean value of the Relative Strength Index is set at a value of 69. In this case, it indicates the stock is most likely oversold or is currently overvalue. Based on this figure, a decline in the stock value is probable to occur.

However, the RSI is usually examined in much shorter period of 14 days. As well as part of fundamental analysis may remind the potential buyer about increased incentive to buy AI related stocks due to its increased popularity and widespread mention.

Figure 27 IBM, RSI, March 2023 – March 2024



Source: (<https://yhoo.it/48p4XcG>, 2024)

4.5.3 Bollinger Bands

Bollinger Bands is more advanced indicator utilizing SMA to identify price volatility and possible breaks in prices. It consists of 3 lines: lower, middle, and upper, where the middle line is usually Simple Moving Average or SMA (29). Essentially, other two lines create the

indicator of securities volatility expand or contracting. Usually, after long term of contraction the expansion follows and vice versa.

The lower and upper lines serve a purpose of representing lines of resistance and support. Any potential outbreak over upper lines signalizes that the asset is overbought and may have potential fall in price in the future. As well if the price is below the lower line, this indicates potential selling pressure below its normal trading price. Essential serving as a failsafe in making a decision in case of volatility and price reversal signal.

Normally, the metric is utilised in much shorter timeframe, usually consisting of 20 days.

The graph below represents the tendency of the contraction shifting to expansion for the period of last year. With the prices going up, the increase in volatility is in effect, causing two bands to move apart and therefore, becomes more riskier for investors, influencing their incentive to invest.

Figure 28 Bollinger Bands, for the period from March 2023 to 2024-IBM



Source: (<https://yhoo.it/48p4XcG>, 2024)

4.6 Correlation Analysis

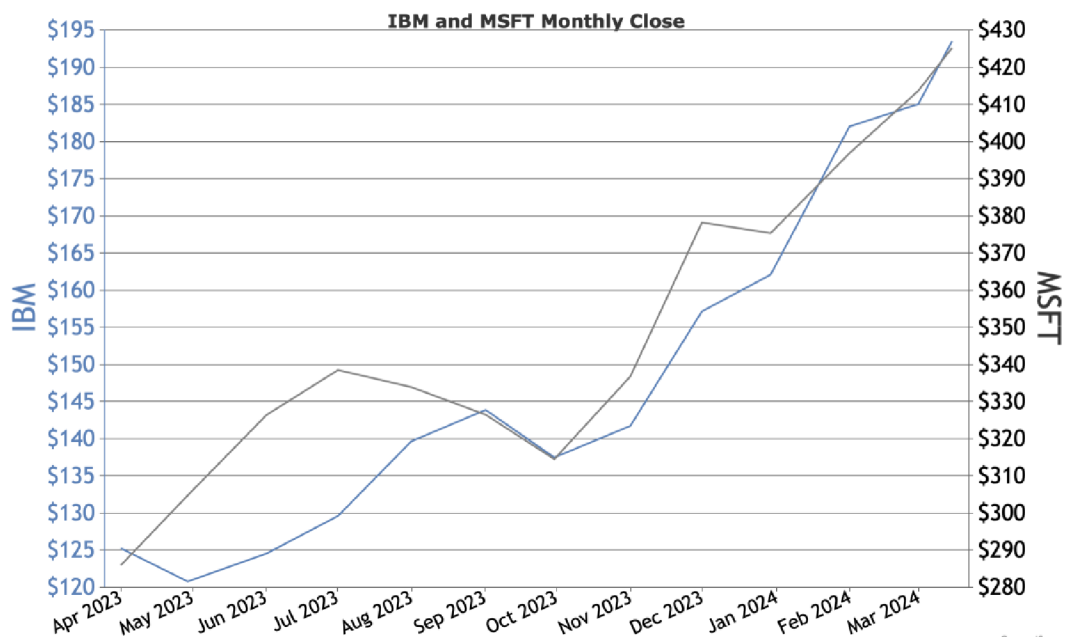
Correlation analysis is another metric in technical analysis. In economics, Correlation analysis examines how two variables are dependent on each other. It is a great instrument which diversifies investors' portfolio, potentially shielding them from risk or on the contrary, enhancing gains of companies connected.

Essentially, the outcome of correlation Analysis represents the strength of connectedness or on the contrary, of no relationship at all. Two coefficients of -1 and 1 represent weak and strong relatedness of the variable or their movement towards or backwards. Lastly, the variable of 0 represents no relationship between variables at all.

4.6.1 Stock price correlation between IBM and Microsoft

The stock correlation analysis compares the prices of IBM and Microsoft stocks over the period of last year, meaning March, 2023 to March, 2024

Figure 29 Stock Price Correlation, IBM and Microsoft, for the period of: March, 2023 - March, 2024



Source: (<https://www.buyupside.com>), 2024

As per calculations of Stock correlation, the correlation coefficient is 0.951, signifying there's a strong correlation between stock prices of IBM and Microsoft.

5 Conclusion

Hypotheses

H1: The financial situation at IBM has begun to improve since the COVID-19 period.

H2: There is a strong correlation between IBM and Microsoft stock prices

H3: IBM's total assets are decreasing.

Fundamental and Technical analyses are evidence that all three hypotheses proposed by this thesis have been evaluated and clearly demonstrated.

The first hypothesis can be demonstrated by the Fundamental analysis and financial statements evaluation. However, company, without a doubt, has taken a financial hit. It remains relatively highly leveraged with much lesser margin of safety and therefore less space to make a mistake, demanding more competence from management.

The second thesis is confirmed by correlation analysis. The same field that both companies share is cloud computing. IBM expands its focus providing full-fledged services which include mainframe computers, cloud systems and services, which are aimed to maintain these structures. As well as IBM has strong research facilities and operating research with a help of its supercomputers. While Microsoft focuses on operating systems, productivity software like Microsoft Office and presence in gaming in the face of XBOX. With recent claims in October, 2023 the official message on IBM's website confirmed that two companies are working together, additionally confirming the hypothesis.

The third hypothesis is confirmed as well in balance sheet section. IBM starts to reinvent itself by streamlining its focus into cloud-based computing as per the approach of IBM's CEO (9, p. 11) in its letter to investors and eliminating its degree of business spread. As well as cutting cost on significantly overfunded initiatives like pension plan and sell of products like Watson Health and therefore, reducing its total assets for more focused approach.

In summary, positive signs of management intervention and clear vision of the top figures helps IBM pave its way to revival once again. Alongside with its ability to establish collaborative relationships with companies, who might look at the first glance like competitors is a major boost to potential investments. And closing this assumption with almost of century of market presence, these factors may promise bright future for IBM. As long as it doesn't consider getting back to its tight corporate organization which brings

unwanted bureaucracy and getting spread out over too many fields. Which in its case, might be apprehended by more mobile and younger competitors in cloud computing and AI developing companies.

If IBM's management will hold up to its pace to resolve issues in the same manner as well as utilizing its immeasurable experience and science-based facilities the new generation may see the "Big Blue" back again on the rise.

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