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Equity Valuation: Hewlett Packard Enterprise

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Master in Finance

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ISCTE-IUL

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BUSINESS
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Department of Finance

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Abstract

This study aimed to determine the fair value of Hewlett Packard Enterprise (HPE) stock on October 31, 2022. By comparing the actual market value with the predicted fair value, the goal was to identify market undervaluation or overvaluation.

Investors can measure if the market price aligns with intrinsic value by comparing estimated fair value to actual market value. A higher projected fair value could suggest undervaluation, offering investment opportunities. Conversely, a lower projected fair value might signal overvaluation, urging caution in investment choices.

This research sheds light on HPE's market perception, aiding informed investment decisions. It underscores the need to scrutinize the company's underlying value and comprehend market valuation to uncover investment potential or prudence during overvaluation.

HPE is a technology company focused on intelligent solutions, spanning Compute, HPC & AI, Storage, Intelligent Edge, FS, Corporate Investments and Other segments.

This thesis examines HPE's valuation using DCF (FCFF-based) and Relative Valuation methods. It involves meticulous evaluation of company projections, historical performance, macroeconomic climate, and industry trends. These methodologies and assumptions aim to provide a comprehensive and precise evaluation of HPE's intrinsic value.

The two methods used yield different conclusions, yet the DCF analysis indicates that, on October 31st, 2022, HPE's share price was undervalued by roughly 34,24%.

Keywords: Hewlett Packard Enterprise; HPE; Equity Valuation; Discounted Cash Flow; Relative Valuation

Classificação JEL: G30; G32

Resumo

Este estudo tem como objetivo calcular o justo valor das ações da Hewlett Packard Enterprise (HPE) em 31 de outubro de 2022. Ao comparar o valor de mercado real com o justo valor estimado, procuramos determinar se a empresa estava, à data, subavaliada ou sobreavaliada pelo mercado.

Os investidores podem avaliar se o preço de mercado reflete o valor das ações ao comparar o justo valor estimado com o valor de mercado real. Se o valor projetado exceder o valor de mercado, indica subavaliação e, portanto, oportunidade de investimento. Se for inferior, pode indicar sobreavaliação, exigindo cautela.

A tese procura dotar o leitor de uma compreensão sobre a posição de mercado da HPE e auxilia os investidores a tomarem decisões informadas. Enfatiza a importância de examinar o valor subjacente e compreender a avaliação de mercado para identificar oportunidades ou ser cauteloso em momentos de sobrevalorização.

A HPE é uma empresa que opera no setor de tecnologia e foca a sua atividade em soluções inteligentes para capturar, analisar e agir com dados. Opera em seis segmentos: Compute, HPC & AI, Storage, Intelligent Edge, FS e Corporate Investments and Other.

Este estudo avalia a HPE por meio de DCF (FCFF) e avaliação por múltiplos. Considera projeções, desempenho histórico, cenário macroeconómico e tendências do setor.

Os dois métodos utilizados produzem resultados divergentes. No entanto, a análise de DCF indica que, em 31 de outubro de 2022, o preço das ações da HPE estava subvalorizado em aproximadamente 34,24%.

Palavras-Chave: Hewlett Packard Enterprise; HPE; Avaliação; Fluxos de Caixa Descontados; Múltiplos

Classificação JEL: G30, G32

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Glossary

ACP - Average Collection Period
AHP - Average Holding Period
APP - Average Payment Period
CAGR – Constant Annual Growth Rate
CAPEX – Capital Expenditures
CAPM – Capital Asset Pricing Model
CCC - Cash Conversion Cycle
CF – Cash Flow
CMVM – Comissão do Mercado de Valores Mobiliários
CRP – Country Risk Premium
D – Debt
D/E – Debt-to-Equity ratio
D&A – Depreciation and Amortization
DCF – Discounted Cash Flow
E – Equity
EBIT – Earnings Before Interest and Taxes
EBITDA – Earnings Before Interest, Taxes, Depreciation and Amortization
ECB – European Central Bank
EQV – Equity Value
ESG – Environmental, Social, and Governance
EV – Enterprise Value
EVA – Economic Value Added
FCFE – Free Cash Flow to Equity
FCFF – Free Cash Flow to the Firm
FY – Fiscal Year
g – Growth Rate
GDP – Gross Domestic Product
HICP – Harmonized Index of Consumer Prices
IMF – International Monetary Fund
INE – Instituto Nacional de Estatística

r_d – Cost of Debt
r_e – Cost of Equity
n – Period
NOA – Non-operating assets
pp – percentage points
P/E - Price to Earnings ratio
PV – Present Value
r – Discount Rate
rf – Risk-free rate
ROE – Return on Equity
ROIC – Return on Invested Capital
t – Corporate Tax Rate
TV – Terminal Value
VAT – Value Added Tax
WACC – Weighted Average Cost of Capital
WC – Working Capital

Introduction

Assessing a company's worth and the environment it operates in is crucial for aiding managers and investors in pinpointing what drives its economic value, either positively or negatively. Equity valuation serves various purposes, including M&A deals, public offerings, strategic choices, and long-term planning.

In this report, the primary objective is to determine the fair value of HPE shares as of October 31, 2022. This analysis will involve comparing the estimated value with the actual closing share price. Based on this comparison, we will draw conclusions about whether the shares were trading at their fair market value or not.

HPE is a leading global technology company renowned for its innovative solutions in the fields of edge-to-cloud computing, hybrid cloud, and data-driven insights. With a rich history spanning nearly eight decades, HPE boasts a comprehensive portfolio of cutting-edge technologies and services that empower organizations to accelerate their digital transformations. Their commitment to openness, security, and scalability positions them as a trusted partner for enterprises navigating the complexities of modern IT ecosystems. HPE's forward-looking approach, combined with a seasoned leadership team, underscores their dedication to driving business outcomes in an era defined by rapid technological advancements.

The report comprises six chapters. Firstly, we will discuss various valuation methods in the Literature Review. Then, we will analyze the External Environment globally and delve deeper into HPE's activities. Chapter four will focus on Value Drivers, breaking down revenue and costs. The fifth chapter presents a financial analysis, and the sixth delves into an in-depth valuation of HPE using the Discounted Cash Flow (FCFF) and Relative Valuation methods.

In the concluding chapter, we will summarize the key findings and offer a final recommendation to investors. This recommendation will guide investors on whether it is advisable to sell, hold, or buy shares of the company.

1 Theoretical Overview

In the world of corporate valuation and strategic analysis, understanding the theory behind it all is like having a reliable GPS in a constantly changing landscape. This chapter acts as our guide through the theoretical side of our study. Here, we dive into the basic theories, models, and concepts that form the foundation of the methods and strategies we will use to evaluate HPE. By delving into these core theories, we will have the necessary tools and viewpoints to break down and understand the various aspects of HPE's corporate valuation. Looking through this modern theoretical lens, our goal is to sharpen our analytical skills and gain a better understanding of the complex world of finance, strategy, and operations that shapes HPE in today's ever-evolving tech industry.

1.1) Introduction to Valuation

Valuation is critical in many sectors of finance, responding to the specific needs and goals of each domain. In corporate finance, valuation serves to create the link between financial decisions, corporate strategy, and enterprise value, to maximize the company's overall worth. According to Damodaran (2002), valuation is critical in the context of acquisitions because both bidding firms and target organizations seek to ascertain the proper value for the target firm before accepting or rejecting an offer.

Equity valuation is crucial to investors as it provides a method to determine the intrinsic worth of a company's stock, aiding in informed investment decisions and assessing whether a stock is overvalued or undervalued in the market.

There are several viewpoints on the efficiency of markets in reflecting the underlying value of a security. As Depamphilis (2019) stated, some claim that a publicly traded share price already includes all essential information regarding earnings and risk, while others consider that share prices can diverge from their intrinsic worth in the near term.

According to Damodaran (2002), in general, valuation approaches can be divided into three categories. The DCF valuation evaluates an asset's value based on the present value of predicted future cash flows. Relative valuation calculates the worth of an asset by comparing it to the market pricing of similar assets. Contingent Claim Valuation evaluates assets with option-like features using option pricing techniques.

Overall, valuation is an important tool in finance because it allows decision-makers to assess the value of assets, firms, or investments using various approaches customized to certain circumstances and objectives.

1.2) Discounted Cash Flow Approach

The DCF method is commonly employed in valuation since it focuses on a company's cash flow changes. The DCF approach seeks to establish a company's worth by forecasting its future free cash flows and discounting them at a suitable discount rate that corresponds to the risk associated with those cash flows (Wilson, 1997). The following is the general formula for calculating the value using DCF:

$$DCF = \sum_{t=1}^{n} \left(\frac{CF_t}{(1+r)^t}\right) \quad (1)$$

where:

- t represents the life of the asset or the projection period
- n represents the period of time
- CF_t refers to the cash flow at period t
- r is the discount rate that captures the riskiness of the cash flows

The DCF approach estimates the company's worth by discounting future cash flows to their present value using an appropriate discount factor. The DCF methodology has two main versions based on the cash flows being discounted: free cash flows to the firm (FCFF) or free cash flows to equity (FCFE). When valuing the company, these variables take into account various factors such as debt and equity components.

1.2.1) Free Cash Flow to the Firm (FCFF)

The valuation of a company's operations entails a thorough examination of its financial performance and future cash flow possibilities. The DCF methodology, notably the FCFF model, is one extensively used method. The cash flow available to all claim holders, including equity and debt holders, is represented by FCFF.

According to Koller (2020, p. 209), "FCFF can be thought of as the after-tax cash flow that would be generated if the company held only core operating assets and financed the business entirely with equity".

$$FCFF = EBIT \times (1 - t) + D\&A - CAPEX - \triangle WC \quad (2)$$

To calculate FCFF, we begin with EBIT, which measures the profitability created by the company's operating activities. EBIT is calculated by deducting the cost of goods sold and operating expenses from the revenue. The after-tax earnings are then calculated using the tax rate (t).

$$\text{EBIT} = \text{Revenues} - \text{Cost of Goods Sold} - \text{Operating Expenses} \quad (3)$$

To calculate FCFF, we must consider more variables other than EBIT by adding back non-cash expenses like depreciation and amortization (D&A) and removing capital expenditures (CAPEX) needed to sustain and expand the company's asset base. CAPEX represents investments made to sustain the

company's activities, whereas D&A represents the systematic distribution of the cost of fixed or intangible assets throughout their useful lives.

Working capital (WC), which represents the company's ability to meet short-term obligations, is another essential aspect in determining FCFF. Current liabilities are subtracted from current assets to calculate WC. Cash and cash equivalents, accounts receivable, and inventory are examples of current assets, whereas current liabilities include accounts payable, short-term debt, and other current commitments.

$$\text{WC} = \text{Current Assets} - \text{Current Liabilities} \tag{4}$$

where:

- Current Assets = Cash and Cash Equivalents + Accounts Receivable + Inventory;
- Current Liabilities = Accounts Payable + Short-Term Debt + Other Current Liabilities.

Changes in working capital (ΔWC) are used to account for fluctuations in the company's short-term financial health. Increases indicate a rise in working capital, which may require additional cash expenditures, while negative changes indicate the release of cash, which could positively impact FCFF.

Finally, FCFF is discounted at the company's weighted average cost of capital (WACC), which is the cost of equity and debt financing combined. The discounting process considers the temporal worth of money as well as the risk associated with the cash flows. We arrive at the current value of the company's future cash flows by discounting predicted FCFF at the appropriate WACC, which serves as an estimate of its intrinsic value.

Overall, the FCFF model provides a thorough and rigorous approach to evaluating a company's operations, accounting for profitability, tax concerns, capital investments, working capital, and cost of capital. This strategy enables investors and analysts to determine a company's fair value and make informed investment decisions.

1.2.2) Weighted Average Cost of Capital (WACC)

It is critical to guarantee consistency with the discount rate used when discounting cash flows in valuation. Because free cash flows are available to all investors in enterprise valuation, the discount factor must reflect the risk that each investment faces. The WACC combines the required rates of return for both debt and equity holders to achieve this, (Koller, 2020).

The WACC can be defined as follows:

$$\text{WACC} = r_e \times \left(\frac{E}{(E+D)}\right) + r_d \times \left(\frac{D}{E+D}\right) \times (1-t) \tag{5}$$

where:

- r_e is the return demanded by shareholders (cost of equity)
- r_d is the cost of debt

- E is the market value of equity
- D is the market value of debt
- t is the marginal tax rate

The cost of equity rises as a company expands its usage of debt financing to maintain a constant WACC, according to Modigliani's (1958) proposition II without taxes. This means that increased leverage results in a greater cost of equity. Modigliani's (1958) proposal I, on the other hand, proposes the concept of tax shelters. Tax shields are savings from interest expenses that boost the worth of a corporation in the context of WACC.

While WACC-based models are simple to employ, they do have significant drawbacks. They work well with simple and static capital structures. If a company's debt-to-equity ratio increases dramatically, the present cost of capital may underestimate the predicted tax benefits. Extensive modifications are required in more complex cases with dynamic capital structures to account for tax shelters, issue costs, subsidies, hedges, exotic debt securities, and so on. In such instances, the adjusted present value (APV) model is frequently a better option (Luehrman, 1997).

The Market Value of Debt (D) covers the company's interest-bearing liabilities as well as other non-operating liabilities. Commercial paper, notes payable, and the current portion of long-term debt are examples of short-term debt, whereas long-term debt includes fixed debt, floating debt, and convertible debt with maturities greater than one year (Koller, 2020). Working capital elements, such as accounts payable and other credit accounts, should be omitted from the Market Value of Debt.

The Market Value of Equity (E) is normally calculated using the firm's market capitalization at the time of valuation. The market capitalization is determined by multiplying the number of outstanding shares by the share price. It shows the whole market value of the company's equity.

The DCF valuation method estimates a company's intrinsic value based on future free cash flows by using the appropriate WACC and considering the market values of debt and equity.

1.2.3) Capital Asset Pricing Model (CAPM) – Cost of Equity

The cost of equity is an important component of the weighted average cost of capital and measures the required rate of return on equity investments in a company. To determine the cost of equity, the CAPM is often utilized (Damodaran 2002).

For many years, the CAPM has been a popular risk and return model. It is based on the premise that the risk-free rate of return and the sensitivity of the equities to market movements influence an investor's expected return on an equity investment. Sharpe introduced the CAPM in 1964, and it was subsequently developed by Lintner (1965) and Mossin (1966). It is a typical approach for pricing risky assets.

The market portfolio in the CAPM is a portfolio that includes all traded assets. To build their portfolio, each investor holds a combination of the market portfolio and the risk-free asset. The CAPM model can be stated mathematically as follows:

$$E(r_i) = r_f + \beta_i \times \left(E(r_m) - r_f\right) \quad (6)$$

where:

- $E(r_i)$ is the expected return of security i,
- β_i is the sensitivity of security i to the market portfolio,
- $E(r_m)$ is the expected return of the market portfolio,
- r_f represents the risk-free rate.

Analysts can use the CAPM to predict the expected return on a certain security by taking into account its beta (systematic risk) and the risk-free rate of return. This enables the calculation of the cost of equity, which is an important component in computing the weighted average cost of capital (WACC) and valuing a company's operations.

Risk-free asset

The risk-free asset is critical in risk-return models in finance. It is used to assess the risk-free rate and acts as a baseline for measuring the projected returns of other investments.

A risk-free asset has two key characteristics. First, there must be no default risk linked with its cash flows. This means that the investor can be confident that the promised profits will be received with no risk of loss due to default. Second, there should be no reinvestment risk, which means that the investor should be able to reinvest the risk-free asset's cash flows at the same risk-free rate, as mentioned in Damodaran (2008).

The risk-free rate (r_f) is the expected return on a risk-free asset. In financial models, it is commonly used as a surrogate for the risk-free rate. The risk-free rate is defined as the rate of return that an investor can receive with confidence across the time horizon under consideration, as stated in Damodaran (2002).

In reality, the risk-free rate is frequently calculated using treasury bills or bonds issued by the government. Because they are guaranteed by the government, these securities are believed to be default-free. In most established economies, the government is regarded as a dependable borrower, particularly in local currency.

It is critical to align the timing of the cash flows being discounted with the risk-free asset's associated zero-coupon rate for determining the appropriate risk-free rate. This guarantees that the risk-free rate reflects the projected cash flow's timing.

Country risk may be a consideration in some circumstances, particularly in riskier countries. In certain cases, an additional premium to the risk-free rate may be added to account for the higher risk

associated with investing in those countries. This additional premium can be calculated using default spreads on country bonds issued by each country.

Overall, the risk-free asset and its associated risk-free rate serve as a baseline for assessing the projected returns of other investments, allowing investors to weigh the risks and potential benefits of their investment choices.

Equity Risk Premium

The equity risk premium is an important term in finance because it indicates the additional rate of return that investors expect to earn by investing in stocks (equity) above and beyond the risk-free rate, (Damodaran, 2002). It rewards investors for the higher level of risk involved with stock market investing.

The risk premium is the premium that investors demand for bearing the risk of investing in the market portfolio, which includes all risky assets, rather than investing in a risk-free asset. Higher returns are expected from riskier investments to compensate investors for the greater risk they are taking.

The risk-free rate is frequently added to the equity risk premium when assessing the expected return on an investment.

The equity risk premium can be estimated using a variety of methodologies, and different ways may be utilized depending on the market and available data. One popular method, suggested by Damodaran (2012), is to use historical data to compute the average risk premium gained by stocks over default-free assets over time. In markets with large and diverse stock markets and a long history of returns on both stocks and government securities, such as the United States and Europe, this historical risk premium is regarded as a credible approximation.

It should be noted that determining the equity risk premium is fraught with ambiguity, and there is no commonly accepted approach. Depending on their analysis and judgment, different researchers and practitioners may use alternative methodologies or adjust the estimations.

Beta of an investment

An investment's beta is a measure of its systematic risk or market risk. It denotes how sensitive the investment's returns are to overall market swings. A greater beta indicates that the price of the investment is projected to be more volatile and responsive to market changes, whilst a lower beta indicates less susceptibility to market moves.

The formula for calculating beta is:

$$\beta_i = \frac{Cov(r_i, r_m)}{Var(r_m)} \tag{7}$$

where:

- β_i is the beta of the investment,

- $Cov(r_i; r_m)$ is the covariance between the returns of the investment and the market, and
- $Var(r_m)$ is the variance of the market returns.

Damodaran (2002) proposes three ways to estimate beta:

1. The historical data approach entails studying the investment's and the general market's previous prices and calculating the covariance and variance to derive the beta.
2. The fundamental approach estimates the beta by using the fundamental properties of the investment, such as its industry, business model, and financial indicators.
3. Accounting data approach: This approach estimates the beta using accounting data, such as the company's financial statements.

The most typical approach for measuring beta is linear regression analysis, which compares the investment's historical returns to the returns of a market index. It is crucial to remember, however, that measuring beta from historical data has limitations, as the time period, market index, and modifications used can all alter the results. Thus, a more broad and generic strategy is frequently required.

Estimating beta is a key step in estimating an investment's necessary rate of return and analyzing its risk relative to the market. It is important to note, however, that beta estimate entails some subjectivity and uncertainty, and different procedures may produce different findings.

1.2.4) Cost of Debt

The yield to maturity of the company's long-term, option-free bonds can be used to assess the cost of debt for investment-grade corporations. This shows the market interest rate required by investors to lend to the company. The cost of debt can be calculated by multiplying the estimated yield to maturity by one and subtracting the marginal tax rate, yielding the after-tax cost of debt, (Koller, 2020).

The formula to calculate the after-tax cost of debt is as follows:

$$After\ tax\ cost\ of\ debt\ =\ Pre\ tax\ cost\ of\ debt \times (1 - Tax\ Rate) \quad (8)$$

The yield to maturity on the company's long-term bonds is often used to assess the pre-tax cost of debt. However, if the bonds are not traded on a regular basis, an alternate way is to estimate the cost of debt based on the company's credit rating and associated default spreads. If the company does not have a credit rating, a synthetic rating based on financial ratios can be estimated.

Damodaran (2002) suggests utilizing the interest coverage ratio as a determinant of the firm's rating to estimate the pre-tax cost of debt using a synthetic rating. The interest coverage ratio assesses a company's capacity to satisfy interest payments from earnings. The firm can be assigned an equivalent rating based on the interest coverage ratio, and the pre-tax cost of debt can be calculated as the sum of the default spread associated with that rating and the risk-free rate.

It is vital to remember that assessing the cost of debt requires some judgment and uncertainty, especially when utilizing synthetic ratings. The estimation's accuracy is determined by the suitability of the chosen approach as well as the availability and dependability of the required data.

1.3) Free Cash Flow to Equity (FCFE)

The Free Cash Flow to Equity (FCFE) indicates the cash flows available to the firm's equity shareholders after all obligations, such as debt payments, CAPEX, WC adjustments, and other non-equity claims such as preferred dividends, have been met. It is a metric of cash flow that can be directly attributed to equity investors.

The formula to calculate FCFE is as follows:

FCFE = Net Income + D&A - Changes in WC- Changes in Capex Net of Disposals - Debt Variations (9)

The major distinction between FCFF and FCFE is how cash flows connected with interest payments, principal repayments, and other non-equity claims are treated. FCFF represents all claim holders' cash flows, including both equity and debt holders, whereas FCFE focuses solely on equity shareholders' cash flows. FCFE considers the unique cash flows and liabilities associated with equity investments and provides insights into cash flows attributable to equity holders' investments.

To assess the present value of these cash flows from the standpoint of equity investors, FCFE is commonly discounted at the cost of equity. This enables the company's stock to be valued based on the predicted cash flows available to its owners.

1.4) Equity Value and Enterprise Value

The enterprise value is a valuation term that indicates a company's overall value, considering all claim holders, including both stock and debt holders. It is determined by discounting the predicted future cash flows to the firm at the WACC and adding the terminal value at the end of the forecasted period.

The formula to calculate the enterprise value is as follows:

$$Enterprise\ Value = \sum_{t=1}^{n} \left(\frac{FCFF_t}{(1+wacc)^t} \right) + \frac{TV}{(1+wacc)^n} \quad (10)$$

The components of the enterprise value formula are as follows:

- $FCFF_t$: The free cash flow to the firm in period t.
- wacc: The weighted average cost of capital, which is the average rate of return required by all the company's claim holders (both equity and debt holders).
- TV: The terminal value at the end of the forecasted period.

- n: The number of forecasted periods.

The whole value of the company, including both equity and debt, is represented as the enterprise value.

The formula to calculate equity value is as follows:

Equity Value = Enterprise Value + Non-Operating Assets - Non-Equity Claims *(11)*

Non-operating assets are added to the equity value, while non-equity claims are subtracted.

Non-operating assets include cash, interests in other companies, and other non-core assets. Financial debt, operating leases, provisions, convertible bonds, minority interests, and other liabilities are examples of non-equity claims.

The equity value is computed for the free cash flow to equity (FCFE) by discounting the expected future cash flows to equity at the appropriate rate of return, which is the cost of equity.

$$\text{Equity Value} = \sum_{t=1}^{n} \frac{FCFE_t}{(1+r_e)^t} + \frac{TV_n}{(1+r_e)^n} \quad (12)$$

The components of the equity value formula utilizing FCFE are similar to the components of the enterprise value formula, with FCFE representing free cash flow to equity, r_e representing the needed rate of return on equity, and TV indicating terminal value.

The value per share is then obtained by dividing the equity value by the number of shares outstanding. Adjustments may be made to account for different types of options, stocks with varying voting rights, or other factors influencing share prices.

Terminal Value (Continuing Value)

The terminal value is an estimate of a company's activities beyond the projected period, assuming a constant cash flow growth rate. It is employed when forecasting yearly values over a lengthy period of time becomes impracticable. The terminal value is derived using the perpetuity concept.

The formula to calculate the terminal value is as follows:

$$Terminal\ Value = \frac{CF_{n+1}}{r-g} \quad (13)$$

The components of the terminal value formula are as follows:

- CF_{n+1}: The cash flow at the end of the forecasted period, which is the beginning of the perpetuity.
- r: The discount rate used to discount cash flows, typically the company's weighted average cost of capital (WACC).
- g: The stable growth rate, which represents the expected annual growth rate of the cash flows in perpetuity.

The terminal value calculation assumes that cash flow will continue to rise at a constant nominal rate (g) eternally at the end of the anticipated time, (Kaplan and Ruback, 1995). The perpetual cash

flow formula is used to compute the present value of these perpetual cash flows, which represents the terminal value.

It should be noted that establishing an adequate and fair growth rate (g) is critical because it has a substantial impact on the terminal value computation. The company's long-term sustainable growth prospects should be reflected in the stable growth rate, which is often expected to be in line with the broader economy or industry growth rate.

To calculate the entire worth of the company, add the terminal value to the present value of the cash flows over the predicted time. This method allows for a more thorough valuation, taking into account both the finite anticipated period and the perpetuity beyond it.

1.5) Market Multiples (Relative Valuation)

Relative valuation, often known as comparative analysis, is a way of valuing assets in the market by comparing them to similar assets. This method entails converting prices into multiples of earnings, growth, or cash flows and identifying a peer group of comparable enterprises for comparison.

Damodaran (2002) proposes four methods to ensure good multiples use and avoid misuse:

1. Consistent Definition and Measurement: Ensure that the multiple being utilized is consistently defined and assessed uniformly across the firms being compared. This facilitates meaningful comparisons.
2. Consider the cross-sectional distribution of the multiple not only inside the sector under consideration, but also throughout the entire market. This provides a more comprehensive understanding of how the many are valued in various circumstances.
3. Analyze the multiplicity and comprehend the fundamentals that drive it. Determine the elements that drive multiple changes and how changes in these basics translate into multiple changes.
4. Control for Differences: Select the appropriate firms for comparison and account for any differences that may exist among these firms. It is critical to choose comparable firms that are similar to the firm under consideration and to make changes to account for any differences in size, risk, or other relevant criteria.

The following are three regularly used multiples for valuation:

1. Price-to-Earnings Ratio (PER): This measure compares the current share price to earnings per share. The price investors are willing to pay per unit of current earnings is reflected in the PER, which reflects market expectations.

$$\text{Price to Earnings Ratio (PER)} = \frac{Share\ Price_N}{Earnings\ per\ share_N} = \frac{Market\ Capitalization_N}{Total\ Net\ Income_N} \quad (14)$$

2. Price-to-Book Value Ratio (P/BV): This ratio compares a company's market value to its book value. The P/BV ratio indicates how much equity investors are ready to pay for a unit of net assets.

$$\text{Price to Book Ratio } (P/BV) = \frac{Market\ Capitalization_N}{Total\ Book\ Value_N} = \frac{Share\ Price_N}{Book\ Value\ per\ Share_N} \quad (15)$$

3. Enterprise Value-to-EBITDA Ratio (EV/EBITDA): This ratio compares enterprise value (market value of equity plus debt) to earnings before interest, taxes, depreciation, and amortization (EBITDA). The EV/EBITDA ratio is used to calculate the worth of a company in relation to its annual EBITDA.

$$\text{EV/EBITDA} = \frac{Enterprise\ Value_N}{EBITDA_N} \quad (16)$$

Damodaran believes that when using relative valuation, it is considered that markets are generally correct in evaluating companies on average, even if individual equities are priced incorrectly. Comparative analysis not only checks DCF estimates, but it also provides vital insights into the characteristics driving value in a certain industry, (Koller, 2020).

2 External Environment

In this chapter, we step into the external environment where HPE operates, encompassing three critical dimensions: the macroeconomic outlook, industry overview, and competitive dynamics. As we navigate the global landscape, considering factors like politics, economics, society, technology, environment, and regulation, we start by shedding light on the prevailing macroeconomic factors that influence HPE's strategic choices. Then, we zoom in to dissect HPE's industry, analyzing its structure, emerging trends, and growth patterns. Finally, we turn our focus to the competitive arena, identifying rival players, their strategies, and the market forces that shape HPE's competitive position. These three analyses provide stakeholders with up-to-date insights, fostering a comprehensive grasp of the external forces steering HPE's strategic path.

2.1) Macroeconomic Outlook

The year of 2022 was marked by a significant event that unfolded in Europe: Russia invaded Ukraine on February 24th. This had a big impact, especially on the energy situation, because Russia decided to stop supplying natural gas to European Union countries.

With the global economy still recovering from the COVID-19 pandemic, the conflict in Ukraine made existing problems even worse. Starting in July 2021, families and businesses had to deal with rising prices for things like raw materials, fuel, energy, and other basic goods. This situation had a domino effect, leading to a major increase in the overall cost of goods and services, which in turn

resulted in higher inflation. According to data from the Instituto Nacional de Estatística (INE), the average inflation rate in 2022 was around 7,83%.

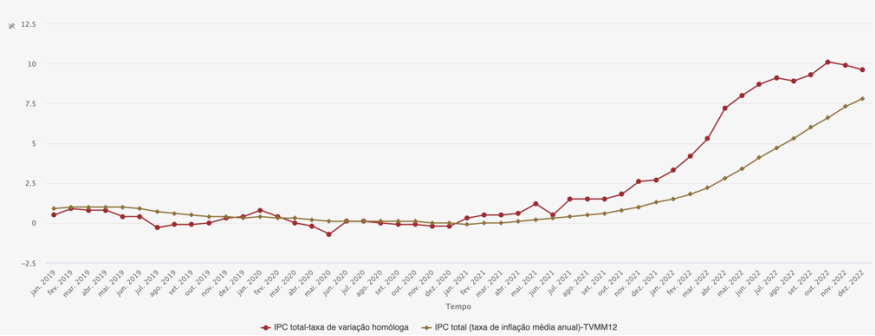

Figure 1. Harmonized Index of Consumer Prices in Portugal. Source: Banco de Portugal.

Looking at *Figure 1*, it's clear that inflation rates took a sharp upward turn as we entered 2022.

Additionally, data from Banco de Portugal indicates that the expected average inflation rate for 2023 is 5,5%, then dropping to 3,2% in 2024, and further down to 2,1% in 2025. This suggests that businesses are likely to continue feeling the effects of the pandemic and the ongoing conflict in the medium term. To cope, they will need to find ways to pass on some of these increased costs to their customers across all market segments.

To tackle these rising inflation rates, governments from all over Europe have been implementing several measures that aim both curb inflation and provide support to families and businesses. Furthermore, the European Central Bank (ECB) has raised interest rates several times to try to slow down the price increases. However, this puts additional pressure on individuals and companies with variable interest rates tied to their debt.

Looking at *Figure 2*, it is clear that the global economy took a major hit because of the COVID-19 pandemic and is still on the path to recovery.

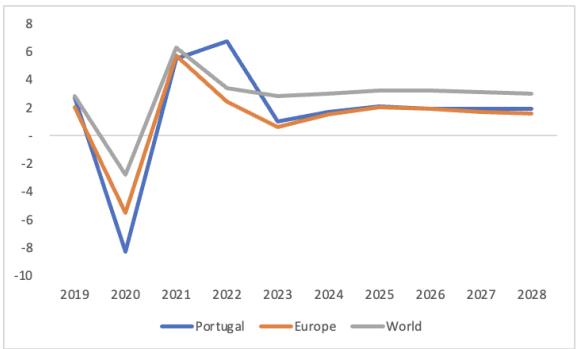

Figure 1. Real GDP growth. Adapted from IMF

According to data from the IMF dating back to 1980, Portugal experienced its lowest recorded GDP growth rate at approximately -8,3% in 2020, highlighting the pandemic's severe impact on the Portuguese economy. However, there is a positive outlook as the forecasted real GDP growth is expected to return to pre-pandemic levels by 2025.

2.2) Industry Overview

The HPE is involved in a variety of sectors:

Compute: The increased demand for cloud services, digital transformation projects, and the expanding volume of data generated by enterprises are all driving this growth. Infrastructure components like servers, storage devices, networking equipment, and power and cooling systems dominate the market.

Furthermore, developments such as the adoption of edge computing, the shift toward modular and scalable data center designs, and the growing emphasis on energy efficiency and sustainability in data center operations all have an impact on the industry.

The market is expected to expand further in the coming years, owing to continued technological improvements and the growing demand for powerful and dependable data center infrastructure to support the digital economy.

HPC & AI: The increasing demand for quicker processing capabilities, data analytics, simulation and modeling across many industries is driving the high-performance computing (HPC) industry. Advances in parallel computing technology, increasing acceptance of HPC in research and academic institutions, and the requirement for effective data management and analysis are all driving market expansion. The market includes many components including servers, storage systems, software, and services, and it is expected to grow further when new technologies emerge, such as quantum computing.

Similarly, the artificial intelligence (AI) market is expanding rapidly, owing to the extensive application of AI technology in industries like healthcare, finance, retail, and automotive. Advances in machine learning algorithms, the availability of enormous amounts of data, and the growing need for automation and intelligent decision-making are driving market expansion. The market includes artificial intelligence software, hardware, and services, with subsegments such as natural language processing, computer vision, and deep learning.

Both the HPC and AI industries are likely to grow significantly in the next years, owing to technical developments, increased R&D investments, and the incorporation of AI capabilities into HPC systems. These markets provide chances for organizations in various industries to benefit from the increasing demand for high-performance computing and artificial intelligence technologies.

Storage: According to publicly accessible data, the data storage market is expected to grow rapidly, with a compound annual growth rate (CAGR) of 17,8% and a market size of 777.98 billion dollars by 2030.

Several reasons are propelling the data storage market forward. These include the expanding volume of digital data generated by enterprises in a variety of industries, the increasing usage of cloud computing and big data analytics, and the need for safe and scalable storage solutions. Hard disk drives

(HDDs), solid-state drives (SSDs), and tape storage systems are among the storage technologies available in the market.

Factors like as the rapid expansion of e-commerce, the proliferation of mobile devices, the rise of social media platforms, and the rising reliance on data-driven decision-making are driving demand for data storage solutions. Furthermore, the demand for effective data management, data protection, and backup and recovery solutions is driving the adoption of modern storage technologies.

The data storage market provides an opportunity for storage providers to profit from the increased demand for storage solutions. This comprises storage device makers, software suppliers, and cloud storage service providers. As businesses continue to collect and store massive volumes of data, the data storage industry is likely to expand steadily in the coming years.

Intelligent Edge: The edge computing industry is expected to grow significantly as a result of rising demand for low-latency data processing, real-time analytics, and the proliferation of IoT devices. Edge computing brings data processing and storage closer to the point of origin, lowering latency and increasing the efficiency of data-intensive applications. Edge computing market growth is being driven by factors such as the increasing acceptance of IoT, the advent of autonomous vehicles, and the demand for quicker and more reliable data processing in industries such as healthcare, manufacturing, and retail.

The IoT market is also expected to expand significantly as more devices and things connect to the internet. The growing implementation of IoT in a variety of industries, including healthcare, manufacturing, transportation, and smart homes, is propelling the industry forward. The Internet of Things facilitates the collection, analysis, and exploitation of data from connected devices, resulting in increased operational efficiency, better decision-making, and the development of novel goods and services. Advances in wireless networking technology, the rising availability of affordable IoT devices, and a greater emphasis on digital transformation programs are all driving the IoT market forward.

These expanding markets offer opportunities for technology businesses, service providers, and solution vendors to benefit from rising demand for edge computing and IoT solutions. Edge computing and IoT integration provide benefits such as lower bandwidth utilization, increased security and privacy, and enhanced data processing capabilities. Edge computing and IoT markets are likely to develop in the future years as sectors continue to embrace digital transformation and rely on real-time data insights.

Financial Services: Key financial services sector companies, such as Allianz, JPMorgan Chase, and China Life Insurance, are driving market expansion through strategic initiatives and product offerings. The market study emphasizes the growth of financial services in a variety of industries, including banking, insurance, asset management, and other financial activities.

Technological improvements, increased acceptance of digital payment solutions, the expansion of financial technology (fintech) companies, and rising demand for individualized financial services are all factors driving the growth of the financial services industry. The research also underlines the importance of regulatory reforms and government activities in influencing the landscape of the sector.

Overall, the worldwide financial services market is expanding rapidly, owing to reasons such as technology improvements, shifting customer tastes, and regulatory reforms.

Corporate Investments and Other: Individuals' increasing disposable income, the growing demand for financial planning and asset management, and increased awareness of investment alternatives are driving market expansion. Furthermore, technical improvements and the emergence of digital investing platforms have increased the accessibility of investment opportunities to a broader audience.

2.3) Competition

HPE has a diverse technology portfolio that includes enterprise IT infrastructure products, solutions, and services as well as as-a-service options. In every aspect of the business, HPE faces fierce competition.

Technology, innovation, performance, price, quality, reliability, brand, reputation, distribution, range of products and services, ease of use of HPE´s products, account relationships, customer training, service and support, security, and the availability of HPE´s IT infrastructure offerings are the primary differentiators.

HPE´s markets are characterized by fierce competition between giant organizations with long-established positions and a large number of new and rapidly rising firms. Most product life cycles are quite short, and in order to remain competitive, they must develop new products and services, consistently improve the existing products and services, and effectively compete based on the factors outlined above, among others.

Furthermore, HPE competes with many of their current and prospective partners, including OEMs (original equipment manufacturers) that design, manufacture, and market their own brand names. HPE´s ability to successfully manage these competing partner relationships is vital to its long-term success. Additionally, they estimate that will need to continue adjusting prices on many of their products and services in order to remain competitive.

The competitive environments in which HPE´s segments operate are described below:

Compute and Storage: The company competes in the highly competitive enterprise data center infrastructure market, which is characterized by constant technical innovation and pricing competition. Dell Technologies Inc., Cisco Systems Inc., Lenovo Group Ltd., International Business Machines Corporation ("IBM"), and NetApp Inc. are their key competitors. In some areas, HPE also faces competition from local businesses as well as generically labeled or "white-box" manufacturers.

HPE´s goal is to provide exceptional products, high-value technical support services, and differentiated integrated solutions that combine the capabilities of HPE´s infrastructure, software, and services. HPE´s competitive advantages include HPE´s extensive end-to-end solution spectrum, which is supported by a strong intellectual property portfolio and R&D capabilities, as well as HPE´s global presence and partner ecosystem.

HPC & AI: The company focuses on data-intensive supercomputing, analytics, and artificial intelligence and competes with companies like Dell, Lenovo, IBM, Fujitsu, and Atos. Superior products, high-value technological support services, and distinctive integrated solutions that combine infrastructure, software, and service capabilities are all part of the company's goal. Competitive advantages include the company's knowledge and capabilities, a large array of end-to-end solutions, a strong intellectual property portfolio and R&D capabilities, global reach, and a partner ecosystem.

Intelligent Edge: The company competes with technology companies such as Cisco Systems, Extreme Networks, Juniper Networks, and Arista Networks in the highly competitive networking and connectivity infrastructure industry. Superior enterprise wired and wireless local-area networking components and software, high-value technical support services, and innovative integrated solutions that combine infrastructure, software, and services capabilities are all part of the company's approach. A broad end-to-end solution offering, a strong intellectual property portfolio and research and development skills, global reach, and a partner ecosystem are among the company's competitive advantages.

Financial Services: The company competes in the finance market with captive financing companies like IBM Global Finance, Dell Financial Services, and Cisco Capital, as well as banks and other financial institutions. The company's competitive advantage over its competitors is its ability to offer investment solutions combined with expertise in managing technology assets, which enables customers to create unique technology deployments, extract value from existing IT investments, and manage the retirement of those assets efficiently. Customers can use the company's solutions to expedite digital transformation, establish new revenue streams, and satisfy Circular Economy goals.

Company	Revenue (TTM)	Net income (TTM)	Market cap	Employees
Insight Enterprises, Inc.	10.10bn	273.95m	4.12bn	13.45k
Super Micro Computer Inc	6.57bn	587.25m	7.06bn	4.61k
TD Synnex Corp	62.00bn	681.09m	8.29bn	23.50k
Zebra Technologies Corp.	5.75bn	408.00m	13.69bn	10.50k
HP Inc	59.78bn	2.60bn	28.47bn	58.00k
Dell Technologies Inc	102.30bn	2.44bn	32.73bn	133.00k

Figure 2. Peer analysis key information. Adapted from Financial Times

As we can see in *Figure 3*, the company faces strong competition from plenty of competitors in many sectors of business, and their core market segments are being targeted. Technology, innovation, price, quality, reliability, brand, reputation, distribution, product range, ease of use, account

connections, customer training, service, support, and security are the most important factors that impact competition. While competitors specialize in specific product lines and may have stronger financial, technical, and marketing capabilities, HPE must allocate its resources across all products and services. Consolidation in the industry and exclusive agreements with customers or suppliers may also have an impact on competition. Competitive pricing is intense, and competitors in lower-cost markets may provide better pricing and contractual terms. The company spends a higher proportion of its revenue on research & development, which may have an impact on profitability.

3 The Company

In this chapter, we embark on a comprehensive exploration of HPE, delving into the very core of this dynamic organization. We will begin by painting a detailed portrait of HPE, its history, mission, and strategic direction. To gain a deeper understanding of its operations, we will dissect the company into its various operating segments, shedding light on how each contributes to its overall performance. Additionally, we will conduct a SWOT analysis, identifying HPE's strengths, weaknesses, opportunities, and threats, which will serve as a compass guiding us through the company's strategic landscape.

3.1) Overview

HP, short for Hewlett-Packard, traces its roots back to a humble beginning in a Palo Alto, California garage in 1939. It was founded by two visionaries, William R. Hewlett and David Packard. Initially, the company's primary focus was on electronic test equipment, but it soon diversified into various facets of technology, including computing and printing.

Over the 20th century, HP became a hotbed of innovation. They introduced groundbreaking products like the world's first desktop calculator, desktop computer, and handheld computer. Beyond their product innovations, HP played a pivotal role in nurturing Silicon Valley's technology ecosystem, fostering an environment of creativity and entrepreneurship.

Fast forward to October 2014, HP embarked on a strategic transformation. It decided to split its operations into two distinct entities. HP Inc. would specialize in traditional PC and printer businesses, while Hewlett Packard Enterprise (HPE) would focus on enterprise products and services. This strategic overhaul was completed with the formal incorporation of Hewlett Packard Enterprise on February 15, 2015. The objective was clear: to enhance efficiency and focus for both HP Inc. and HPE in their respective domains, thereby better serving their customers and adapting to the ever-evolving technology landscape.

Today, HPE stands as a global corporate powerhouse with a presence in over 170 countries and approximately 60.200 employees. Its core mission revolves around delivering intelligent solutions that empower users to harness, analyze, and act upon data seamlessly from the edge to the cloud, all in

real time. HPE's clientele spans the spectrum, ranging from small and medium-sized enterprises to colossal multinational corporations and governmental entities. The company remains unwavering in its commitment to providing innovative technical solutions that accelerate business outcomes, foster novel customer and employee experiences, and drive operational efficiency.

3.2) Operating Segments

Compute: To provide the best performance and value for demanding applications, HPE´s compute portfolio includes both general-purpose servers for multi-workload computing and workload-optimized servers. This product line comprises HPE Synergy, a modular infrastructure for both conventional and cloud-native applications, as well as HPE´s reliable and secure HPE ProLiant rack and tower servers. For the fastest-growing workloads in the market, such as hyper converged infrastructure ("HCI"), virtual workspaces, data management, transcoding, and visualization, HPE ProLiant servers serve as the computing solid foundation. Operational and support services as well as HPE GreenLake for Compute are included in the compute solutions. Through the HPE GreenLake edge-to-cloud architecture, HPE GreenLake for Compute offers IT infrastructure that is flexible and consumes compute as a service.

HPC & AI: Globally, HPE's HPC & AI division provides government and commercial clients with integrated systems for HPC, AI, data analytics, and transaction processing. The HPC portfolio consists of Converged Edge Systems, HPE Cray, and HPE Apollo. HPE NonStop and mission-critical compute are both part of the Data Solutions offering. Additionally, HPE offers a variety of software solutions, some of which are AI-based. The HPE GreenLake edge-to-cloud platform is where the operational and support services for HPC & AI are offered. Sales to government entities are subject to particular conditions and rights.

Storage: Through the HPE GreenLake platform, HPE Storage offers cloud data services and storage as a service. It comprises main storage services such storage as a service, cloud native primary storage, and HCI. In addition, HPE Storage offers solutions for backup, big data, disaster recovery, and secondary workloads. Customers can leverage HPE CloudPhysics and HPE InfoSight for data-driven intelligence and artificial intelligence. Additionally, HPE Storage offers a spectrum of data infrastructure solutions, operational and support services, and software subscription services.

Intelligent Edge: With an emphasis on work from anywhere settings, mobility, and IoT, HPE's Intelligent Edge division offers secure edge-to-cloud solutions for companies of any size under the Aruba brand. Wi-Fi access points, switches, cloud-based management, network access control, analytics and assurance, location services, and expert support services are just a few examples of the hardware, software, and services available through Aruba. A cloud-native technology called Aruba ESP assists users with connection, security, and finance needs across various contexts.

Financial Services: offers asset management, leasing, and investment solutions to let customers purchase entire IT solutions from companies like Hewlett Packard Enterprise and others. FS supports a variety of consumption models, including the edge-to-cloud HPE GreenLake platform. To develop investment strategies that improve company agility and assist business transformation, FS collaborates with customers. Financial Solutions (FS) provides financial options for SMBs, educational institutions, and governmental bodies in addition to investment solutions for major enterprise clients and channel partners.

Corporate Investments and Other: Corporate Investments and Other, a division of HPE, consists of a variety of businesses, including Advisory and Professional Services, which offers advisory and implementation services, Communications and Media Solutions, which provides software and services to the telecommunications sector, HPE Software, which offers container and data management solutions, and Hewlett Packard Labs, which is in charge of research and development.

3.3) Strategy

HPE has identified three transformative megatrends that are significantly influencing customer expectations in the corporate technology landscape: edge computing, cloud computing, and data analytics.

First, we are seeing a huge increase in data being generated right at the edge of networks. This means data is being produced and processed much closer to where it is made, and it is becoming a challenge for businesses to handle all this data efficiently.

Second, there is a growing demand for a kind of cloud experience that you can access from anywhere. This is changing the way data and work-related tasks are managed. Companies want the ability to easily handle their data and applications on different cloud platforms.

Lastly, because there is so much more data around, there is a big opportunity to find really important insights for businesses. As data keeps growing, it is becoming super important to figure out how to get valuable information from all this data.

To tackle these trends, HPE has a smart plan. They are all about making data the star, and they have changed their products and services to focus on connecting things, cloud solutions, and handling data better. They offer these services through something called HPE GreenLake edge-to-cloud platform, which makes it easier for customers to use cloud services. With this, they can work with their data across different places, like public clouds, their own data centers, and more.

Complementing its product and service offerings, HPE's Financial Services also helps out by giving customers the money they need for these big changes. So, HPE is all about helping businesses do well in a world where data, connecting stuff, and using the cloud are super important.

3.4)SWOT Analysis

In this subchapter, we are diving into the world of HPE's strategy. We will be looking at what HPE does well, its strengths, and where it might need improvement, its weaknesses. Plus, we will explore what is happening around HPE, like exciting opportunities, and what could pose challenges, the threats. For this purpose, information from the HPE 2022 annual report was used. Our goal is to help the investors grasp what is shaping HPE's strategy and how they can navigate the tech world successfully. For a resume overview, please see *Figure 4*.

3.4.1) Strengths

HPE has several competitive advantages that set them apart from the competition, including:

- *Edge-to-cloud strategy and solutions uniquely solve customer challenges:* HPE's edge-to-cloud approach and solutions are designed to support clients in gaining access to, controlling, and maximizing the value of their data and workloads, allowing them to accelerate business outcomes. HPE's platform provides an open, secure, and fully integrated experience across the edge, data center, colocation, and cloud as data expands and enterprises become more distributed. The platform is simple to use, with the ability to scale up and down in response to demand, and it provides a real pay-per-use consumption model. HPE's GreenLake managed services offering can handle the full hybrid cloud experience for customers.
- *Comprehensive portfolio:* HPE has a leading portfolio of edge-to-cloud technologies and capabilities that help customers accelerate their digital transformations. They provide a holistic IT strategy that connects customers' data from the edge to the cloud through a single package of high-quality products, consultancy, and support services. Their enterprise solution offering is one of the strongest in the IT market due to the mix of software-defined infrastructure and services capabilities. This is one of HPE's primary differentiators.
- *Differentiated consumption-based IT solutions for a growing opportunity:* Enterprises' digital transformation challenges include a lack of in-house IT skills, limited budgets, financing choices, and the flexibility to choose the appropriate technology foundation. Consumption-based IT provides solutions by increasing agility, allowing people to focus on innovation by using data insights while avoiding costs associated with infrastructure over-provisioning. HPE is the only company that provides a real consumption-based IT experience.
- *Open platforms:* The transition to a more decentralized and distributed data approach requires the use of a unified cloud platform capable of bringing agility and intelligence closer to data sources to provide real-time insights. This needs a shift away from centralized and closed techniques in huge data centers and toward data centers all over the place. Instead of requiring

consumers to be locked into a cloud stack, HPE thinks that the cloud experience should be open and seamless across all of their customers' clouds.

- *Multi-year innovation roadmap and strong balance sheet:* HPE has been in the technology and innovation business for almost 80 years. The company has a large intellectual property portfolio and global R&D capabilities aimed at assisting organizations in leveraging the power of expanding data and the most recent technological developments such as cloud, artificial intelligence, supercomputing, and cybersecurity to drive business outcomes. The company's solid balance sheet and liquidity profile provide financial flexibility to take advantage of acquisition opportunities.
- *Global distribution and partner ecosystem:* HPE is skilled at delivering new technology solutions to customers in multi-country, multi-vendor, and/or multi-language scenarios. They have one of the industry's greatest go-to-market capabilities, as well as a broad ecosystem of channel partners, allowing them to promote and distribute product offers to clients all over the world. Their HPE GreenLake edge-to-cloud platform offers open cloud APIs to partners, allowing them to better provide their unique solutions to clients.
- *Custom financial solutions:* HPE's Financial Services business supports customers in freeing up capital, fulfilling sustainability goals, and investing in new technologies through financing choices and the recovery of outdated IT assets. The segment's Technology Renewal Centers collect IT assets for refurbishment and reuse, helping customers achieve their sustainability goals. HPE's consumption-based IT models are also enabled by Financial Services, which spreads upfront solution costs throughout customer contracts.
- *Experienced leadership team:* Antonio Neri is the President and CEO of HPE, having over 25 years of leadership experience at HPE and Hewlett-Packard Company. Additionally, the senior management team has vast experience in the enterprise IT industry and the markets in which HPE competes.

3.4.2) Weaknesses

- *Dependence on legacy hardware*: HPE's income remains mainly dependent on traditional hardware products, which may become obsolete in the face of future technology.
- *High competition*: Other significant firms in the business technology industry, such as Dell EMC, IBM, and Cisco, compete fiercely with HPE.
- *Limited presence in emerging markets:* In comparison to its competitors, HPE has a small market presence in emerging markets.

- *Slow growth*: HPE's revenue growth has been slow in recent years, due in part to its reliance on outdated hardware products.

3.4.3) Opportunities

- *Cloud computing*: To capitalize on the increased demand for cloud-based solutions, HPE can expand its cloud offerings.
- *Internet of Things (IoT)*: To fulfill the growing need for connected devices and systems, HPE can develop IoT solutions and services.
- *Data Analytics*: HPE can use its existing data analytics skills to create new solutions for data-driven insights and decision-making.
- Artificial intelligence (AI): HPE can improve its AI capabilities in order to offer more advanced and innovative solutions to its clients.

3.4.4) Threats

- *Economic downturns and market volatility* could have an adverse impact on HPE's sales.
- *Cybersecurity threats*: Cybersecurity breaches and data leaks might have a significant impact on HPE's brand and income.
- *Regulatory changes:* Changes in rules and compliance requirements could have a substantial influence on HPE's operations and revenue.
- *Rapid technological advancements*: Emerging technologies that replace traditional hardware offerings could represent a threat to HPE's income.

Strengths	Weaknesses
Edge-to-Cloud Strategy	Dependence on legacy hardware
Comprehensive Portfolio	High competition
Innovative IT Solutions	Limited presence in emerging markets
Open Platforms	Slow growth
Innovation and Financial Stability	
Global Reach	
Custom Financial Solutions	
Experienced Leadership	

Opportunities	Threats
Cloud Computing	Economic downturns and market volatility
Internet of Things (IoT)	Cybersecurity threats
Data Analytics	Regulatory changes
Artificial Intelligence (AI)	Rapid technological advancements

Figure 3. SWOT Analysis. Source: Author

4 Value drivers

This chapter is dedicated to dissecting the core engines that drive HPE's financial performance: revenue and costs. We will take an in-depth look at the sources of HPE's income, unraveling the intricate web of revenue streams that sustain the company's growth. Simultaneously, we will delve into the world of costs, discerning the elements that impact profitability and efficiency. By the end of this chapter, the reader will have a clear view of how HPE generates income and manages expenses, providing essential insights into its financial health and sustainability.

4.1) Revenue breakdown

A detailed examination of HPE's core business segments was conducted with the intend to provide readers with informed insights on each segment's likely future behavior. We can provide a comprehensive outlook on HPE's trajectory by studying its Compute, HPC & AI, Storage, Intelligent Edge, Financial Services, and Corporate Investments and Other segments.

We used a method that combined the estimated market size CAGR of each related sub-segment to forecast HPE's revenues. This approach allows to account for prospective market growth and changes, offering a more accurate estimate of HPE's future performance.

Compute segment study includes an extensive analysis of industry trends, technological improvements, and customer expectations. We may outline the likely direction that HPE is going to take in this segment by taking these aspects into account. The enterprise data center infrastructure market is set to grow significantly, reaching a size of 120 billion dollars by 2030 with a CAGR of 12%, according to Global Market Insights (July, 2023). This growth is driven by factors such as the increasing volume of digital data, cloud computing adoption, and emerging technologies.

We have considered the growing relevance of high-performance computing and artificial intelligence in the *HPC & AI market*. We may shed light on the company's potential in this domain by anticipating market demands and examining HPE's strategy to meet these changing needs. The High Performance Computing (HPC) market is expected to grow from 36 billion dollars in 2022 to 49.9 billion dollars by 2028, at a CAGR of 6,7%, according to the Markets and Markets report. The market growth can be attributed to several factors, such as increasing demand for Cloud based HPC in applications such as media and entertainment. The global Artificial Intelligence market size was worth approximately 86.9 billion dollars in 2022 and is expected to generate revenue around 407 billion dollars by the end of 2027 growing at a CAGR of around 36,2 between 2022 to 2027, according to Markets and Markets report.

We have closely monitored the changing landscape of data storage technologies within the *Storage* segment. HPE's future orientation and predicted market share have been influenced by factors such as the launch of cloud storage and the demand for scalable solutions. The worldwide data storage

market was valued at 217.02 billion dollars in 2022 and is expected to expand from 247.32 billion dollars in 2023 to 777.98 billion dollars by 2030, at a CAGR of 17,8% between 2023 and 2030, according to Fortune Business Insights report. Companies' increasing emphasis on data security, dependability, speed, portability, and enhanced programmability will help drive market expansion in the future years.

As enterprises attempt to handle data closer to its source, the *Intelligent Edge* segment has garnered tremendous traction. We examined HPE's product portfolio, collaborations, and market potential in this space to provide a complete picture of the company's position and prospects in Intelligent Edge solutions. The global Edge Computing Market size was valued at 44.7 billion dollars in 2022 and it is projected to reach 101.3 billion dollars by the end of 2027 growing at a CAGR of 17,8%, according to Markets and Markets report. The rapid rate of growth is attributed to the Asia region being home to many Small and medium-sized enterprises involved in the development and adoption of edge computing hardware, software and devices. The global IoT market size in terms of revenue was reasonably estimated at 300.3 billion dollars in 2021 and is anticipated to rise to 650.5 billion dollars by 2026, presenting a CAGR of 16,7%, according to Markets and Markets report. The major factors fueling this market include access to low-cost, low-power sensor technology, availability of high-speed connectivity, increase in cloud adoption, and increasing use of data processing and analytics.

HPE's *Financial Services* branch is critical in assisting customers in acquiring HPE solutions through various financing alternatives. We can forecast the growth and influence of Financial Services on HPE's total business by researching industry trends, client preferences, and HPE's strategic efforts. The global financial markets size in terms of revenue was estimated at 23.319,52 billion dollars in 2021 and is anticipated to grow to 37.343,95 billion dollars in 2026 at a compound annual growth rate of 9,6%, according to the Research and Markets report.

Finally, we looked at HPE's *Corporate Investments and Other* sector, which consists of investments in developing technologies, strategic acquisitions, and other projects. The global financial services market is witnessing robust growth, surging from 25.8 trillion dollars in 2022 to an impressive 37.5 trillion dollars in 2027, maintaining a strong CAGR of 7,5%, according to The Business Research Company (April 2023).

By conducting a comprehensive analysis of each segment and considering the corresponding market size projections and CAGR of relevant sub-segments, we have generated revenue forecasts for HPE's business units. These forecasts aim to provide readers with valuable insights into the overall market behavior and future expectations for HPE.

4.2) Costs Breakdown

In this subchapter, we will discuss the costs related to HPE. The analysis addresses three types of costs: cost of goods sold (COGS), selling, general, and administrative (SG&A), and research and development (R&D). While HPE's yearly reports lack a full breakdown of each expense category, they do provide useful insights that support the analysis. The approach utilizes relevant comments and informed assumptions to estimate the costs and provide valuable insights for stakeholders.

4.2.1) Costs of Goods Sold (COGS)

First, we look at the COGS related to HPE's operations. COGS includes the direct costs of manufacturing and distributing the company's goods and services. We present an overview of COGS and analyze all the variables that influence it. The estimations are based on publicly accessible data and industry benchmarks, as HPE's yearly reports do not provide a full breakdown.

HPE, like many other companies, has been severely impacted by the continued global effects of the COVID-19 pandemic and the recent conflict in Ukraine. These events have had a significant impact on HPE's operations, resulting in a variety of challenges and disruptions.

Supply chain disruptions have been a big issue for HPE, originating in material and labor delays and shortages. The pandemic-related limitations, as well as the war in Ukraine, have impacted the free flow of goods and services, making it hard for HPE to continue operations as they normally would.

These occurrences, in addition to disrupting supply chains, have contributed to the ongoing global energy crisis. The oil crisis has resulted in higher energy and transportation expenses, placing HPE under additional economic pressure. Rising energy costs have an impact not just on HPE's operational expenses, but also on the general market.

HPE must manage these challenges carefully and seek alternatives to minimize the impact on its operations. This could include looking for new suppliers, optimizing supply chain operations, and adjusting to a constantly evolving energy situation. HPE may attempt to reduce disruptions, manage expenses, and continue its commitment to providing effective customer service by taking steps to resolve these issues.

The COGS is indeed the largest expense on HPE's income statement. In 2022, it accounted for nearly 67% of the company's total revenues, resulting in a gross margin of approximately 33%. In *Figure 5* it is possible to observe the gross margin variation between 2019 and 2022.

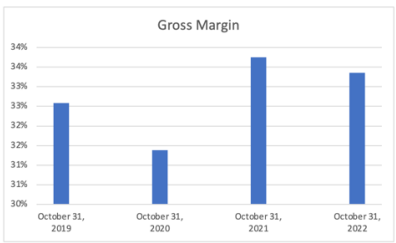

Figure 4. Gross Margin 2019-2022. Adapt from HPE´s 2022 Annual Report

For the purpose of the valuation model until 2030, we assume that the gross margin ratio will remain equal to its historical average in the short term (33%). This assumption considers that any operational improvements in manufacturing may be offset by the rise in variable costs, such as those mentioned earlier. Therefore, while there may be potential improvements in HPE's manufacturing processes, the impact of factors like supply chain disruptions, travel restrictions, material shortages, labor constraints, and higher raw material prices are expected to counterbalance those improvements.

By maintaining the historical average gross margin ratio, the valuation model accounts for the anticipated challenges and cost pressures faced by HPE. This approach provides a realistic assessment of the company's profitability and helps stakeholders evaluate the potential impact of these factors on HPE's financial performance in the coming years.

4.2.2) Selling, General and Administrative Expenses

Following COGS analysis, we will focus on HPE's SG&A expenditures. Some examples of SG&A expenses are Sales and marketing expenses, administrative charges, and other general operational costs. We estimate these expenses for the period 2022 to 2030 using relevant statements from HPE's annual reports and using informed assumptions. We provide a full understanding of the elements influencing SG&A spending and how they may grow over time by doing so.

In terms of absolute values, we expect HPE's SG&A costs to continue to rise considerably. The surge is mostly due to arising PP&E expenditures. HPE incurs elevated PP&E costs as it invests in developing and upgrading its physical infrastructure, such as facilities and equipment.

Additionally, rises in the salary expectations of employees, particularly in white-collar R&D positions, contribute to the growth of SG&A costs. Factors like rising inflation and the changing demands and skill sets of R&D professionals influence these compensation expectations. As HPE continues to invest in research and development, the demand for talented employees in these positions grows.

To account for these variations in the valuation model, we assume a static SG&A cost-to-PP&E ratio equal to its historical average over the last known years. Basically, we assumed that the SG&A costs, would stay about the same compared to the company's PP&E spending. we looked at how this ratio has been in the past few years and just kept it steady. This way, we can factor in the predicted rise in SG&A costs due to PP&E growth and increased research spending. This assumption takes into account current PP&E expenditure and associated costs, as well as predicted growth in R&D spending. We hope to capture the anticipated increase in SG&A expenses caused by these factors by maintaining a steady ratio. Please see *Figure 6* for a more detailed overview.

	Growth Assumpion	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
SG&A	*% PPE*	4 907	4 624	4 929	4 941	5 498	6 149	6 882	7 709	8 643	9 699	10 892	12 242

Figure 5. SG&A Analysis

Overall, this methodology allows us to analyze the impact of increased SG&A expenditures while also taking into account changing needs and expectations in terms of property, plant, and equipment investments and employee salaries.

4.2.3) Research and Development

Finally, we evaluate the R&D costs related to HPE's business. R&D expenses generally refer to the costs incurred in developing new products, processes, or services. We present an overview of R&D expenses and investigate the elements that influence them. The predictions are based on publicly available data and industry benchmarks.

HPE understands the importance of protecting its R&D investment and obtaining ownership of its innovations through patents. Patent ownership provides HPE with a competitive advantage and allows the company to develop industry-leading solutions. The patents cover a wide range of sectors critical to existing and prospective commercial possibilities, influencing HPE's overall business success.

HPE must keep a strong focus on investing in research and development since it directly affects the company's ability to adjust to changes in customer needs and market dynamics. Inadequate investment in research and development might result in a slow-paced reaction to market needs, thus influencing revenue streams.

Given the importance of R&D investment to HPE's growth, we expect that the company will increase R&D expenses in line with revenue growth, see *Figure 7* (values are expressed in millions). This assumption acknowledges the close relationship between revenue increases and years of R&D and innovation. HPE hopes to maintain its commitment to technical improvement, innovation, and satisfying customer expectations by aligning R&D costs with revenue growth.

	Growth Assumpion	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
R&D	*% revenue*	1 842	1 874	1 979	2 045	2 194	2 454	2 747	3 077	3 449	3 871	4 347	4 886

Figure 6. R&D Analysis

HPE can increase its market position, drive revenue growth, and preserve its capacity to deliver cutting-edge solutions that match shifting customer needs by consistently investing in R&D and product development.

4.3)Working Capital and Cash-Flow

HPE has been unable to achieve positive operating free cash flows without relying on financing and monetization activities to supplement its cash flows for several years, see *Figure 8* (values are

expressed in millions). This means that HPE has used external sources of finance or engaged in asset monetization efforts to bridge the gap between operating cash flows and capital requirements.

This means that HPE has struggled to generate enough cash flows from its main operating activities to meet its operational expenses, capital expenditures, and other financial obligations. As a result, to achieve its cash flow requirements, the company has had to rely on external sources of capital or asset monetization.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Net Working Capital	(4.062)	(2.259)	(1.809)	(2.668)	(2.778)	(2.877)	(2.988)	(3.114)	(3.255)	(3.415)	(3.596)	(3.801)
Changes in Net Working Capital		*1.803*	*450*	*(859)*	*(110)*	*(99)*	*(111)*	*(125)*	*(142)*	*(160)*	*(181)*	*(205)*

Figure 7. Changes in Net Working Capital

It is important to note that strong operating FCFs are critical for a company's long-term financial sustainability. Positive operating FCFs show that a company generates enough cash from core operations to fund continuing operations, invest in growth possibilities, and service debts without relying excessively on external financing or asset sales.

To overcome this challenge, HPE may need to prioritize operational efficiency, cost reduction, cash conversion cycle optimization, and revenue growth. As a result, HPE can strive toward positive operating FCFs and minimize its reliance on external financing or asset monetization to meet its cash flow requirements.

The cash conversion cycle (CCC) reveals important information about HPE's operational efficiency over the regular trading cycle. It is worth mentioning that in recent years, HPE has continuously maintained a negative CCC, see *Figure 9* (values are expressed in millions). This suggests that the company experienced difficulties in successfully converting its inventory into cash, resulting in a lengthy cash conversion process. Improving the CCC is critical for HPE to improve working capital management and maximize cash flow generation from operations.

Based on the expected consistency in trade cycle trends in the industries in which HPE operates, we expect the business to sustain its negative rate of CCC (-10,8). This implies that HPE may continue to experience difficulties in transforming its inventory into cash within the predicted trade cycle. HPE must identify opportunities for improvement in its inventory management and cash conversion operations in order to increase overall operational efficiency and cash flow generation.

As a result, we anticipate that the Average Holding Period (71,4 days), Average Collection Period (46,9 days), and Average Payment Period (129,1 days) will stay constant and comparable to the historically recorded average levels.

Cash Flow Management	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Inventories	2.387	2.674	4.511	5.161	4.195	4.697	5.263	5.901	6.622	7.435	8.355	9.396
Cost of Sales	19.642	18.513	18.408	18.990	21.436	24.002	26.894	30.155	33.836	37.994	42.694	48.011
Avg Holding Period	**44,4**	**52,7**	**89,4**	**99,2**	**71,4**	**71,4**	**71,4**	**71,4**	**71,4**	**71,4**	**71,4**	**71,4**
Receivables	2.957	3.386	3.979	4.101	4.098	4.589	5.141	5.765	6.469	7.263	8.162	9.178
Sales	29.135	26.982	27.784	28.496	31.885	35.701	40.002	44.853	50.328	56.513	63.504	71.412
Avg Collection Period	**37,0**	**45,8**	**52,3**	**52,5**	**46,9**	**46,9**	**46,9**	**46,9**	**46,9**	**46,9**	**46,9**	**46,9**
Payables	5.595	5.383	7.004	8.717	7.584	8.492	9.515	10.668	11.971	13.442	15.105	16.986
Cost of Sales	19.642	18.513	18.408	18.990	21.436	24.002	26.894	30.155	33.836	37.994	42.694	48.011
Avg Payable Period	**104,0**	**106,1**	**138,9**	**167,5**	**129,1**	**129,1**	**129,1**	**129,1**	**129,1**	**129,1**	**129,1**	**129,1**
Cash Conversion Cycle	**-22,6**	**-7,6**	**2,8**	**-15,8**	**-10,8**	**-10,8**	**-10,8**	**-10,8**	**-10,8**	**-10,8**	**-10,8**	**-10,8**

Figure 8. Cash Conversion Cycle

HPE may optimize its working capital management by keeping a steady CCC, ensuring regular cash flows and liquidity. This enables the organization to satisfy its financial obligations, invest in prospects for growth, and continue to provide value to its stakeholders.

Overall, HPE's ability to properly manage its inventories, collections, and payments is reflected in the company's goal of maintaining a steady CCC. It represents HPE's operational efficiency and financial stability across the business cycle.

4.4) Capital Expenditures

Capital expenditures, often known as CAPEX, are expenditures made by a firm to acquire or improve long-term assets that offer benefits over time. Office buildings, machinery, vehicles, and other infrastructure required for the company's activities are examples of these assets.

Capital expenditures can be found on HPE's cash flow statement under the heading "Investment in property, plant and equipment", see *Figure 10*. This section describes the cash flows associated with the acquisition, sale, or disposal of long-term assets. Capital expenditures are classified as a cash outflow since they include investing on assets that will yield future rewards.

The impact of capital expenditures is also reflected on the balance sheet of HPE. These expenses raise the value of fixed assets, which are classified as "Property, Plant, and Equipment". This shows the company's long-term investment and helps to determine its overall financial status.

Values in millions	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Investment in property, plant and equipment	2 856	2 383	2 502	3 122	3 072	3 422	3 908	4 467	4 889	5 502	6 209	6 985
% revenue	*10%*	*9%*	*9%*	*11%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*

Figure 9. CAPEX

Capital expenditures must be tracked in order to analyze a company's investment in future growth and to maintain or improve operational capabilities. Stakeholders can acquire insights into the company's strategic resource allocation and commitment to increasing and improving its asset base by evaluating the cash flow statement and balance sheet.

Based on the Capital Asset Turnover ratio, we forecasted the evolution of PP&E. We assessed the growth of PP&E in relation to the Capital Asset Turnover to accurately portray the changes over time.

For 2022, the ratio is derived using historical data, resulting in a 13% rise in PP&E between 2022 and 2023. We anticipate that capital asset turnover will remain constant with its historical average of

around 4.9 in the future. This level is expected to remain until the conclusion of the forecast period, as it is possible to see in *Figure 11* (values are expressed in millions).

Capital Asset Turnover	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sales	29.135	26.982	27.784	28.496	31.885	35.701	40.002	44.853	50.328	56.513	63.504	71.412
PPE	6.054	5.625	5.613	5.784	6.545	7.328	8.211	9.207	10.331	11.601	13.036	14.659
Capital Asset Turnover	**4,8**	**4,8**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**	**4,9**

Figure 10. Capital Asset Turnover

The goal of this approach is to align PP&E growth with projected revenue growth in the long term. We attempt to deliver realistic valuations for short-term PP&E investments by keeping capital asset turnover at its historical average. It is reasonable to anticipate that HPE will continue to invest in CAPEX to support its digital transition and maintain modern manufacturing facilities.

This approach represents HPE's commitment to remaining competitive in a fast-changing digital economy and adjusting to changing market demands. HPE can improve operational efficiency, boost innovation, and efficiently meet the needs of the digital era by investing in advanced manufacturing facilities.

In HPE's financials, the value of D&A is never greater than the value of CAPEX. This discovery lends credence to the hypothesis that HPE will make additional investments in addition to those required to replace machinery that has reached the end of its useful life.

While we believe that assets will continue to appreciate in value in accordance with the company's development, HPE must capitalize on its CAPEX investments. Failure to do so may result in equipment breakdowns, increasing obsolescence, and the loss of specialized knowledge staff. As a result, not only is HPE's CAPEX driven by the need to replace aged assets, but also by the increase of intangible assets, particularly the constant extension of its patent portfolio.

HPE can efficiently deploy resources to areas that will drive its long-term success by aligning CAPEX with the predicted growth in future core free cash flows. This strategy assures that the company can maintain its technological advances, safeguard its intellectual property, and capitalize on emerging market opportunities.

5 Financial Analysis

In this chapter, we have used a range of metrics to thoroughly evaluate HPE's performance when it comes to making money. These metrics give us important insights into different aspects of the company's profitability, from how well it turns a profit on its products to how it handles taxes. By carefully looking at these metrics, we get a better understanding of how HPE has been doing financially over several years. This helps us see where it is doing well and where there might be some issues. Ultimately, this analysis gives everyone involved a more complete picture of HPE's financial situation, which is crucial for making smart decisions in the ever-changing world of the tech industry.

5.1) Profitability analysis

Analyzing profitability ratios is a fundamental aspect of assessing a company's financial health and performance. These ratios provide invaluable insights into how efficiently a company utilizes its resources to generate profits and returns for its shareholders. In this context, we will delve into three key profitability ratios, see *Figure 12* (values are expressed in millions): Return on Assets (ROA), Return on Equity (ROE), and Return on Invested Capital (ROIC). By understanding these metrics and their calculations, we can gain a comprehensive view of HPE`s financial performance in 2022.

Firstly, let's look at the ROA, which measures how efficiently a company utilizes its assets to generate profits. It can be calculated dividing the EBIT by the Total Assets. In 2022, HPE achieved a ROA of 1,53%, indicating that the company generated 1,53 dollars in operating profit for every 100 dollars of assets. However, this ROA is relatively modest and signifies a decrease of -4,68 pp when compared to the previous year, indicating a decline in asset usage and profitability.

Next, the ROE assesses how effectively a company deploys shareholder capital to generate profits. HPE's ROE for 2022 stood at 4,36% (dividing the Net Income by Equity), indicating that the company earned a 4,36% return on each dollar of shareholder equity. While this ROE represents a moderate level of profitability, it does suggest that HPE efficiently used the funds provided by its shareholders to generate returns. Nonetheless, it represents a -12,76 pp decrease compared to the previous year.

Lastly, the ROIC evaluates the efficiency with which a company's capital assets generate cash flow, irrespective of their financing structure. In 2022, HPE's ROIC was 1,96% (dividing the Noplat by the IC), meaning the company generated approximately 1,96 dollars in cash flow for every 100 dollars invested. Despite its relatively low value and a -5,38 pp variation from the previous year, ROIC provides insights into HPE's ability to generate returns on its capital investments and assesses the effectiveness of its core business activities.

	2020	2021	2022
EBIT	*(442)*	*3 587*	*876*
Assets	*53 938*	*57 699*	*57 123*
ROA	**-0,82%**	**6,22%**	**1,53%**
Net Income	*(322)*	*3 427*	*868*
Equity	*16 096*	*20 017*	*19 909*
ROE	**-2,00%**	**17,12%**	**4,36%**
Noplat	*(322)*	*3 427*	*868*
IC	*44 322*	*46 699*	*44 243*
ROIC	**-0,73%**	**7,34%**	**1,96%**

Figure 11. Profitability Ratios

In summary, these profitability ratios suggest that HPE faced some challenges in 2022, with declines in ROA, ROE, and ROIC compared to the previous year.

HPE experienced consistent revenue growth from 2019 to 2022, averaging a yearly increase of 3%, as it is possible to see in *Figure 13*. However, there was an exception in 2020 when revenues declined by 7%, largely attributable to the widespread impact of the COVID-19 pandemic on the entire industry. The compute segment was the primary contributor to HPE's revenues, accounting for an average of 45% of the total revenues during the period from 2019 to 2022.

Values in millions	2019	2020	2021	2022
Net revenue:				
Compute	13 642	12 215	12 284	12 742
HPC & AI	2 910	3 036	3 184	3 192
Storage	5 185	4 681	4 760	4 711
Intelligent Edge	2 913	2 855	3 302	3 674
Financial Services	3 581	3 352	3 401	3 339
Corporate Investments and Other	507	490	1 356	1 255
A & PS	1 012	951	-	-
Total segment net revenue	**29 750**	**27 580**	**28 287**	**28 913**
Elimination of intersegment net revenue	(615)	(598)	(503)	(417)
Total consolidated net revenue	**29 135**	**26 982**	**27 784**	**28 496**

Figure 12. Net Revenue by Segment

Over the observed period, EBITDA displayed a fluctuating pattern, *see Figure 14*. In 2019, it stood at 1.274 million, but in 2020, there was a significant downturn, reaching -329 million, likely due to the disruptions caused by the pandemic. In 2021, EBITDA showed signs of recovery, reaching 1.132 million, and in 2022, it was 782 million. EBITDA margins, which gauges the firm's operational profitability before accounting for interest, taxes, depreciation, and amortization, also exhibited variation, ranging from -1,2% to 4,4% between 2019 and 2022. EBITDA Margin in 2022, we find it to be 2,7%. In practical terms, this means that HPE achieved an operational profit of approximately 2,7 cents for every dollar of revenue.

	October 31, 2019	October 31, 2020	October 31, 2021	October 31, 2022
EBITDA	**1 274**	**(329)**	**1 132**	**782**
EBITDA margin (%Revenue)	***4,4%***	***-1,2%***	***4,1%***	***2,7%***

Figure 13. EBITDA Margin

In terms of Net Profit, 2021 marked the highest performance with a value of approximately 3.427 million dollars. However, in 2020, there was a notable downturn, with Net Income showing a negative figure of (322) million dollars, primarily attributed to the impact of the pandemic.

5.2) Liquidity Analysis

As part of our valuation of HPE, a thorough Liquidity Analysis was conducted to assess the company's ability to fulfill its short-term financial obligations, see *Figure 15* (values expressed in millions) to resume overview.

Between 2019 and 2022 the Current Ratio was below 1. In 2022, the Current Ratio stood at 0,88, signifying HPE's inability to meet its immediate commitments using its current assets. Essentially, for every dollar in current liabilities, the company held 0,88 dollars in current assets.

Furthermore, we examined the Quick Ratio, a more conservative measure of liquidity as it excludes inventory from current assets. In 2022, HPE's Quick Ratio was 0,66, indicating that the firm possessed 0,66 dollars in highly liquid assets (comprising cash, marketable securities, and receivables) to cover its short-term liabilities. As we can observe in the figure below, this indicator was also below 1 during the period analyzed (2019 to 2022)

Lastly, our analysis included the Cash Ratio, which measures the company's ability to satisfy its short-term obligations using cash and cash equivalents. In 2022, HPE's Cash Ratio was 0,18, ranking lower than 86,87% of 2353 companies in the Hardware industry, indicating that it held 0,18 in cash and cash equivalents for every dollar in short-term obligations. Equivalently to the indicators mentioned before, this one also saw a below 1 value during the timeframe studied.

Liquidity analysis	2019	2020	2021	2022
Current Assets	15.097	16.479	18.878	20.506
Current Liabilities	19.159	18.738	20.687	23.174
Current Ratio	**0,79**	**0,88**	**0,91**	**0,88**
Currrent Assets - Inventories	12.710	13.805	14.367	15.345
Current Liabilities	19.159	18.738	20.687	23.174
Quick Ratio	**0,66**	**0,74**	**0,69**	**0,66**
Cash and Cash Equivalents	3.753	4.233	3.996	4.163
Current Liabilities	19.159	18.738	20.687	23.174
Cash Ratio	**0,20**	**0,23**	**0,19**	**0,18**

Figure 14. Liquidity Analysis

It is worth noting that a ratio greater than 1 suggests a more favorable liquidity position, while a lower ratio may raise concerns about liquidity constraints. In the case of HPE, these liquidity ratios collectively provide insight into the firm's ability to meet its short-term financial obligations, which do not seem to be good, indicating areas where potential improvements may be considered for optimizing liquidity management.

Examining the cash conversion components *(see Figure 9)*, we notice that the Days of Average Holding Period (AHP) have been consistently high and have shown an upward trend over the years. The AHP increased from 44,4 and 52,7 in 2019 and 2020 to 89,4 and 99,2 in 2021 and 2022, respectively. Days of Average Collection Period (ACP) have increased from 37 days in 2019 to 52,5 days in 2022. The Average Payable Period (APP) has been consistently high and has seen an increase since 2019, rising from 104 days in 2019 to 167,5 days in 2022. The cash conversion cycle remained negative between 2019 and 2022, signifying that HPE's operations were primarily financed by investing and financing activities. However, there was an exception in 2021 when the value turned positive.

Net operational cash flows (NOCF) exhibited growth from 2.240 million dollars in 2019 to 4.593 million dollars in 2022.

Across the years ending on October 31, 2020, 2021, and 2022, HPE consistently reported negative cash flows from investments. However, it is worth noting that cash flows generated by operating activities experienced substantial growth during this period, climbing from 2.240 million dollars in 2020 to 5.871 million dollars in 2021 and then to 4.593 million dollars in 2022. These robust operating cash flows effectively funded investment activities in all years except 2020, when they fell slightly short. Despite cash flows from financing activities typically being negative, with values of 883 million dollars in 2020, (3.364) million dollars in 2021, and (1.796) million dollars in 2022, they successfully offset a significant portion of the cash outflows associated with investments.

Therefore, the average Net Cash Flow between 2020 and 2022 amounted to 4.572 million dollars.

Values in millions	2020	2021	2022
Cash flow at the beging of the period	4 076	4 621	4 053
Net cash provided by operating activities	2 240	5 871	4 593
Net cash used in investing activities	(2 578)	(2 796)	(2 087)
Net cash used in financing activities	883	(3 364)	(1 796)
Net cash flow	4 621	4 332	4 763

Figure 15. Cash Flow Analysis

5.3) Capital Structure

HPE's capital structure suffered some changes over the observed period. Equity not only increased in absolute value but also gained more prominence within the capital structure. It rose from 17.149 million dollars in 2019 to 19.909 million dollars in 2022, primarily due to a capital injection.

The total asset value saw an increase from 51.757 to 57.123 between 2019 and 2022, mainly due to expansion in inventory.

The Net Leverage, which can be calculated as (Net Debt – Cash & Cash Equivalents) / EBITDA) increased when compared with the previous period.

Values in millions	2019	2020	2021	2022
Book Value of Equity	17 149	16 096	20 017	19 909
Book Value of Debt	34 654	37 919	37 682	37 214
Assets	51 757	53 938	57 699	57 123
Debt to Equity Ratio	202,1%	235,6%	188,2%	186,9%
Net Leverage	24,26	-102,39	29,76	42,26

Figure 16. Capital Structure

5.4) Economic Value Added (EVA) Analysis

As part of our comprehensive company analysis, we conducted an EVA analysis for HPE to gain insights into the company's effectiveness in leveraging its assets. This analysis involves a critical comparison of the ROIC with the WACC.

In 2022, HPE reported an ROIC of 1,96%, while the WACC stood at 5,2%. The EVA computation, which is derived from subtracting the WACC from the ROIC and then multiplying the result by the Invested Capital (IC), yielded a negative value of -1,44 dollars. This negative EVA indicates that the company's assets are not being optimally utilized to generate returns that exceed the cost of capital.

The EVA formula, (ROIC - WACC) × IC, takes into account the capital employed in the firm, calculated as (Total Assets - Accounts Payable - Cash). A negative EVA underscores that HPE is not generating returns sufficient to cover its cost of capital, signifying inefficiencies in capital allocation and utilization.

This analysis underscores the critical importance of HPE enhancing its profitability and operational efficiency to achieve a positive Economic Value Added. Doing so will not only enhance the company's financial performance but also maximize shareholder value, aligning with its long-term objectives and strategies.

6 Valuation

Our valuation model for this analysis relies on historical data spanning from 2019 to 2022 as its basis. For the years from 2023 to 2030, our model generates cash flow projections. Beyond this timeframe, we establish a terminal value to account for perpetual cash flows. This terminal value is determined by assuming that the cash flows observed in the final year of our forecast (2030) will continue to increase at a fixed nominal rate. This approach helps us estimate HPE's intrinsic value when predicting annual cash flows becomes more uncertain over the long term.

By combining our forecasted period with the perpetual cash flows represented by the terminal value, our method provides a comprehensive assessment of the company's future cash flows, considering both the foreseeable and enduring aspects of its operations.

6.1) Operational Expenses & Earnings Before Interest and Taxes (EBIT)

HPE stands out in the technology sector with its distinct advantages across various segments. In the domain of IT infrastructure, HPE possesses several experienced professionals and high-quality assets that enable the company to deliver superior solutions and outperform its competitors.

Within the enterprise server and storage sector, HPE leverages its expertise to provide efficient and reliable solutions. The company's extensive product portfolio, coupled with its strong focus on innovation, allows HPE to meet the evolving demands of businesses and stay ahead of the competition.

In the hybrid IT and cloud services market, HPE benefits from its comprehensive offerings and deep industry knowledge. The company's strategic investments in cloud computing and hybrid solutions position it as a trusted partner for organizations seeking reliable and secure IT infrastructure.

HPE's software division excels in providing cutting-edge software solutions that empower businesses to optimize their operations. With a range of software offerings, including data management, security, and analytics, HPE enables organizations to leverage technology effectively and drive business growth.

Furthermore, HPE's focus on sustainability and environmental responsibility aligns with growing market trends and customer preferences. By prioritizing energy-efficient technologies and reducing its carbon footprint, HPE positions itself as a responsible corporate citizen while also capturing opportunities in the sustainable technology market.

With a forward-thinking approach, a robust product portfolio, and a commitment to delivering value to its stakeholders, HPE is well-positioned to continue its success in the ever-evolving technology landscape.

The analysis generally assumed the continuation of the current cost structure. For each cost item, an average from 2019 to 2022 was used as a historical reference for projections in 2023 and beyond (*see Figure 18*).

Values in millions	2023	2024	2025	2026	2027	2028	2029	2030
Net revenue	31 840	35 606	39 852	44 643	50 051	56 163	63 073	70 894
Costs and expenses:								
Cost of sales	21 406	23 938	26 793	30 014	33 650	37 759	42 405	47 663
Gross Margin	**10 433**	**11 668**	**13 059**	**14 629**	**16 401**	**18 404**	**20 668**	**23 231**
Operating Expenses								
Research and development	2 194	2 454	2 747	3 077	3 449	3 871	4 347	4 886
Selling, general and administrative	5 498	6 149	6 882	7 709	8 643	9 699	10 892	12 242
Amortization of intangible assets	375	417	477	545	596	671	757	852
Impairment of goodwill	508	568	636	712	799	896	1 006	1 131
Transformation costs	803	898	1 005	1 125	1 262	1 416	1 590	1 787
Disaster charges	48	48	48	48	48	48	48	48
Acquisition, disposition and other related charges	19	19	19	19	19	19	19	19
Total costs and expenses	**30 851**	**34 491**	**38 606**	**43 249**	**48 466**	**54 378**	**61 064**	**68 628**
EBITDA	**989**	**1 115**	**1 247**	**1 394**	**1 585**	**1 785**	**2 009**	**2 266**
Interest and other, net	(225)	(251)	(281)	(315)	(353)	(396)	(445)	(500)
Tax indemnification and related adjustments	73	82	92	103	115	129	145	163
Non-service net periodic benefit credit	114	127	142	159	179	201	225	253
Litigation judgment	-	-	-	-	-	-	-	-
Earnings from equity interests	137	153	171	192	215	241	271	305
EBIT	**1 088**	**1 226**	**1 371**	**1 532**	**1 741**	**1 959**	**2 205**	**2 486**

Figure 17. EBIT Analysis

6.2) CAPEX & Depreciation

The role that CAPEX play in sustaining HPE´s long-term growth and competitiveness. In order to maintain a constant level of capital asset turnover and ensure effective asset use, HPE intends to align its investment in PP&E with anticipated revenue growth. This demonstrates HPE's dedication to innovation, modern technology, and the defense of its intellectual property.

For its digital transition and future growth, HPE's CAPEX strategy focuses on both replacing aging assets and investing in new assets. HPE wants to improve its operational capabilities, satisfy market expectations, and maintain its competitiveness by appreciating the growth of PP&E and successfully controlling obsolescence. With this strategy, HPE can preserve its position as an industry leader, seize new possibilities, and keep its highly skilled workforce while sustaining technical progress.

HPE takes into account the effects of D&A in addition to its CAPEX investments. The fact that the value of D&A is never more than the value of CAPEX shows that HPE invests in intangible assets in addition to replacing old physical assets, including growing its patent portfolio.

By carefully controlling depreciation, HPE makes sure that its assets maintain their worth and advance the business. This plan protects from equipment failures, escalating obsolescence, and the departure of knowledgeable people with specialized skills. For HPE to maintain operational effectiveness, safeguard intellectual property, and take advantage of rising market opportunities, it is essential to manage depreciation along with its CAPEX investments.

6.3) Working Capital

Historical data make it clear that the company's current assets have continuously been lower than its current obligations. A 4-year average holding period, average collecting period, and average paying period (*see Figure 9*) were used to anticipate inventory, accounts receivable, and accounts payable. Applying the historical average weight to revenues yielded these components.

This research sheds light on how the company manages its working capital as well as the distribution of its short-term assets and liabilities, please see *Figure 19*.

Values in millions	2023	2024	2025	2026	2027	2028	2029	2030
Current Assets:								
Cash and cash equivalents	4 582	5 124	5 735	6 424	7 203	8 082	9 076	10 202
Accounts receivable, net of allowances	4 092	4 576	5 122	5 738	6 433	7 218	8 107	9 112
Financing receivables, net of allowances	4 205	4 703	5 264	5 897	6 611	7 418	8 331	9 364
Inventory	4 189	4 685	5 243	5 874	6 585	7 389	8 299	9 328
Other current assets	3 068	3 431	3 840	4 302	4 823	5 412	6 077	6 831
Total current assets	**20 137**	**22 519**	**25 204**	**28 234**	**31 654**	**35 520**	**39 890**	**44 836**
Current Liabilities:								
Notes payable and short-term borrowings	4 623	5 169	5 786	6 481	7 267	8 154	9 157	10 293
Accounts payable	7 573	8 469	9 479	10 618	11 905	13 358	15 002	16 862
Employee compensation and benefits	1 523	1 523	1 523	1 523	1 523	1 523	1 523	1 523
Taxes on earnings	170	170	170	170	170	170	170	170
Deferred revenue	3 836	4 290	4 801	5 378	6 030	6 766	7 599	8 541
Accrued restructuring	261	261	261	261	261	261	261	261
Other accrued liabilities	4 929	5 512	6 169	6 911	7 748	8 694	9 764	10 974
Total current liabilities	**22 914**	**25 393**	**28 188**	**31 342**	**34 903**	**38 926**	**43 475**	**48 623**
Net Working Capital	(2 777)	(2 875)	(2 984)	(3 108)	(3 248)	(3 406)	(3 585)	(3 787)
Changes in Net Working Capital	*(109)*	*(97)*	*(110)*	*(124)*	*(140)*	*(158)*	*(179)*	*(202)*

Figure 18. Net Working Capital

6.4) Dividends

In the past, HPE has paid dividends to its stockholders. Over the years, the company has consistently declared cash dividends per common share (*see Figure 20*). The business declared a cash dividend of 0,36 dollars per common share for the fiscal year that ends on October 31, 2020, for a total dividend payment of 464 million dollars. This was a distribution of profits to shareholders as a reward for their financial commitment.

HPE boosted the cash dividend per common share for the fiscal year ending on October 31, 2021, to 0,48 dollars as part of its ongoing commitment to shareholders. The total dividend payment was 625 million dollars as a result of the higher dividend payout. The company's confidence in its financial situation and capacity to produce reliable cash flows is reflected in the increase in dividends.

In accordance with the most recent information available, HPE declared a cash dividend of 0,48 dollars per common share for the fiscal year ending on October 31, 2022. The entire amount of dividends paid out was 621 million dollars. This demonstrates the business' unwavering dedication to continuing to distribute a portion of its profits to its shareholders.

HPE may show its strength and stability financially and give shareholders a concrete return on their investment by paying dividends. For investors who want to regularly receive income from their stock investments in the company, dividends are a crucial factor to take into account.

HEWLETT PACKARD ENTERPRISE COMPANY AND SUBSIDIARIES
Consolidated Statements of Stockholders' Equity

	Common Stock							
	Number of Shares	Par Value	Additional Paid-in Capital	(Accumulated Deficit) Retained Earnings	Accumulated Other Comprehensive Loss	Equity Attributable to the Company	Non-controlling Interests	Total Equity
	In millions, except number of shares in thousands							
Balance at October 31, 2019	1,294,369	$13	$28,444	$(7,632)	$(3,727)	$17,098	$ 51	$17,149
Net (loss) earnings				(322)		(322)	11	(311)
Other comprehensive loss					(169)	(169)	—	(169)
Comprehensive (loss) income						(491)	11	(480)
Stock-based compensation expense			278			278		278
Tax withholding related to vesting of employee stock plans			(89)			(89)		(89)
Issuance of common stock in connection with employee stock plans and other	17,397		63			63	1	64
Repurchases of common stock	(24,756)		(346)			(346)		(346)
Cash dividends declared ($0.36 per common share)				(464)		(464)	(16)	(480)
Effects of adoption of accounting standard updates relating to the reclassification of stranded tax effects				43	(43)	—		—
Balance at October 31, 2020	1,287,010	$13	$28,350	$(8,375)	$(3,939)	$16,049	$ 47	$16,096
Net earnings				3,427		3,427	9	3,436
Other comprehensive income					1,024	1,024	—	1,024
Comprehensive income						4,451	9	4,460
Stock-based compensation expense			382			382		382
Tax withholding related to vesting of employee stock plans			(86)			(86)		(86)
Issuance of common stock in connection with employee stock plans and other	23,135		49	1		50		50
Repurchases of common stock	(15,511)		(225)			(225)		(225)
Cash dividends declared ($0.48 per common share)				(625)		(625)	(10)	(635)
Effects of adoption of ASC 326, Current expected credit losses				(25)		(25)		(25)
Balance at October 31, 2021	1,294,634	$13	$28,470	$(5,597)	$(2,915)	$19,971	$ 46	$20,017
Net earnings				868		868	5	873
Other comprehensive income					(183)	(183)	—	(183)
Comprehensive income						685	5	690
Stock-based compensation expense			391			391		391
Tax withholding related to vesting of employee stock plans			(111)			(111)		(111)
Issuance of common stock in connection with employee stock plans and other	21,346		54			54	2	56
Repurchases of common stock	(34,943)		(505)			(505)		(505)
Cash dividends declared ($0.48 per common share)				(621)		(621)	(8)	(629)
Balance at October 31, 2022	1,281,037	$13	$28,299	$(5,350)	$(3,098)	$19,864	$ 45	$19,909

Figure 19. Consolidated Statements of Stockholders´Equity. Source: HPE 2022 Annual Report

6.5) Weighted Average Cost of Capital (WACC)

In these subchapter WACC will be introduced, as well as the inputs that this fundamental concept depends on. WACC is very important for our analysis because of the role that it plays to discount the FCFF primarily used in the DCF method.

6.5.1) Capital Structure

The Market Value of Debt and the Market Value of Equity were computed to assess HPE's target capital structure. The number of outstanding shares was multiplied by the stock price, which was the closing price on October 31, 2022, to calculate the Market Value of Equity. It was assumed that the market value of the debt would be equal to its book value. *Figure 21* sums up the capital structure.

Capital Structure	2022
Number of shares outstanding (in millions	1 281
Share price	14
Market Value of Equity	18 280
Book Value of Debt	37 214
Debt to Equity Ratio	203,6%

Figure 20. D/E Ratio Calculation

6.5.2) Risk-Free Rate

The risk-free interest rate is commonly established using the yields of US Treasury zero-coupon bonds as a reference point.

Given their widely acknowledged minimal risk and extensive market acceptance, US Treasury zero-coupon bonds were used in the model as a prevalent benchmark for the risk-free interest rate, with a value of 1%, as of February 2022. This widespread adoption ensures consistency and comparability in assessing investment prospects and making informed financial decisions.

6.5.3) Beta Value

For the Beta value, we chose to rely on the estimates provided by the Financial Times, which stood at 1,2480%.

6.5.4) Market Risk Premium

The market risk premium represents the additional expected return when investing in the overall market compared to a risk-free investment. As of December 9th, 2022, data obtained from Statista was used to calculate a market risk premium of 5,6% for the analysis. Including this market risk premium in our analysis takes into account the expected compensation for the risks associated with investments in the broader market.

6.5.5) Cost of Equity

After considering all the necessary inputs for the CAPM, such as the risk-free rate, market risk premium, leveraged beta, and market risk premium, we arrived at a calculated cost of equity of 8%. The CAPM model, which is widely recognized for estimating expected investment returns based on systematic risk and market expectations, was employed to determine the cost of equity. The 8% cost

of equity represents the minimum return investors anticipate for holding the company's shares, factoring in the investment's level of risk and the potential rewards presented by the overall market.

6.5.6) Cost of Debt

The cost of debt is calculated by dividing the interest payments made during the fiscal year (471 million dollars) by the total debt reported in the 2022 financial report (12.465 million dollars). This calculation yields a cost of debt (r_d) of approximately 3,78%. This percentage represents the interest expenses as a portion of the overall financial debt, indicating the annual interest payment relative to the total outstanding debt.

It is crucial to note that the cost of debt can fluctuate over time and is influenced by factors such as prevailing interest rates, the company's creditworthiness, and broader market conditions. Therefore, this estimate, based on the information available in the 2022 financial report, provides a snapshot of the company's cost of debt at that specific moment.

6.5.7) Weighted Average Cost of Capital (WACC) Calculation

Now that we have all the components necessary to compute the WACC and using the *Equation 5*, we arrive at a discount rate of 5,2%. Below, in *Figure 22* (values in millions), is a summary of the steps required to determine the WACC.

Interest Costs	*471*
Financial Debt	*12 465*
Cost of dept (rd)	**3,78%**
Risk free rate	*1,00%*
Beta	*1,2480*
Market Risk Premium	*5,60%*
Cost of equity (re)	**8%**
Equity	*19 909*
Debt	*37 214*
Equity + Debt	*57 123*
WACC	**5,2%**

Figure 21. WACC Calculation

In the case of HPE, the calculated WACC of 5,2% indicates that the company must generate a return higher than this rate to create value for its shareholders.

6.6) Discounted Cash Flow (DCF) Valuation

Based on the assumptions from the previous section, the following components are projected to compute the FCFF: Revenues, Operational Expenses, CAPEX, Depreciations and Amortizations, and Working Capital.

The WACC rate is used to discount the FCFF once it has been calculated.

This discounting process is essential in arriving at the present value of future cash flows, aiding in the assessment of a company's financial performance and investment attractiveness.

6.6.1) Terminal Value and Growth Rate Estimate

The company's predicted permanent growth rate is expected to be comparable to its projected 3-year revenue compound annual growth rate (CAGR), which is estimated to be 0,94%. This growth rate represents the anticipated long-term annual rise in revenue.

The assumption behind this growth rate is that the company will continue its historical growth path and that external factors affecting revenue creation will stay mostly steady.

This expected growth rate is supported by the data on the Finance Charts website, thus boosting the accuracy of the projection. The perpetual growth rate is an assumption, so it needs to be periodically examined and changed to reflect changes in the business's performance and market circumstances.

To determine the Terminal Value we used *Equation 13*:

A total of 39.998 million dollars constitutes the Terminal Value. This is the company's future value, discounted at the WACC rate.

Using the WACC rate to discount the Terminal Value results in a present value of 26.616 million dollars.

(values in millions €)	2023	2024	2025	2026	2027	2028	2029	2030
EBIT	1 088	1 226	1 371	1 532	1 741	1 959	2 205	2 486
Tax Rate (%)	16,24%	16,24%	16,24%	16,24%	16,24%	16,24%	16,24%	16,24%
NOPLAT	**911**	**1 027**	**1 148**	**1 283**	**1 458**	**1 641**	**1 847**	**2 082**
D&A	2 874	3 213	3 597	4 029	4 517	5 069	5 692	6 398
Changes in NWC	(109)	(97)	(110)	(124)	(140)	(158)	(179)	(202)
CAPEX	3 072	3 422	3 908	4 467	4 889	5 502	6 209	6 985
FCFF	**821**	**916**	**947**	**970**	**1 226**	**1 366**	**1 509**	**1 697**
WACC	**5,22%**							
Growth Rate	**0,94%**							
Discounted FCFF	**781**	**827**	**813**	**791**	**951**	**1 006**	**1 057**	
Terminal Value								**39 998**
Discounted TV	**26 616**							

Figure 22. Terminal Value and FCFF Calculation

6.6.2) Fair Value

The sum of the present value (PV) of all future cash flows is the Enterprise value. The estimated enterprise value is 32.841 million dollars.

The following processes were followed to determine the implied equity value based on the adjustments made to the Enterprise Value:

- Non-Operating Assets: The value of "Cash & Cash Equivalents" amounting to 4.163 million dollars was added to the Enterprise Value.

- Non-Equity Claims: The value of non-equity claims, which includes items such as "Financial debt" amounting to 12.465 million dollars, was subtracted from the Enterprise Value.

The implied equity value, which represents the aggregate market value of all outstanding shares, is therefore determined to be 24.539 million dollars.

The model estimates that the fair value of the share price is 19,16 dollars, representing an upside potential of 34,24%.

6.6.3) Sensitivity Analysis

In this part, we examine how changes in the key value drivers affect the target price. We will first be testing the discount rate and growth rate, then EBIT is evaluated. For the purpose of assessing the effects of various alterations in these factors, we have developed both optimistic and pessimistic scenarios.

Discount rate and growth rate are critical elements that have a significant impact on the firm's worth include the. The risk-free rate or the cost of debt are two WACC components that can alter significantly and have a considerable impact on the firm's value. Similar fluctuations in growth rate, such as a 0,2pp or 0,4pp rise or reduction from the base scenario, might have an impact on the overall valuation.

Regarding the discount rate, we have included variations of ±0,5pp and ±1pp from the base case to assess the impact on the target price.

		WACC				
	19,16	4,8%	5,0%	5,2%	5,7%	5,9%
Growth Rate	0,54%	19,95	18,64	17,44	14,86	13,96
	0,74%	21,06	19,63	18,33	15,56	14,60
	0,94%	22,27	20,72	19,31	16,32	15,30
	1,14%	23,63	21,92	20,39	17,15	16,05
	1,34%	25,13	23,25	21,57	18,05	16,86

Figure 23. Sensitivity Analysis

It is possible to see different combinations of share prices based on various WACC and growth rates in the table that is presented. The table shows the scenarios in which the model predicts a valuation that is less than the price that will actually be paid on October 31, 2022 (highlighted in orange), as well as the scenarios in which the share prices will be higher than the price that will actually be paid (highlighted in white). These scenarios show how the share price is sensitive to variations in the WACC and growth rate. The variation in share prices between 25,13 dollars and 13,96 dollars suggests the valuation may be affected by changing input variables. It is clear that the ensuing share price is greatly influenced by both the WACC and growth rate.

6.7) Relative Valuation

To evaluate and compare HPE's share price to other similar firms, a Relative Valuation analysis was conducted. The selected companies operate in the technology market and are distributed across the six segments in which HPE also operates. All six comparable companies are based in the USA. The chosen multiples for evaluation include Enterprise Value to EBITDA (EV/EBITDA), Price to Earnings (P/E), and Price to Book Value (P/BV) ratios.

Company	Country	Market Cap (in Millions €)	EV/EBITDA	P/E	Price/ Book Value
Insight Enterprises, Inc.	USA	3 970	12,70	15,58	2,42
Super Micro Computer Inc	USA	5 510	17,37	12,61	4,00
TD Synnex Corp	USA	8 400	8,09	12,45	1,03
Zebra Technologies Corp.	USA	13 130	14,69	29,03	4,80
HP Inc	USA	29 270	8,10	11,65	-
Dell Technologies Inc	USA	32 730	16,40	13,81	-
Average HPE Peers		15 502	**12,70**	**15,16**	**1,11**
Median HPE Peers		10 765	13,70	13,21	1,73
HPE Multiple Equity Value			1 626,00	13 159,28	22 116,61
Number of shares Outstanding			**1 281**	**1 281**	**1 281**
HPE Multiple Share Price			1,27	10,27	17,26
Actual Price at 30th Oct 2022			14,27	14,27	14,27
Upside/ Downside			-91%	-28,01%	20,99%

Figure 24. Relative Valuation

To arrive at the implied share price for each multiple, the following process was followed:

First, we calculated an average value for the EV/EBITDA multiple, which is a key metric for valuing companies. By multiplying this average multiple with the actual EBITDA for 2022, we determined the enterprise value of 1.626 million dollars. After adjusting for non-operating assets and non-equity claims, we arrived at the Equity Value of 1.626 million dollars. This suggests an implied share price of 1,27 dollars, which is significantly lower (about 91% less) than the current share price.

Secondly, we determined a geometric average for the P/E (Price-to-Earnings) multiple based on similar companies. This average multiple was calculated to be 15,16 times. To find the Implied Equity Value, we multiplied this average multiple by the actual Net Income. After adjusting for the number of shares outstanding, we arrived at a share price of 10,27 dollars. This implies a downside potential of approximately 28,01% compared to the current share price.

Lastly, we calculated the geometric average of the Price-to-Book Value (P/BV) multiple, which turned out to be 1,11 times. To find the Implied Equity Value, we multiplied this average multiple by the actual book value, resulting in 22.116,61 million dollars. Dividing this equity value by the number of shares outstanding, we determined an implied share price of 17,26 dollars. This implies an upside potential of approximately 20,99% compared to the current share price.

6.8) Valuation Results

There are disparities between the fair values derived from the DCF and relative valuation and the actual share price that are noteworthy. These discrepancies can be due to the choice of the peer group and could be very important. The peer group is made up of businesses that are distinct in size, operate in various locations, and serve slightly different markets.

The results of the relative valuation analysis provide a range of potential share prices, spanning from 1,27 dollars to 17,26 dollars. Notably, the Price-to-Book (P/B) valuation indicates a relatively positive outlook, with an upward potential of approximately 21%. This suggests that there might be room for the stock's price to increase compared to its current level.

However, it's important to highlight that both the Price-to-Earnings (P/E) and Enterprise Value-to-EBITDA (EV/EBITDA) valuations imply a downside potential of -28,01% and -91%, respectively. In simpler terms, these metrics suggest the possibility of a significant decrease in the stock's value relative to its current price.

Investors should carefully consider these valuation results, as they provide insights into potential future movements in the stock's price based on different valuation methods.

As of October 31, 2022, the price predicted by the DCF model is roughly 34,24% higher than the actual share price. The terminal value, which is greatly influenced by the selected growth rate and weighted average cost of capital, accounts for a sizeable amount of the value. Shareholders may think that either future cash flows will be higher or that the cost of capital should be lower, or even both.

Investors would be expecting a growth rate of 0,94% at the end of the anticipated period if we assume that the cost of capital is true. In contrast, investors would be expecting a WACC of 5,22% if the growth rate is accurate.

The share price range produced by the prior sensitivity analysis, which presents many scenarios, is between 13,96 dollars and 25,13 dollars. This range illustrates possible results based on changes in the discount rate, growth rate, and EBIT, taking both optimistic and pessimistic scenarios into account.

To fully comprehend the prospective worth of the shares, it is crucial to take into account these various viewpoints and scenarios. Investors can make more informed decisions thanks to the sensitivity analysis, which offers insights into the possible range of share values.

7 Conclusion

The primary objective of this project was to determine the fair value of HPE's shares and compare it with the stock price as of October 31st, 2022. This valuation process encompassed a DCF analysis, a relative valuation, and a sensitivity analysis.

To lay the groundwork, the Theoretical Overview section provided a comprehensive understanding of the key methodologies employed in equity valuation. This theoretical foundation proved invaluable in shaping the subsequent analysis. Additionally, an in-depth exploration of HPE's external and internal environment unveiled various growth opportunities, guiding the choice of valuation methods and assumptions.

For the DCF valuation, we adopted the free cash flow to the firm approach. This involved forecasting cash flows and discounting them at the WACC, reflecting the expected return for both equity and debt holders. In the relative valuation approach, a peer group of companies with similar risk profiles and cash flow potential was selected. Three multiples—P/E ratio, EV/EBITDA, and P/BV—were used for comparison.

The DCF analysis revealed that, as of October 31st, 2022, HPE's share price was undervalued by approximately 34,24%. Nevertheless, in the sensitivity analysis, various scenarios were explored, revealing potential situations where the share price could either be undervalued or overvalued. The relative valuation approach yielded mixed results: EV/EBITDA and P/E ratios indicated overvaluation by 91% and 28,01%, respectively, while P/BV suggested undervaluation by 20,99%. According to our model, investors were trading HPE's shares below their true value, benefiting buyers while potentially causing losses for sellers of HPE stock.

It is important to acknowledge that the DCF model relied on the assumption that HPE's annual report would be fully adhered to. Any unforeseen setbacks could affect the company's true value.

Furthermore, it is worth noting that data limitations, both internal and external, impacted the quality of the model's assumptions and final results. Access to information within and outside the company was restricted, with reliance on publicly available data from the internet.

In conclusion, by taking into account multiple approaches and situations, the valuation process sought to offer insights into the fair value of HPE shares.

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International Monetary Fund (IMF): https://www.imf.org/en/Home

Markets and Markets: https://www.marketsandmarkets.com/

Report Linker: https://www.reportlinker.com/

Appendix

Annex A - Balance Sheet Assets: Historical

ASSETS	2019	2020	2021	2022
Current assets:				
Cash and cash equivalents	3 753	4 233	3 996	4 163
Accounts receivable, net of allowances	2 957	3 386	3 979	4 101
Financing receivables, net of allowances	3 572	3 794	3 932	3 522
Inventory	2 387	2 674	4 511	5 161
Other current assets	2 428	2 392	2 460	3 559
Total current assets	**15 097**	**16 479**	**18 878**	**20 506**
Property, plant and equipment	6 054	5 625	5 613	5 784
Long-term financing receivables and other assets	8 918	10 544	11 670	10 537
Investments in equity interests	2 254	2 170	2 210	2 160
Goodwill and intangible assets	19 434	19 120	19 328	18 136
Total non-current assets	**36 660**	**37 459**	**38 821**	**36 617**
Total assets	**51 757**	**53 938**	**57 699**	**57 123**

Annex B - Balance Sheet Assets: Projections

ASSETS	2023	2024	2025	2026	2027	2028	2029	2030
Current assets:								
Cash and cash equivalents	4 582	5 124	5 735	6 424	7 203	8 082	9 076	10 202
Accounts receivable, net of allowances	4 092	4 576	5 122	5 738	6 433	7 218	8 107	9 112
Financing receivables, net of allowances	4 205	4 703	5 264	5 897	6 611	7 418	8 331	9 364
Inventory	4 189	4 685	5 243	5 874	6 585	7 389	8 299	9 328
Other current assets	3 068	3 431	3 840	4 302	4 823	5 412	6 077	6 831
Total current assets	**20 137**	**22 519**	**25 204**	**28 234**	**31 654**	**35 520**	**39 890**	**44 836**
Property, plant and equipment	6 536	7 309	8 181	9 164	10 274	11 529	12 947	14 553
Long-term financing receivables and other assets	11 834	13 234	14 812	16 592	18 602	20 874	23 442	26 349
Investments in equity interests	2 199	2 199	2 199	2 199	2 199	2 199	2 199	2 199
Goodwill and intangible assets	19 005	19 005	19 005	19 005	19 005	19 005	19 005	19 005
Total non-current assets	**39 573**	**41 746**	**44 195**	**46 959**	**50 080**	**53 606**	**57 593**	**62 105**
Total assets	**59 709**	**64 264**	**69 400**	**75 193**	**81 734**	**89 125**	**97 483**	**106 941**

Annex C - Balance Sheet Liabilities: Historical

LIABILITIES	2019	2020	2021	2022
Current liabilities:				
Notes payable and short-term borrowings	4 425	3 755	3 552	4 612
Accounts payable	5 595	5 383	7 004	8 717
Employee compensation and benefits	1 522	1 391	1 778	1 401
Taxes on earnings	186	148	169	176
Deferred revenue	3 234	3 430	3 408	3 451
Accrued restructuring	195	366	290	192
Other accrued liabilities	4 002	4 265	4 486	4 625
Total current liabilities	**19 159**	**18 738**	**20 687**	**23 174**
Long-term debt	9 395	12 186	9 896	7 853
Other non-current liabilities	6 100	6 995	7 099	6 187
Total non-current liabilities	**15 495**	**19 181**	**16 995**	**14 040**
Total Liabilities	**34 654**	**37 919**	**37 682**	**37 214**

Annex D - Balance Sheet Liabilities: Projections

LIABILITIES	2023	2024	2025	2026	2027	2028	2029	2030
Current liabilities:								
Notes payable and short-term borrowings	4 623	5 169	5 786	6 481	7 267	8 154	9 157	10 293
Accounts payable	7 573	8 469	9 479	10 618	11 905	13 358	15 002	16 862
Employee compensation and benefits	1 523	1 523	1 523	1 523	1 523	1 523	1 523	1 523
Taxes on earnings	170	170	170	170	170	170	170	170
Deferred revenue	3 836	4 290	4 801	5 378	6 030	6 766	7 599	8 541
Accrued restructuring	261	261	261	261	261	261	261	261
Other accrued liabilities	4 929	5 512	6 169	6 911	7 748	8 694	9 764	10 974
Total current liabilities	**22 914**	**25 393**	**28 188**	**31 342**	**34 903**	**38 926**	**43 475**	**48 623**
Long-term debt	9 833	9 833	9 833	9 833	9 833	9 833	9 833	9 833
Other non-current liabilities	7 492	8 378	9 378	10 505	11 778	13 216	14 842	16 682
Total non-current liabilities	**17 325**	**18 211**	**19 210**	**20 337**	**21 610**	**23 048**	**24 674**	**26 515**
Total Liabilities	**40 238**	**43 604**	**47 399**	**51 679**	**56 513**	**61 974**	**68 150**	**75 138**

Annex E - Balance Sheet Equity: Historical

Stockholders' equity	2019	2020	2021	2022
Common stock, $0.01 par value	13	13	13	13
Additional paid-in capital	28 444	28 350	28 470	28 299
Accumulated deficit	(7 632)	(8 375)	(5 597)	(5 350)
Accumulated other comprehensive loss	(3 727)	(3 939)	(2 915)	(3 098)
Total HPE stockholders' equity	**17 098**	**16 049**	**19 971**	**19 864**
Non-controlling interests	51	47	46	45
Total stockholders' equity	**17 149**	**16 096**	**20 017**	**19 909**

Annex F - Balance Sheet Equity: Projections

Stockholders' equity	2023	2024	2025	2026	2027	2028	2029	2030
Common stock, $0.01 par value	13	13	13	13	13	13	13	13
Additional paid-in capital	28 391	28 391	28 391	28 391	28 391	28 391	28 391	28 391
Accumulated deficit	(6 739)	(6 739)	(6 739)	(6 739)	(6 739)	(6 739)	(6 739)	(6 739)
Accumulated other comprehensive loss	(3 420)	(3 420)	(3 420)	(3 420)	(3 420)	(3 420)	(3 420)	(3 420)
Total HPE stockholders' equity	**18 246**	**18 246**	**18 246**	**18 246**	**18 246**	**18 246**	**18 246**	**18 246**
Non-controlling interests	47	47	47	47	47	47	47	47
Total stockholders' equity	**18 293**	**18 293**	**18 293**	**18 293**	**18 293**	**18 293**	**18 293**	**18 293**

Annex G - Income Statement: Historical

	October 31, 2019	October 31, 2020	October 31, 2021	October 31, 2022
Net revenue	29 135	26 982	27 784	28 496
Costs and expenses:				
Cost of sales	19 642	18 513	18 408	18 990
Gross Margin	**9 493**	**8 469**	**9 376**	**9 506**
Operating Expenses				
Research and development	1 842	1 874	1 979	2 045
Selling, general and administrative	4 907	4 624	4 929	4 941
Amortization of intangible assets	267	379	354	293
Impairment of goodwill	-	865	-	905
Transformation costs	453	950	930	473
Disaster charges	(7)	26	16	48
Acquisition, disposition and other related charges	757	80	36	19
Total costs and expenses	**27 861**	**27 311**	**26 652**	**27 714**
EBITDA	**1 274**	**(329)**	**1 132**	**782**
Interest and other, net	(177)	(215)	(211)	(188)
Tax indemnification and related adjustments	377	(101)	65	(67)
Non-service net periodic benefit credit	59	136	70	134
Litigation judgment	-	-	2 351	-
Earnings from equity interests	20	67	180	215
EBIT	**1 553**	**(442)**	**3 587**	**876**
Provision for taxes	(504)	120	(160)	(8)
Net Income	**1 049**	**(322)**	**3 427**	**868**
Net earnings per share:				
Basic	0,78	(0,25)	2,62	0,67
Diluted	0,77	(0,25)	2,58	0,66
Cash dividends declared per share	0,4575	0,36	0.48	0.48
Weighted-average shares used to compute net earnings per share:				
Basic	1 353	1 294	1 309	1 303
Diluted	1 366	1 294	1 330	1 322

Annex H - Income Statement: Projections

	2023	2024	2025	2026	2027	2028	2029	2030
Net revenue	31 840	35 606	39 852	44 643	50 051	56 163	63 073	70 894
Costs and expenses:								
Cost of sales	21 406	23 938	26 793	30 014	33 650	37 759	42 405	47 663
Gross Margin	**10 433**	**11 668**	**13 059**	**14 629**	**16 401**	**18 404**	**20 668**	**23 231**
Operating Expenses								
Research and development	2 194	2 454	2 747	3 077	3 449	3 871	4 347	4 886
Selling, general and administrative	5 498	6 149	6 882	7 709	8 643	9 699	10 892	12 242
Amortization of intangible assets	375	417	477	545	596	671	757	852
Impairment of goodwill	508	568	636	712	799	896	1 006	1 131
Transformation costs	803	898	1 005	1 125	1 262	1 416	1 590	1 787
Disaster charges	48	48	48	48	48	48	48	48
Acquisition, disposition and other related charges	19	19	19	19	19	19	19	19
Total costs and expenses	**30 851**	**34 491**	**38 606**	**43 249**	**48 466**	**54 378**	**61 064**	**68 628**
EBITDA	**989**	**1 115**	**1 247**	**1 394**	**1 585**	**1 785**	**2 009**	**2 266**
Interest and other, net	(225)	(251)	(281)	(315)	(353)	(396)	(445)	(500)
Tax indemnification and related adjustments	73	82	92	103	115	129	145	163
Non-service net periodic benefit credit	114	127	142	159	179	201	225	253
Litigation judgment	-	-	-	-	-	-	-	-
Earnings from equity interests	137	153	171	192	215	241	271	305
EBIT	**1 088**	**1 226**	**1 371**	**1 532**	**1 741**	**1 959**	**2 205**	**2 486**
Provision for taxes	(138)	(138)	(138)	(138)	(138)	(138)	(138)	(138)
Net Income	**950**	**1 088**	**1 233**	**1 394**	**1 603**	**1 821**	**2 067**	**2 348**
Net earnings per share:								
Basic	0,72	0,83	0,94	1,06	1,22	1,39	1,57	1,79
Diluted	0,72	0,82	0,93	1,05	1,21	1,37	1,56	1,77
Cash dividends declared per share	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Weighted-average shares used to compute net earnings per share:								
Basic	1 315	1 315	1 315	1 315	1 315	1 315	1 315	1 315
Diluted	1 328	1 328	1 328	1 328	1 328	1 328	1 328	1 328

Annex I - Working Capital: Historical

Values in millions	2019	2020	2021	2022
Current Assets:				
Cash and cash equivalents	3 753	4 233	3 996	4 163
Accounts receivable, net of allowances	2 957	3 386	3 979	4 101
Financing receivables, net of allowances	3 572	3 794	3 932	3 522
Inventory	2 387	2 674	4 511	5 161
Other current assets	2 428	2 392	2 460	3 559
Total current assets	**15 097**	**16 479**	**18 878**	**20 506**
Current Liabilities:				
Notes payable and short-term borrowings	4 425	3 755	3 552	4 612
Accounts payable	5 595	5 383	7 004	8 717
Employee compensation and benefits	1 522	1 391	1 778	1 401
Taxes on earnings	186	148	169	176
Deferred revenue	3 234	3 430	3 408	3 451
Accrued restructuring	195	366	290	192
Other accrued liabilities	4 002	4 265	4 486	4 625
Total current liabilities	**19 159**	**18 738**	**20 687**	**23 174**
Net Working Capital	(4 062)	(2 259)	(1 809)	(2 668)
Changes in Net Working Capital		*1 803*	*450*	*(859)*

Annex J – Relative Valuation EV/EBITDA

Company	Country	Market Cap (in Millions €)	EV/EBITDA
HPE	USA	18 570	8,02
Insight Enterprises, Inc.	USA	3 970	12,70
Super Micro Computer Inc	USA	5 510	17,37
TD Synnex Corp	USA	8 400	8,09
Zebra Technologies Corp.	USA	13 130	14,69
HP Inc	USA	29 270	8,10
Dell Technologies Inc	USA	32 730	16,40
Average HPE Peers		15 502	**12,70**
Median HPE Peers		10 765	13,70
HPE EBITDA			782
HPE Multiple EV			9 928
Non-Operating Assets			4 163
Non-Equity claims			12 465
HPE Equity Value			1 626
Number of shares Outstanding			1 281
HPE Multiple Share Price			1,27
Actual Price at 30th Oct 2022			14,27
Upside/ Downside			-91%

Annex K – Relative Valuation P/E

Company	Country	Market Cap (in Millions €)	P/E
HPE	USA	18 570	22.05
Insight Enterprises, Inc.	USA	3 970	15,58
Super Micro Computer Inc	USA	5 510	12,61
TD Synnex Corp	USA	8 400	12,45
Zebra Technologies Corp.	USA	13 130	29,03
HP Inc	USA	29 270	11,65
Dell Technologies Inc	USA	32 730	13,81
Average HPE Peers		**15 501,7**	**15,16**
Median HPE Peers		10 765,0	13,21
HPE Net Income			868
HPE Equity Value			13 159
# of shares Outstanding			1 281
HPE Multiple Share Price			**10,27**
Actual Price at 30th Oct 2022			14,27
Upside/ Downside			-28,01%

Annex L – Relative Valuation Price/ Book Value

Company	Country	Market Cap (in Millions €)	Price/ Book Value
HPE	USA	18 570	0,93
Insight Enterprises, Inc.	USA	3 970	2,42
Super Micro Computer Inc	USA	5 510	4,00
TD Synnex Corp	USA	8 400	1,03
Zebra Technologies Corp.	USA	13 130	4,80
HP Inc	USA	29 270	-
Dell Technologies Inc	USA	32 730	-
Average HPE Peers		**15 501,7**	**1,11**
Median HPE Peers		10 765,0	1,73
HPE Book Value			19 909
HPE PBV Equity Value			**22 117**
# of shares Outstanding			1 281
HPE PBV Share Price			**17,26**
Actual Price at 30th Oct 2022			14,27
Upside/ Downside			20,99%