VILNIUS UNIVERSITY
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SUSTAINABLE BUSINESS FINANCE AND INVESTMENTS PROGRAMME

THE FINAL MASTER'S THESIS (PROJECT)

Evaluation Of The Efficiency Of Financial Activities Of Ørsted'	Ørsted finansinės veiklos efektyvumo vertinimas

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Summary In English

Ørsted once known as DONG Energy, a Danish oil and gas company recently transformed itself from an offshore oil drilling business to a major clean power generator. Despite tough times including supply chain issues, higher costs for materials and regulatory risks Ørsted remains on course to develop more renewable energy projects with the intention of upping its offshore wind capacity to 35-38 gigawatts (GW) by 2030, the company has said. ©Finance The company follows an integrated financing strategy and use green bonds and other sustainable financial instruments to finance its operations. In an environment where a further slide in interest rates or other uncertainties may push the business case, there are risks from external factors, but Ørsted is actually not shying away from sustainability all together and is continuing to invest in energy storage innovation and technology that will bring down cost and increase efficiency. Supported by attractive market fundamentals and government backing for renewable energy, Ørsted is an excellent place to reside long-term in the international energy markets. Ørsted has solid long-term opportunity in place because global decarbonization targets continue expand demand for offshore wind and governments are still backing renewables through incentives and climate policy. Specifically, the firm uses green bonds and sustainable financial mechanisms to tap capital as it invests in tech updates and energy storage systems to drive down LCOE, even out production levels, and solidify long-term cash flow. Ørsted's trajectory demonstrates how renewable energy companies need to reconcile steep upfront investment and market risk with innovation, policy support and disciplined financing in order to continue growing amid the clean-energy transition

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Summary In Lithuanian

Ørsted, anksčiau žinoma kaip DONG Energy, yra Danijos naftos ir dujų bendrovė, kuri pastaraisiais metais iš esmės transformavosi iš jūrinės naftos gręžimo verslo į vieną iš pagrindinių švariosios energijos gamintojų. Nepaisant sudėtingų laikotarpių, įskaitant tiekimo grandinės sutrikimus, išaugusias medžiagų sąnaudas ir reguliacines rizikas, Ørsted išlieka pasiryžusi plėtoti atsinaujinančiosios energijos projektus. Bendrovė paskelbė, kad iki 2030 m. siekia padidinti savo jūrinio vėjo energijos pajėgumus iki 35–38 gigavatų (GW).

Įmonė taiko integruotą finansavimo strategiją ir savo veiklai finansuoti naudoja žaliąsias obligacijas bei kitus tvarius finansinius instrumentus. Aplinkoje, kurioje galimas tolesnis palūkanų normų mažėjimas ar kiti neapibrėžtumai gali daryti spaudimą verslo modeliui, išoriniai veiksniai kelia tam tikrų rizikų. Vis dėlto Ørsted nesitraukia nuo tvarumo tikslų ir toliau investuoja į energijos kaupimo inovacijas bei technologijas, kurios padeda mažinti sąnaudas ir didinti veiklos efektyvumą.

Remiama palankių rinkos fundamentalių veiksnių ir vyriausybių paramos atsinaujinančiai energetikai, Ørsted yra patraukli ilgalaikė investicija tarptautinėse energijos rinkose. Bendrovė turi tvirtas ilgalaikes augimo perspektyvas, nes pasauliniai dekarbonizacijos tikslai toliau didina jūrinio vėjo energijos paklausą, o vyriausybės ir toliau remia atsinaujinančią energetiką per paskatas ir klimato politiką.

Konkrečiai, įmonė naudoja žaliąsias obligacijas ir tvarius finansinius mechanizmus kapitalui pritraukti, investuodama į technologinius atnaujinimus ir energijos kaupimo sistemas, siekdama sumažinti elektros energijos gamybos savikainą (LCOE), išlyginti gamybos svyravimus ir sustiprinti ilgalaikius pinigų srautus. Ørsted vystymosi kryptis parodo, kaip atsinaujinančiosios energetikos įmonės turi suderinti dideles pradines investicijas ir rinkos rizikas su inovacijomis, politine parama ir drausmingu finansavimu, kad galėtų toliau augti švariosios energijos pereinamuoju laikotarpiu.

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Abbreviation

ROA - Return on Assets

ROE - Return on Equity

EBITDA - Earnings Before Interest, Taxes, Depreciation, and Amortization

EVA - Economic Value Added

TSR - Total Shareholder Return

OR - Operational Revenue

NPV - Net Present Value

IRR - Internal Rate of Return

WACC - Weighted Average Cost of Capital

CAPEX - Capital Expenditure

OPEX - Operating Expenditure

CAGR - Compound Annual Growth Rate

ROI - Return on Investment

TFA - Total Fixed Assets

SVM - Support Vector Machine

KNN - K-Nearest Neighbors

ANOVA - Analysis of Variance

F-stat - F-statistic

P/E - Price-to-Earnings

COGS - Cost of Goods Sold

Introduction

The running of a concern is dependent upon financial operations it helps to hold down costs and look ahead for future development. Organizations such as Ørsted need to ensure prudent use of funds in order to stay competitive and, in view of today's rapid changes in the economy, to keep ahead of their rivals. In this paper, Ørsted's quid seems to be pretty good at managing its money almost as good as anyone's. Of the investment companies that provided data, 39% responded, whereas 40% didn't respond because their willingness exceeded the present data inquiry time limit; the rest did not provide data at all. The research also looks at whether Ørsted's procedures are in accordance with its overall business goals for growth. The study seeks to analyze Ørsted's financial management using a few major financial ratios such as earnings efficiency, liquidity, and solvency and questions how well it is really doing. The research aims to locate Ørsted's strengths and weaknesses in financial terms by looking at these factors and then offers practical advice on where it might do better with individual investment choices. They both used quantitative and qualitative methods in their research techniques to gather a wide range of information from Ørsted financial reports over a certain period, in addition to making comparisons between Ørsted and its rivals in terms of performance(*Ørsted Investor Presentation Q4 2024*, n.d.).

This gives a fuller picture of where the company ranks in the marketplace. In conclusion, some of the major goals for the thesis are examining how sound financial performance affects a company's strategy, decision-making, operating effectiveness, and total profit levels looking for factors that contribute to financial success, such as economic conditions, managerial decisions, and allocation of resources and seeing where Ørsted fits its financial plans with its long-range goals especially when managing cash flow, debt levels, and apportionment of capital. In the later chapters we also examined financial forecasting and scheduling as a way to avoid risks and keep production going(Bohl et al., 2013).

This thesis examines specifically the connection between financial efficiency and a range of corporate operations. It explains how major financial activities are critical for the smooth running of the entire company and how important the production innovation is over long periods of time. The objective of our study is to find areas in which the long-term financial performance of Ørsted could be improved and suggest methods for doing so. Ultimately, the research serves to enhance business performance, improve financial results, and raise profits and returns. The study also examines how changes in macroeconomic and financial environments affect business financial management. This is a particularly important point for businesses in fields that are high risk and have tough competition. The study gives Ørsted concrete proposals on how it could improve its financial activities by making a comprehensive

review. This will ensure that the enterprise uses its resources most effectively to achieve development goals that are consistent with its aims. other enterprises wanting to make their financial machinery run more smoothly can use these findings as a list to work from and then put it into full play(Steffen et al., 2025).

Ørsted's scrapping of large offshore projects on account of inflation, supply chain bottlenecks and financing expenses is a reminder of how renewable energy firms need to continue to be financially sound if they are going to maintain growth over the long-term but at the same time how their fortunes remain tethered tightly to macroeconomic shocks and regulatory retooling. the study explores how theories of financial efficiency and models of financial performance might help to understand and assess these tensions.

The study examines the financial effectiveness and performance of Ørsted in the renewable energy industry with emphasis on offshore wind projects. The impact of financing policy (green bonds and sustainable instruments), corporate governance characteristics, cost structure and macroeconomic disruptions (interest rates, policy uncertainty) on financial effects are therefore analyzed. Ørsted's financial performance, some interesting insights on the links and interconnection between Sales, Profit, and Cost of Goods Sold were obtained. Based different algorithm like Linear Regression, ANOVA, SVM, KNN, and the Granger Causality test, I obtained useful knowledge on Ørsted's business specifics.

Purpose of the Research

This paper's objective is to analyze the financial efficiency and longevity of companies when working on green field renewable projects such as Ørsted and how well-established financial theories and measures of performance measure drivers, risk appetite, and investment returns. The research shall investigate how mineral carbonation efficiency can be achieved in the face of uncertainties in renewable energy market by using financial instruments and sustainable financing strategies to ensure long-term competitiveness.

Theoretical Economic Efficiency theories and the real financial dynamics of renewable investments, involving Ørsted as an applied example of a corporate portfolio shift from fossils to offshore wind. A majority of previous studies either concentrate mainly on reductions in renewable energy technology costs (e.g., LCOE) or financial performance indicators far fewer build te efficiency construct (EMH, cost–benefit, agency theory, dynamic efficiency) centered specifically around finance-related strictures to determine whether a particular renewable project remains economically viable when locked into interest rate and supply chain volatility, as well as policy regimes.

Theis is divided in 3-part initial start with Literature Review study and analysis different papers, after that start with Research Methodology and discuss about different methods and Analysis techniques in last section is result analysis and discussion on comparative analysis and algorithms.

The Limitation of study is availability of granular project-level financial data (e.g., precise WACC assumptions, contract pricing, and hedging terms) and market/policy volatility that makes it challenging to tease out clear cause–effect relationships in Ørsted's financial performance.

Chapter 1. Literature review

1.6 Theoretical foundations of financial efficiency

In corporate finance, and in banking, financial efficiency is the attempt to bring about maximum profit (benefit) for given living conditions and equal consumption. There are many theoretical underpinnings on why a consensus might be reached as to how the financial markets are supposed to behave. One of the most popular theories, describing stock price movement is Efficient Market Hypothesis (EMH) of Fama theory claims that in a semi-strong form market prices reflect all available information or no investor can achieve returns above average market return with an equal amount risk consistently. In the fine print: Ørsted and its annual reports, come investor deck give a window as to what financial efficiency means when an ORE (or renewables in general) investment like wind farm construction to time of their operation actual performance versus MWh's provider effect on the production quite literally rises off the reoccurring expense structure at corporate level. For example, Ørsted's financial statement for 2024 reveals a remarkable surge of income from strategic options and concentration in offshore wind projects (Ørsted Investor Presentation Q4 2024, n.d.).Cost-benefit analysis Another theoretical basis is the cost-benefit approach, which allows one to consider if a decision is financially viable or not comparing its costs with its benefits. This same kind of analyses is conducted in Ørsted when evaluating long-term value and financial efficiency of investments such as expansion of offshore wind farms (Ørsted Investor Presentation Q4 2024, n.d.). Further, ratio analysis such as profitability and liquidity ratios is a model to appraise an efficiency with which the company is utilising resources. One can discover, by reading Ørsted's quarterly reports about its strategic modifications that it poses changes in order to maintain financial measures (Steffen et al., 2025). Agency theory also contributes to financial efficiency, too especially in a company like Ørsted, where management and shareholders may well have different interests. A theory that describes the oppositional relationship between agents and principals, such as managers and owners, in order to reconcile their interest for enhanced financial performance. The fact is that Ørsted's financial results, their strategy to make adjustments in the way they operate, will be based on a compromise between managerial practices and shareholder demands (Delapedra-Silva et al., 2022). Ørsted should be able to achieve the kind of broad-based financial efficiency efficient over time, despite significant short-term uncertainties in renewable energy markets, that is implied by dynamic efficiency theory, which is all about company adaptability to long-run shifts in its operating environment.

This article studies technological and economic evolution in onshore wind power between 2008 and 2016. It compares design of wind mills, cost and energy yield in six participating countries. A key conclusion is that there is a higher penetration of bigger, taller

turbines with lower specific power but also higher capacity factor despite the small reduction of the average wind resource values for new sites. During that time, the capital cost ($/kW) for wind dropped 10%, while the levelized cost of energy (LCOE) decreased by 33%, falling to 48€/MWh in 2016. The piece asserts that while the costs are down, the wind value has decreased even more so and grid points (where renewable energy price becomes equal in cost to what is sold in the market) would be kicked farther down the road than ever(Bohl et al., 2013).

The results are discussed by key components such as: individual power role; project finance role and operational cost. It has been found that the turbine with increased size and increased efficiency in energy capture played a crucial role to reduce LCOE. Notably, the lower SPC, financing cost and capital cost contributed 45%, 25% and 17% of the reduction in LCOE. However, those falls were partially offset by a drop in the market value of wind power, with the average value of wind generation down 43% across the countries covered(Duffy et al., 2020).

The model uses many different data points, such as wind project performance (MEF50 series) data, capital cost (CapEx), operating cost (OpEx) and weighted average cost of capital. Data was obtained through industry surveys and national data sources providing a complete view for cost and technology development over time in the wind sector. The study underscores the importance of factoring in both costs and market value of wind energy into future policy design and planning, as it shows that while technology costs are falling, so is the market value of wind power(Baik et al., 2013).

Analyses the price development of land-based wind markets in Germany, Denmark, Ireland, Norway, Sweden and the USA across the period 2008 up to 2016. Calculation terms mostly appeared in the investment, operating costs and hours used in wind resources projects. The average cost of levelized electricity (LCOE) plummeted by a third, due to technological advancements and increasing turbine size. The cost of offshore wind is not doing the same – it remains low in absolute terms (compared to other generation sources), and so grid parity is still ac hieved at a high price. The changes are modeled in the report according to financial models and industry data, which provides a field-estimated sense of just how much it's the financial incentives that have pushed wind energy prices – and by extension wind power itself. The article extrapolates that policy support remains necessary to drive down costs and to spur the market introduction of renewable energy technologies. And it highlights financial risks and rewards in a market that is expanding rapidly with wind energy(Augutis et al., 2020).

Discusses sustainability in terms of the financial aspect of wind electricity enterprises in the Baltic countries. The author intends to determine the relation between the financial well-being of these enterprises and the policy instruments that relate to that specific kind of energy:

feed-in-tariff and bonus scheme. The quantification method used is mainly financial ratios in four groups: leverage, profitability, liquidity, and asset utilization, which helps determine the vitality and sustainability in independent living. “The calculation is based on financial statement analysis, bankruptcy forecasting models (Altman et al., Liss and Tafler) and trend analyses for the last five years, giving a detailed insight into the financial behavior of companies using the tree state comparison”. The article results point out that Lithuania and Estonia have a higher financial leverage, which means both are highly dependent on, whereas Latvia has much equity. On the one hand, these three countries have developed a market of wind electricity quite well and to a relevant extent, yet the financial sustainability of companies is at higher median level, with different possibility for bankruptcy prevalence in the examined states. Long-term financial stability is ensured primarily if the liquidity, profitability, and fixed asset usage is effectively controlled. This study could serve as a useful reference in further researching economically how policies on wind energy may influence and also help to give recommendations for policy makers and investors on strengthening the financial risk ability of wind electricity enterprises; hence, it makes a valuable reference for further research(Areliano & Boverb, n.d.).

Finance management as a major role and its Implications on implementation of Renewable energy projects (case study more focus on wind project). In this article the issues companies have in financing capital intensive deals for renewable energy will be outlined. It represents how market volatility, political unknowns and regulatory changes are influencing investment in renewable energy. Baker emphasises the need for robust policy frameworks and incentive systems to reduce risk perceptions from investment in renewable energy technologies. Non-traditional financing, such as green bonds and public–private partnership arrangements, for renewable energy projects are also found to be potentially relevant. Further, the assessment analyses financial risks faced by wind power generation under uncertainty about electricity production and market prices which are going to determine project IRR. The study reveals that financially the wind industry is viable on a twin parallel track of good financial management and supportive policy because of which it would assist in knocking off investment hindrances which currently acts as wrinkle to growth vis-à-vis other clean energy sectors(Baltagi, n.d.).

1.2 Models and approaches to financial activity evaluation

The financial metric aids in evaluating the efficiency, profitability, and financial standing of companies. Employ various models and techniques to gain insights into a company’s viability and assess the efficiency of its financial resource utilization. Ratio analysis Ratio analysis is another popular approach that uses financial ratios to help figure out how profitable, liquid, efficient and solvent a business is. ROA, ROE and the current ratio are all examples of

financial metrics you can use to assess how a company is doing financially. Ratios that can be calculated based on business records or financial statements indicate how effectively a company utilizes its assets to generate revenue (Nassani et al., 2025).

Flow cash analysis is a typical way of viewing monetary transactions. It's about deciding what to do when money comes and goes. Actually, you need to do a cash flow analysis: This detail how much money your business receives and spends at any given time, based on recent sales data, account balances and other factors. It is runoff that a company with strong positive free cash flow can be continued, reinvest back to the business and returned from stockholders (Steffen et al., 2025). Economic value added, or EVA, is one way of determining how well a company's doing by considering how much profit it can generate over the cost of capital. EVA calculates the variance in between NOPAT and cost of capital, so companies can be value creating. Benchmarking is also quite critical for financial analysis. This is the method of companies asking themselves relative to their competitors or the industry in general how good a job management has done. It is useful for instantly learning about issues in the business environment that the relevant company operates in, as well as its shortcomings. This type of knowledge is generally reported in financial reports too where they present how their offshore wind projects perform along other companies. Cost benefit analysis describes the comparison of an investment or business opportunity with its cost. When considering different capital investment / infrastructure projects, this model will be an important deciding factor for what to do and what not to do (Ørsted Investor Presentation Q4 2024, n.d.).

Total shareholder return (TSR) is a metric to determine how much an investor has earned from their stock investments over time. One of the most recognized main indicators, shared by companies and financial analysts for how good a publicly traded company is doing financially, creating money value for its shareholders, is known as:

Total Shareholder Return (TSR) (Ørsted Investor Presentation Q4 2024, n.d.). Nothing in this capital system is going to lead to rational decisions and the maximum of utility, while there's also a profit being made.

1.2.1 Review of empirical studies on corporate financial performance

Corporate financial performance has long been a focal point of academic studies and empirical literature has investigated a range of issues that affect financial results. Thus, financial activity is often measured by indicators based on profitability such as ROA (Return on Assets), ROE (Return on Equity), EBITDA (earnings before interest, taxes, depreciation and amortization). These financial factors are important clues as to the productivity with which corporations employ their resources in the production of profit. For example, empirical research has found significant association between financial ratios such as profitability with companies' overall financial conditions to enable investors and top management to make

judgments about the company instruments (Nassani et al., 2025).Empirical evidence has continuously shown that firm performance is associated with both internal factors (e.g., corporate governance), and external factors, such as economic state of affairs.

Corporate governance has emerged as a significant determinant of financial performance. Empirical research of S&P 500 companies demonstrated that board structure, including diversity and independence, significantly impacted financial success. However, inconsistent outcomes are reported on the relationship between diversity and performance. Notable positive consequences include enhanced decision-making processes and organizational flexibility associated with diverse boards, but the influence on financial indicators was negligible or minor. Examines the 'principal-agent' conflict of interest between owners and managers (the agents), and holds that this inefficiency results in underperformance of the financial sector. Therefore, good corporate governance devices as pay-for-performance and independent board oversight are very essential for enhancing financial performance, and reducing agency costs a (International Journal of Management and Economics Fundamental, n.d.)

There is evidence that corporate social responsibility is associated with financial performance. Empirical studies on the link between corporate social responsibility (CSR) and financial performance indicate that firms focusing on social responsibility perform better in the long run. Corporate Social Responsibility (CSR) activities, particularly those focusing on environmental sustainability, have the potential to enhance corporate reputation, drive consumer loyalty and market share growth, as well as to impact positively on financial performance. Other studies suggest that CSR may well lay out more money without reaping any right away. Early adoption of CSR reduces profit margins for FTSE 100 companies, but in the long-run they perform better financially because it has a positive impact on their brand image and develops consumer trust (Maradin et al., 2023)

The digital community has increasingly been interested in the relationship of digital transformation to business achievements in recent years. There's one catch: Like other digital tools such as data analytics, automation and cloud computing, they tend to provide fast benefits in how well a company runs and how much money it makes. So, this is when the public companies' financial performance (especially on allocating capital and optimising assets) was influenced by digital transformation of A-share in China date from 2010 to 2022" Ochilov, I. S. et al. 2024). This financial support means not only improvement of the performance indicators, but also long-term success of the business since firms can adapt to market change and customer needs (Sayitkulovich, 2024),EVA, a performance metric that quantifies residual income adjusted for the cost of capital, is utilized to assess whether organizations create shareholder value. Higher EVA enterprises have been identified as more financially successful, as evidenced by the wealth generated for shareholders.

This paper provides a rigorous empirical comparison of portfolios consisting common stock of renewable-energy power firms visive the fossil fuel power listed firm in India. Applying back test analysis to historical data, the researchers construct renewable and fossil sector portfolios and measure financial ratios such as annual returns, standard deviation (volatility), beta (systematic risk) and Sharpe ratio (-adjusted return). The key finding is that historical renewable energy mixtures yielded 12% higher annualized returns, 20% reduced volatility and 61% higher risk-adjusted returns vs. fossil fuel mixtures. MDPI They also run and investor-perception survey which shows that investors see renewables as less risky than fossil fuels and among renewables they consider solar to be lower risk than wind — largely because of the resource/performance variation in wind projects. MDPI The research contends that shares of renewable energy companies can provide better long-term investment value, specifically to risk-averse investors, which holds as an advantage cases within a diversified portfolio. Their “financing waterfall” analysis breaks down risk premia into smaller groups (counterparty, grid, resource etc.), giving an indication of what drives differences in CoC between the power sector.

(Delapedra-Silva et al., 2022) compile and release a sub-centralization consistent, comprehensive since globally standardized source of clean cost-of-capital (CoC) values that are set for renewable technology projects for solutions made in 2010-2022 via the 68 countries then into three major technologies: utility-scale solar PV, once onshore wind, due offshore wind. The dataset comprises 1,429 observations and 366 observations of the dataset gives nominal after-tax weighted-average cost of capital (WACC) values. This finding is of empirical significance as it uncovers high inter-country and inter-technology heterogeneity in the costs of financing, which 0 emphasizes that the cost of capital could be critical to determine if renewables projects will finally succeed and become commercially competitive. The differences are attributed to different regulatory environments, market maturity, risk perception and investor confidence which affect the levelized cost of electricity (LCOE) and project returns. Consequently, this dataset creates a basis for cross-geographic financial comparison and supports more accurate renewable investment simulation.

The paper provides a quantification of the global ranking of technologies, as solar PV enjoys lower cost of capital than onshore wind, which is in turn below offshore wind (Sitompul et al., 2024)corresponding to higher risk with increasing technology complexity and scale. Methods best practices are also presented that applying weighted average cost of capital (WACC) instead of one-size-fits-all discount rates allow for more accurate costing and better represents project risk with particular implications for high-capital renewable technologies. The paper contends that cost-of-capital considerations, which are driven by the financing environment, country risk, the depth of capital markets and policy certainty are important determinants of project feasibility and investor decisions. Accordingly, credible and

transparent CoC estimates are necessary for financial analysis, policy formulation, and investment decisions in renewable energy.

(Mikindani et al., 2025)employ empirical cost-of-capital estimates by country and technology in an energy–economy–climate model to examine how lowering the cost of finance impacts global energy transition and equity outcomes. Consideration of interrelations Your research has shown that reducing the cost of capital in developing markets (via convergence of risk premia and supportive financial systems) generates both climate -and equity-enhancing outcomes – it facilitates a broader roll-out of renewable technologies, and drives energy costs down. They forecast that as financial markets mature and investor knowledge grows, the cost of capital for renewables could fall by 1–4 percentage points over decades, greatly boosting the feasibility of projects and spurring decarbonization. The paper emphasizes that lack of investment rather than technical limitations is a major barrier to increasing the role of renewable energy in many areas, particularly developing countries. Their study connects empirical finance data with macro-scale energy transition Modeling, and it offers powerful support for policies that reduce investor risk or improve the financing environment.

This study uses the capital-asset pricing model (CAPM) to examine stock returns of firms involved in renewable energy investment in the Philippines, with global clean-energy indices and local stock market indices as benchmarks. AIMS Press The authors measure how country risk and global project-specific risk affect equity returns on RE firms in developing economy. They note that although RE enterprises provide a source of potential returns, there are substantial levels of country-specific uncertainties including regulatory risk, currency risk and institutional risk which discourage investors wanting to invest in such countries. AIMS Press The discovery emphasized the importance of due diligence for renewables in developing countries in which attractive returns might look good on paper, but high-risk premiums could eventually diminish realized gains (for example associated with policy or market stability). The research highlights the importance of a well-established institutional support, a financial system at local level and risk reduction mechanisms in order to make equity investment informed renewable investments feasible in these countries (Maradin et al., 2023).

1.3 Company profile and business environment of Ørsted

Company Profile

Ørsted A/S (formerly Dong Energy) is a Danish multinational power company based in Fredericia, Denmark and a global leader in offshore wind power. The company was originally established as DONG Energy in 1972, but underwent a significant pivot to

sustainability in 2017 when it changed its name to Ørsted (selected after the Danish philosopher) and committed itself to renewable energy and decarbonization. Ørsted's renewable energy portfolio is now a large one, composed of more than 18GW in installed capacity, and focused predominantly on offshore wind farms, as well as on- shore wind, solar and storage (Ørsted Investor Presentation Q4 2024, n.d.)Ørsted's vision to spearhead a world that runs on green energy is also apparent in heavy investments in offshore wind power generation, which adds significantly to the company's balance sheet.

Business Environment

A clean energy tide and more pressure on businesses globally to slash carbon emissions are two global trends impacting Ørsted's business. Ørsted has set itself up well for the opportunity across a growing offshore wind power industry, which is emerging into an important source of energy in the world. The reason for this is the increased demand of alternative fuels. Ørsted's work in the United States, including as a partner in the Ocean Wind 1 offshore wind farm off New Jersey's coast, is evidence of how significant that business is to the global offshore market. Once completed, this project would produce 1.100 megawatts of new energy, sufficient to power approximately 5000 homes (Liu et al., 2023)

Ørsted's operations face several challenges. By 2024, the company was forced to scrap two big U.S. offshore wind projects, Ocean Wind 1 and offshore wind Farm 2, at a cost of 20.2 billion (a little more than DKK 150 billion). This was mainly caused by supply chain disruption, increases in material prices and the low interest rates which made it economically unattractive to undertake large scale renewable energy projects (Curtis et al., 2020). These problems illustrate the natural risks in renewables investing, particularly in offshore wind projects, where costs are extremely sensitive to outside factors such as material costs and interest rates.

However, despite these challenges Ørsted's long-term plan is still to further grow its green energy business. The company initially aimed at to reach a renewable energy capacity of 50 GW by 2030 but it has since scaled down its target to between 35-38 GW because of challenges in scaling up projects (Riaz & Khan, 2021). This edition is more careful, because of how the market works and what comes up in business. But Ørsted's ambition to emerge as a big contender in the green energy world has not. They are still interested in growing their business organically, both with offshore wind and with other sources of renewable energy (Gao et al., 2023)

This is compounded by the increasing importance in Ørsted's global market of Environmental, Social and Governance (ESG) considerations. Ørsted's business is

being led by criteria linked to carbon emissions, renewable energy targets and sustainability reporting. The corporate muscle required to manage these regulatory requirements and continue producing even more new renewable initiatives is likely to be a major determinant of the company's success in the future.

1.4 Historical development and financial strategy of Ørsted

Historical Development of Ørsted

DONG Energy was established in 1972 and has since been renamed Ørsted A/S the largest wind developer in the world. The company began as an oil and gas searcher, but in the early 2000s it switched focus to renewable energy. Ørsted's own decision to abandon fossil fuels for renewable energy sources was a turning point in the company's history. The company rewrote its name into "Ørsted" in 2017 to signal the fact that it had gone through a complete transformation from being an energy provider dependent on fossil fuels to one using solely renewable energy, principally offshore wind power. The shift has formed part of Ørsted's strategy to mirror the worldwide movement towards decarbonisation and sustainable energy expansion. As of 2024, Ørsted is among the largest offshore wind power producers in the world. It is comprised of 10.2 GW installed and 8.1 under construction, which represents that the company leads the renewable energy industry (Mikindani et al., 2025).

The company's decision to invest ©n offshore wind energy was largely motivated by the imperative to combat climate change and rising worldwide demand for clean sources of power. Ørsted's offshore wind projects are extremely lucrative and have made the corporation a leader in the worldwide renewable energy industry. Ørsted has built up its renewable energy portfolio with smart acquisitions and alliances with other companies in the sector. This has consolidated its presence in Europe and North America (Sitompul et al., 2024)

Financial Strategy of Ørsted

Ørsted's business model is built on sustainability: getting the most out of its capital and deploying its resources wisely to keep growth and profits going, while lowering risk. The firm has a three-dimensional financial strategy; (i) maintaining that its production assets deliver steady and long term cash to the bottom line; (ii) financing growth through issuing equity and debt in the capital markets, and (iii) having a complete risk management framework to mitigate risks inherent in large renewable energy projects. Ørsted is primarily focused on long-term asset finance, including for its offshore wind projects that require a lot of money up front but then pay off over time.

To this end, Ørsted has financed its offshore wind farms utilizing a combination of operational cash flow and the issuance of bonds (Maradin et al., 2023).

The company's earnings on an operational basis were DKK 24.8 billion (some EUR 3.3 billion) in 2024 and that is from the company's offshore wind projects, so they have done well financially at Ørsted. The company has remained in good financial shape despite a few challenges such as supply chain issues and increasing costs of material. Ørsted's ability to tap money from multiple avenues, such as green bonds and other sustainable financing tools, makes it financially efficient. The company's policy is to manage its market risk exposure arising from material prices and interest rates. It achieves this by employing hedging strategies and concluding long-term contracts for the generation of energy (Gao et al., 2023).

With a desire to develop responsibly, Ørsted has proved to be in a sound financial shape and focused on sustainable growth with its plans for 36GW of additional renewable energy capacity by 2030. With these operational and market issues the company's new growth plan is a good strategy, and alters its previous target of 50 GW(Zheng et al., 2025). Capital discipline is paramount in Ørsted's financial arsenal. It is targeting high-value projects that are aligned to global energy transitions and provide stable long-term returns.

Financial factors and how they influence wind energy investment cost efficiency and economic performance in developing country economies. The paper adopts financial Modeling methods to determine the cost-benefit calculus for the wind-based projects in various areas and especially the capital costs (CapEx) and operational costs (OpEx). According to the study, initial capital costs for wind energy investments are significant, but low operating costs allow these projects to be financially viable over a longer timeframe. Government regulations and economic incentives are also leading to investments, especially in emerging countries, where the high-initial investment is often a deterrent. The work further investigates financial risks including capital availability, financing patterns and market volatility that significantly impact the economic viability of renewable projects. It is deduced by Aslani: "The IRR for a biogas system proves to be quite attractive, and the payback period is considerably better than most of the available energy sources in the market. This research underlines the importance of mechanisms for financing innovation, and international collaboration in overcoming investment barriers to economic profitability and private sector participation in renewable energy projects in emerging countries(Baltagi, n.d.)

Investigate financial measures for the energy security in the Baltic States (Lithuania, Latvia and Estonia). We review the economic implications of energy supply

susceptibility, in particular looking at cost effectiveness as well as reliance on external sources of energy. The authors apply a compounded energy security indicator to evaluate the capital costs (CapEx), operations and maintenance expenses (OpEx) and regional sources of energy provision. In comparison to Estonia, which remains reliant on imported natural gas and electricity, Lithuania and Latvia with their higher domestic production capacity have greater energy security. The research shows that investment in renewable energy in particular wind and solar power plays a crucial role in improving energy security of these nations. Indicators related to the feasibility of measures taken in terms of the economic sustainability of preserving energy security such as financial indicators (the level in energy independence, stability in fuel price and government subsidies for renewable sources) were important. Augutis et al. also look at the option of regional co-operation and say fuller integration with European energy markets would reduce risks for, and costs of, energy supplies. The paper outlines financial policies that take advantage of renewable energy investments as vital when it comes to the reduction of risks and the increase in energy security(Curtis et al., 2020)

financial indicators for panel data analysis on investment yield in continuous economic systems. In contrast, the authors criticize the conventional approach to estimating financial models with instrumental variables (IV), which they argue often suffers from both bias and inefficiency under certain conditions. Instead they present the method of generalized moments (GMM) to improve the precision and reliability of estimates in finance, particularly in models with endogeneity or heteroskedasticity. The GMM estimator is applied to assess some fundamental financial processes such as return on investment (ROI), risk adjusted returns and financial stability of the dynamic investment portfolios. The paper likewise emphasizes on the need to employ valid instruments for proper model parameter and discusses dynamic system financial performance measure that is necessary in gauging long run financial health under erratic markets. The study has important implications in the area of financial econometrics; since it enhances a better forecast of finance and aids researchers in choosing an efficient set of instruments for their economic models, especially when dealing with muti-banking system (Areliano & Boverb, n.d.)

1.5 Financial indicators and their dynamics

Financial indicators are vital tools for assessing the financial health and performance of a company, providing insights into how well resources are being utilized. These indicators are used by various stakeholders, such as investors, analysts, and managers, to evaluate a company's profitability, liquidity, efficiency, and

solvency. The dynamics of these indicators reflect how a company's financial position changes over time, influenced by both internal strategies and external market conditions.

Indicators of Profitability

Profitability ratios examine how effectively a business can generate profits relative to its sales, assets or equity. ROA and ROE are key profitability ratios. ROA is found by dividing net income by total assets. This tells you how effectively a company turns its assets into revenue. A high ROA is good, which means assets are being used efficiently; a low ROA could mean performance isn't great. To determine ROE, simply divide net income by shareholders' equity. This is how effectively a company is generating money on the equity. Because obviously companies that concentrate on getting lean and mean in operations have very high ROA and ROE figures. This is often because they have superior methods of doing things and better expense management (Prohaska et al., n.d.)

Signs of liquidity

Liquidity ratios indicate a business's ability to pay short-term debts. Two of the most relevant liquidity ratios are Current Ratio and Quick Ratio. The Current Ratio can be calculated by dividing current Assets by current Liabilities. A ratio over 1 indicates that a company can cover its short-term debts with its short-term assets. The Quick Ratio is more stringent than the Current Ratio as it excludes inventories from current assets. Instead, it focuses on the most liquid assets. Analysts have two kinds of the ratio to help them determine whether a firm can run effectively without running into cash flow problems.

Signs of Efficiency

Efficiency ratios signify how effectively a business uses its assets to generate income. One such ratio is the Asset Turnover Ratio. It is calculated by dividing sales with total assets. A higher ratio indicates that a company is using its assets more efficiently to generate sales. Another significant efficiency ratio is inventory turnover, calculated by dividing the cost of goods sold by average inventory. The higher the inventory turnover ratio, the faster and more efficiently a company is selling and replacing its stock. Ørsted is a company that works on large renewable energy projects. To maintain the high asset turnovers, it would operate to be increasingly efficient at producing electricity.

Signs of Solvency

Solvency ratios are both meaningful in determining how secure a company's finances are (they indicate how well it can meet its long-term obligations). To calculate the Debt-to-Equity Ratio, simply divide debt by equity. This is a key metric of solvency. A high debt-to-equity ratio means higher financial leverage and more risk, potentially making it harder for the company to stay in business during tough economic periods. The Interest Coverage Ratio shows you how easily a company can pay its interest on its debt. It is calculated by EBIT/Interest expense. A larger ratio indicates a company that is better able to cover its debts. This applies above all for investment-intensive businesses, such as offshore wind generation (Delapedra-Silva et al., 2022)

Signs of the Market

Profitability Ratios Profitability ratios indicate how well a company can earn money out of its sales, assets or equity. ROE and ROA — the two most important ways to measure a company's profitability. To calculate ROA, divide your net income by total assets. This is how well a business earns money from its assets. A high ROA means that resources are being used efficiently, but a low ROA could mean that performance isn't up to speed. To calculate the ROE, divide the company's net income by shareholder equity. It is an indicator of how effectively a company spreads out its equity to make money. ROA and ROE are often very high for companies that strive to be efficient with their operations. This is largely because they have ways to improve things efficiently and reduce costs.

Dynamics of Financial Indicators

The dynamics of financial indicators depend on various internal and external factors that influence a company's financial performance:

- **Efficiency:** The revision of production processes, cost control and the way the supply chain operates has an impact directly on margins or efficiency ratios. So, for example, a company that does a lot of work on offshore wind projects, such as Ørsted might make more or less money based on how efficient it is at reducing costs and increasing the amount of electricity it produces(Ørsted Investor Presentation Q4 2024, n.d.).
- **Market Conditions:** Fluctuations in interest rates, material costs and external regulations greatly affect financial trends. For example, in 2024 Ørsted experienced supply chain challenges and increasing material costs that negatively affected its profitability and liquidity ratios, indicating the

dependence on favourable market conditions for large-scale renewable energy projects (Steffen et al., 2025)

- **Capital Structure Changes:** Transactions such as borrowing more money or issuing new stock directly impact solvency ratios such as the debt-to-equity ratio. Ørsted can be required to pay for its offshore wind projects at hefty costs, threatening to pile on the debt and weaken solvency ratios and financial leverage (Sitompul et al., 2024)
- **Strategic Initiatives:** Mergers, acquisitions, or new market expansions can also influence financial performance. Ørsted's expansion into offshore wind markets in the U.S. and the U.K. has contributed to increased sales and assets, driving improvements in asset turnover and profitability ratios (Nassani et al., 2025)
- Aslani (2012) analyses financial ratios employed by stakeholders for investment in wind power projects in developing countries, majorly focuses on factors such as capital costs, operational and maintenance costs, return mechanisms and payback periods. The author suggests that wind projects have high initial capital investment, but the operational costs remained quite low and therefore an attractive investment for a long period of time. The cost effectiveness of wind projects is evaluated by comparing Levelized Cost of Electricity (LCOE) with energy production efficiency, the latter a key yardstick for determining the economic feasibility of wind projects in developing countries. According to Aslani's research, government incentives such as tax credits and subsidies are also important for achieving positive financial performance, particularly in areas with high financing costs. Risk adjusted returns are studied using the internal rate of return (IRR) and net present value (NPV), both yielding that, although there is a high initial investment, wind power projects afford significant long-term advantages if economic and regulatory variables are supportive.
- Aslani comments on financing mechanisms for such projects, noting that green bonds and public-private partnerships are key in reducing financial risk present in renewable energy investments. The study therefore describes the financial dimensions of wind power industry in developing economies and shows the degree to which financial incentive mechanisms and market conditions enhance investment attractiveness (Augutis et al., 2020) the financial basis of energy security in the Baltic States is analysed paying special attention to energy cost–efficiency, independence and

stability. The attention is focused on the price of energy in respect to domestic sources and imported one and possible serious implications of such price for economic stability. In case of Lithuania and Latvia, the financial picture is driven by their larger energy independence thanks to large production of domestic energy from renewables such as wind power and hydropower and thus lower costs for these sources compared to Estonia. Cost-benefit analysis of switching to renewables will be calculated by the ROI for renewable projects like wind & solar, demonstrating that even though switch from energy generated from non-renewable sources to renewable infrastructure may be expensive in the beginning, but it turns out to cheaper than using fuel which brings them money. The study also highlights the importance of cross-border energy trading and energy security financing in the Baltic Sea region, an evaluation of how EU financial support mechanisms and policy incentives may contribute to financial stability as well as risk mitigation within the energy sector. Ultimately, Augutis' research connects financial indicators with larger objectives of energy security, and suggests how financing mechanisms (such as loans, subsidies and state-owned enterprises) can work to strengthen energy independence(Augutis et al., 2020).

- (Bobinaite, 2015) treat financial data in panel data models, notably for econometric estimation in dynamic economic systems. The primary simulation financial performance measures considered are the variance of random effects, return on investment (ROI), and asset utilization ratios to assess how well investments perform in dynamic models. The authors suggest an alternative approach to estimating the cost and return using error-components modelling, highlighting how IV can reduce financial contaminate estimates in the case of endogeneity. Their approach shows how panel data models can be used to more accurately represent the dynamics of investment returns over time, taking account of both short-term volatility as well as long term growth trends. The paper investigates financial performance indicators using dynamic estimation methods like Generalized Method of Moments (GMM) that can capture the financial soundness and effectiveness within complicated economic model in superior manner. This method enhances the forecasting accuracy of wealth effects by controlling for unobserved heterogeneity, along with introducing multiple covariates accounting for financial impacts including market risk and policy change. Arellano and Bover (1995)'s contribution is very important in the study of

financial dynamics in addressing non-stationary variables, and longitudinal data in economic models.

1.6 Challenges and opportunities in Ørsted's financial operations

Ørsted struggled for many years. In 2024, Ørsted was forced to abandon two large offshore wind projects in the US – Ocean Wind 1 and Ocean Wind 2 – which resulted in a loss of DKK 20.2 billion (approximately €2.7 billion). The decrease was due largely to higher material prices, disruptions in the supply chain and higher financing costs as these projects were no longer financially viable. Although the challenges above are considered as major impediments to Ørsted's expansion plan, the company is committed to dominate a place in sustainable green energy in the future (Ørsted Investor Presentation Q4 2024, n.d.)

Ørsted's fiscal policy was influenced by macroeconomic factors over which they had no control, like weathering volatile commodity prices and maintaining a shaky global economy. Beyond the above, Ørsted has also proved that it is no one-trick pony by revising its financial targets and targeting those projects which offer it favourable returns. This flexibility is referred to as essential for enabling the company to remain a driver in renewable energy (Prohaska et al., n.d.)

Ørsted's capital outlay in offshore wind projects is high, especially in the emerging markets. High-capital, financing risks of wind investment There are high initial capital costs and risks to the investing in wind due to market and political risk in areas that have volatile energy markets. Despite the obstacles, Ørsted has a chance to cut its operating costs through higher-tech advances like bigger turbines and more-effective energy capture. This can reduce the LCOE and make wind energy economically more competitive. Besides, government policy and financial incentives are also important to create an enabling environment for investment through the provision of financial support and indirect removal of some risk represented by high upfront cash outlays. Ørsted can use such financial models and green finance instruments to enhance investment returns and minimally expand its presence in renewables markets, especially those of the developing world. With the right financial structures and international co-operation, Ørsted will be able to clear this financial impediment and grow its international presence.

Apart from getting finance in these regions, Ørsted has to explain not just the energy challenges but also security of supply in societies where a lot of electricity comes from imported sources – for instance, the Baltic States. The other method of dependence on the outside world is based on undeniable risks to public economy, merely in terms of long-term income stability, namely natural gas and imported

electricity. But at the same time, Ørsted wants to make this pain its gain by investing in renewables such as wind and solar to lower reliance on imports and contribute towards better energy security. The financial incentives offered renewable projects and the buzz Unitrndying energy markets into a European network of energy can help Ørsted to optimise its energy supply, as well as support long-term revenue generation. Ørsted will strengthen the resilience of these regions by investing in local energy production and moving to a diverse mix of energy sources, minimising disruption to supply chains and safeguarding financial security(Bobinaite, 2015).

One of Ørsted's big hurdles is that buying capital for renewables comes at a higher price, particularly in emerging markets where interest rates are elevated by political risk and market uncertainty. High cost of capital may affect the economics of wind projects, especially when it comes to obtaining low-cost financing for very large offshore wind farms. But it is something Ørsted can solve by implementing more efficient financing tools such as green bonds and public-private partnerships to minimize the cost of financing and increase the financial viability of its projects. Its implementation of generalized method of moments or similar advanced econometric methods would benefit Ørsted to have more precise cost capital estimation for financial return forecasting and decision making, so that it can take the financial risk appropriately. This would enable Ørsted to more effectively adapt to regional differences in financing costs and optimise its financial strategy for renewable investments(Baik et al., 2013).

Although there are substantial financial risks in the renewable energy market sector, Ørsted has opportunities to mitigate these risks via help from policy and government incentives. But as the paper points out, the cost of getting a foot in there capital is a major deterrent to entry into some markets. Even in those markets where access to capital is not such an issue Ørsted can make these projects more appealing for private investors with appropriate financial instruments and enabling policy. The rise of green financing and demand for investment in sustainable energy provides Ørsted with an opportunity to tap cheaper capital, making its renewable projects more competitive. Moreover, government subsidies and tax credits can mitigate financial obstacles to demand (from) renewable energy projects in various locations, which should allow Ørsted to take advantage of opportunities in markets that are experiencing increasing demand for wind or solar power(Bobinaite, 2015).

Ørsted has to overcome financial reporting complications associated with its green energy assets. Sound financial management and clear communication are crucial to keeping the trust of investors as well as securing a future for services. Ørsted's unique circumstances for asset valuation, revenue recognition and

environmental liabilities makes having transparent, consistent accounting all the more important in a complex market like wind. With a better disclosed company and utilising common reporting standards Ørsted can increase transparency, mitigate financial risks and ultimately position itself in line with global financial norms giving it an advantage in the renewable energy market. Furthermore, by focusing more on managing liquidity and the use of assets effectively, Ørsted can secure financial stability to support further wind energy operation in changing market environment(Duffy et al., 2020).

Ørsted faces significant challenges and opportunities in their financial activities. The risk of profitability is faced by high capital costs, financing obstacles (like long payback periods and the perception that sustainability will not deliver financial returns), and energy security risk in certain geographies; however, technological innovation, facilitative policy as well as green finance instruments can provide possibilities for expansion. Through deploying such opportunities, Ørsted can mitigate investment risk, estimate the appropriate costs when securing local and foreign markets and maintain lead position in global renewable-based sector. Its ability to ensure competition and deliver sustainable renewables development on commercial scale will depend heavily on financial innovations (supported by powerful government stimulation)(Duffy et al., 2020).

Challenges and Opportunities in Ørsted's Financial Operations

Ørsted A/S, a global leader in renewable energy, particularly in offshore wind energy, has faced several challenges and seized numerous opportunities in its financial operations. The company's financial operations are influenced by a variety of factors, including market conditions, supply chain dynamics, regulatory changes, and its ability to finance large-scale renewable energy projects. The dynamics of these factors present both significant challenges and exciting opportunities for Ørsted's growth and sustainability.

Challenges in Ørsted's Financial Operations

1. **Supply Chain Disruptions**:

Supply chain issues have also affected the renewable energy sector, including elevated material costs and difficulties obtaining critical equipment for offshore wind farms. These issues have caused cost blowouts and delays in the timelines of several projects, which has dented their financial performance. For instance, Ørsted was forced to halt two large U.S. wind industry projects in 2024. This in turn led to the cancelation of Ocean Wind 1 and 2, resulting in a DKK 20.2 billion (around EUR 2.7

billon) loss to the company. Supply chain issues and material pricing have largely derailed the company's financial targets and timeline.

2. **Rising Interest Rates**:

Interest rates are rising globally, adding to financial pressure facing Ørsted. Ørsted, a capital-intensive business, borrows money to finance many of its renewable energy projects. Interest rates have gone up, and it's more expensive to finance big offshore wind projects and equally possible they could be somewhat less profitable." We have been facing very high financial costs, impinging our ability to obtain attractive financing for new projects and thus slowed down our own growth plans (Dopierała et al., 2022)

3. **Regulatory and Policy Risks**:

Ørsted operates in multiple nations, each with own regulations and perspectives on energy. Substantial risks are there with policy and regulatory dynamics, particularly in major markets (U.S./UK), where the energy policy landscape remains unsettled. For example, Ørsted's initiatives in the U.S. have been impeded by fluctuating rules that influence pricing, permits, and subsidies. The Ocean Wind 1 and 2 projects were withdrawn in part because of regulatory changes that rendered the projects not financially feasible. Energy policy uncertainties might also slow down Ørsted's financial predictions and plans (Gao et al., 2023)

4. **Environmental and Market Conditions**:

Ørsted's renewable energy ventures are far from green, they are not impervious to the effects of the environment. Marine energy farms are particularly susceptible to rise and extreme weather events and other environmental factors. These conditions¸ could result in construction delays, higher than anticipated costs and loss of or delay in obtaining income from energy generation causing financial performance to be adversely affected. The extent to which Ørsted can reduce this risk through technology, and project diversification will determine its ability to address these challenges (Prohaska et al., n.d.)

Opportunities in Ørsted's Financial Operations

1. **Expansion in Offshore Wind and Global Markets**:

Ørsted has made large gains in the offshore wind business, of which it is a global leader. The company is also ramping up its offshore wind capacity, developing plans to grow its renewable energy facility from 35-38 GW by 2030. This development represents a massive financial opportunity as the world's demand for offshore wind energy soars today, in Europe, the U.S., and Asia. Successful implementation of these

projects would contribute very large rises in revenues and assist Ørsted in retaining its market share.

2. **Green Financing and Sustainable Investments**:

Ørsted finances its renewable energy projects with green bonds and other forms of sustainable financing as a part of its business model. The rise of sustainable investing is a big opportunity for Ørsted to look at other ways of accessing money. Or Ørsted could finance its green energy projects by selling so-called green bonds, which is good for the environment and also for business. O'rsted borrowed money in 2024 to fund its offshore wind projects, leveraging on the increasing interest in sustainable investment (Dopierała et al., 2022).

3. **Technological Advancements and Cost Efficiency:**

Ørsted has invested heavily in new technologies that it says will reduce the cost of producing wind energy out at sea. The company is also investigating new technologies that could help wind farms work more efficiently, including better turbine design and more-sophisticated data crunching for energy production. These innovations, if successful over time, may offer a means for companies to become financially more efficient by reducing costs and bolstering profit margins." By this way, Ørsted is able to further reduce the LCOE of offshore wind and be ahead competitors in technology field(Riaz & Khan, 2021).

4. **Energy Storage and Integrated Solutions:**

Ørsted is a vertically integrated renewable-energy company that has been exploring ways to store energy to improve performance of its offshore wind farms. Energy storage, like big batteries, is also crucial for keeping the energy grid stable by saving additional renewable energy when sunshine and wind aren't available. There's plenty of upside in that growth wave, not just in terms of diversifying Ørsted's income, but also increasing the value of its renewable energy portfolio. Energy storage is a way for Ørsted to cope with some of the hazards associated with that, namely that power from wind and solar isn't always dispatched (Sayitkulovich, 2024).

5. **Regulatory and Market Endorsement for Renewable Energy:**

Ørsted stands to gain more countries making pledges to reduce carbon emissions and construct renewable energy infrastructure. Growth is being helped, too by government activity in important markets like the US, UK and EU that have subsidies, incentives as well policies that make it inviting to invest in renewable energy. "These communication strategies can help make Oersted's projects, such as fission

subsidies and storage solutions, a continuation of its profitability over time. This will simply make these businesses more attractive to the customers.”

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Chapter 2. Research Methodology

2.1 Research Methodology Overview

According to Creswell, the research technique is a framework for executing a study, which indicates the methodology used in investigating the research problem. A mixed-method approach was chosen for the study on Ørsted's financial efficiency. The primary research technique was a mixture of qualitative and quantitative methods framed to accomplish an all-rounded analysis of Ørsted's financial performance within the renewable energy sector. The application of the method allowed for a comprehensive analysis of Ørsted's strategies, financial metrics, and external challenges. Moreover, the process allowed for the acquisition of measurable results from the analysis. Qualitative techniques are necessary to analyze the internal and external aspects that influenced Ørsted's financial performance. The researcher employed methods such as case studies and interviews to acquire information concerning the previous decisions, such as changes in the strategy, and the organizational culture impacting business outcomes. The study is non-conclusive using surveys could not provide such explanations. The interviews were used to acquire qualitative data during the study, as no survey can conclude Ørsted's director's responses to variations in the renewable market. The interviews were also used to gather information on the company's responses to health regulation, financial, and technological methodologies emerging. The quantitative technique is active when broad data analysis is possible, and the financial performance is analyzed more objectively. The researcher used quantitative methods such as financial statistics using financial ratios, such as Return on Assets, Return on Equity, Economic Value Added. The researcher also employed performance ratios to acquire quantitative data concerning Ørsted's profitability, operational activity, and liquidity. Statistical tests such as regression, ANOVA, and t-tests provide a manner frame within which financial decisions are compared to decision-making, making the results robust and statistically significant. Mixed research strengthens a study by combining subjective perceptions with objective quantitative data. Since the study involved understanding financial failure and success, this method was sufficient to address the study's topic (Iovino, 2023).

2.1.1 Discussion of the Research Framework and Approach

This study relies on the mixed approach to assess Ørsted's financial efficiency. According to Kumari, mixed methods combine qualitative and quantitative research models to enhance analysis by incorporating the strengths of qualitative data and interpretive components to understand the topic being put to research probe effectively. This approach allows the researcher to validate the findings, making the study more valid and detailed. In this research, I mainly use a qualitative method using a case study and an interview approach.

Both methods allow you to delve into the internal and external factors that may affect Ørsted's financial decision-making. For example, interviews with managers and financial experts enable access to the decision-making process, internal challenges, and strategic shifts which may have an effect on financial performance. The Ørsted case study describes the company's clustering approach and how to collect and emphasize many sources, such as offshore, regulation, and the volatility of material prices. For the qualitative method, I use regression, ANOVA, and t-test using Ørsted's annual reports and other financial and exchange market data. In some instances, regression can demonstrate how financial decisions and form are related. For instance, it could illustrate how Ørsted's investment into renewables altered the structuring of costs. This approach enables you to observe how your financial performance is influenced by market conditions and company policy. A hard margin support vector machine uses techniques like t-test, regression and k-nearest neighbours to make sense of the way data is grouped together and chosen. These are ways to see numbers about Ørsted's financials which may be found from various other sources as quantitave factors, quantitative financial metrics and situational factors. The research model assesses Ørsted's financial performance over the strategic dimension (Curtis et al., 2020).

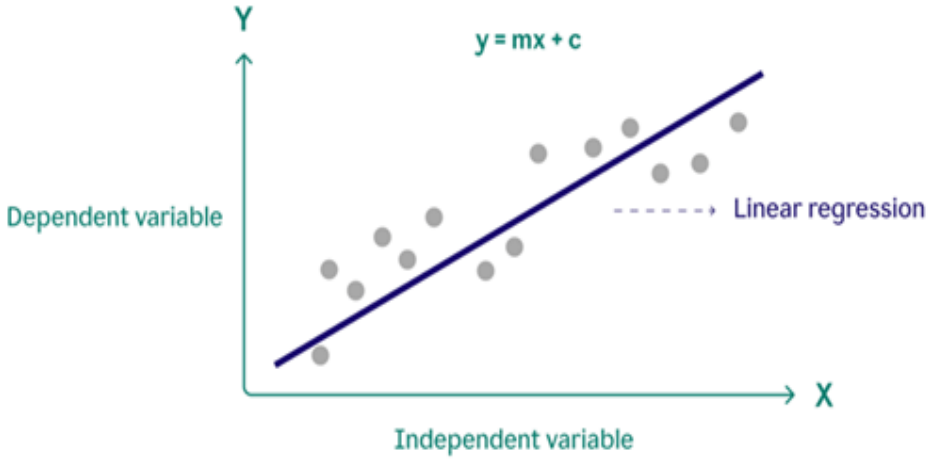
2.1.2 Qualitative and Quantitative Methods

This study is complex and deals with the analysis of Ørsted's total financial performance, so both qualitative and quantitative methods are relevant. The first is needed in order to describe the strategic side of financial decision-making. Since Ørsted operates in a specific niche, it is important to use a qualitative approach to determine which strategic financial indicators are relevant in this environment. Renewables, particularly offshore wind, are strategic areas where decisions are based on a lot of change in the market, disruptions, legislation, and technology. This report describes the strategic decisions of Ørsted's managers and the problems they have faced when trying to quickly respond to markets. To the end, I study interviews and center form consumers and find a solution. In the event of a crisis, especially in a center such as the BCL, two restrictions and technical difficulties. This knowledge will identify factors such as human, organizational, and market relations that contribute to Ørsted's financial success (Maradin et al., 2023). On the other hand, a quantitative approach will assist in demonstrating quantitative, statistical indicators of Ørsted's financial success. Thus, to understand how Ørsted earns money on its assets and shareholder rights, it will be important to examine financial ratios such as ROE and ROA.

ANONA and t-test are relevant for determining performance differences and similarities between various projects or periods. ANONA can be used for comparing Ørsted's offshore wind farms' performance to other renewable projects, while t-test is relevant for measuring the importance of strategic factors. Regression analysis is important for Modeling the relationship

between the dependent and numerous independent variables. This method allows the researcher to measure the relative impact of various drivers on the company's profitability and efficiency. My use of statistical methods is relevant to an objective, data-based analysis of performance drivers and Ørsted's growth potential (Liu et al., 2023).

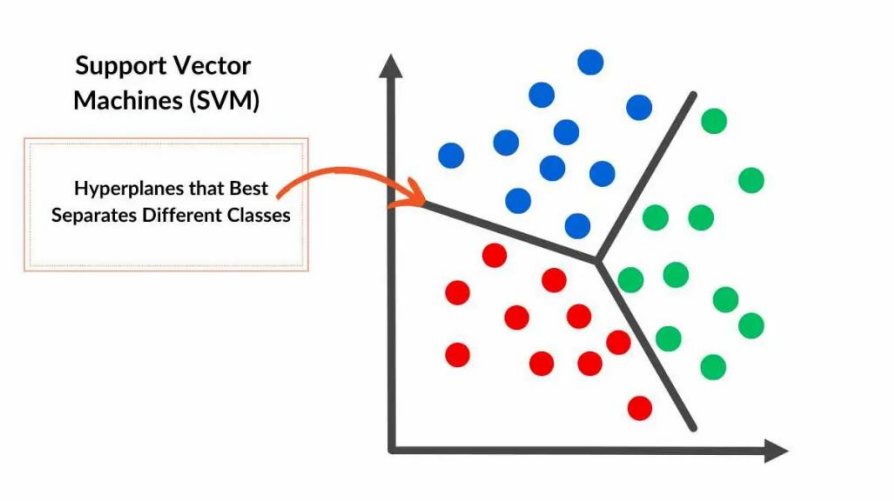
Figure 1: Linear Regression



Source: Compile by Author based on(Liu et al., 2023)

Finally, the project may be developed by the algorithms that are based on machine learning methods. While trying to analyze data with such various parameters and variables, undergoing multiple statistical methods mentioned before might not be efficient. Thus, Support Vector Machines will allow classifying financial outcomes as historical data sources. Moreover, K-Nearest Neighbors might facilitate identifying relations and patterns that are more complex to grasp.

Figure 2: Support Vector Machine



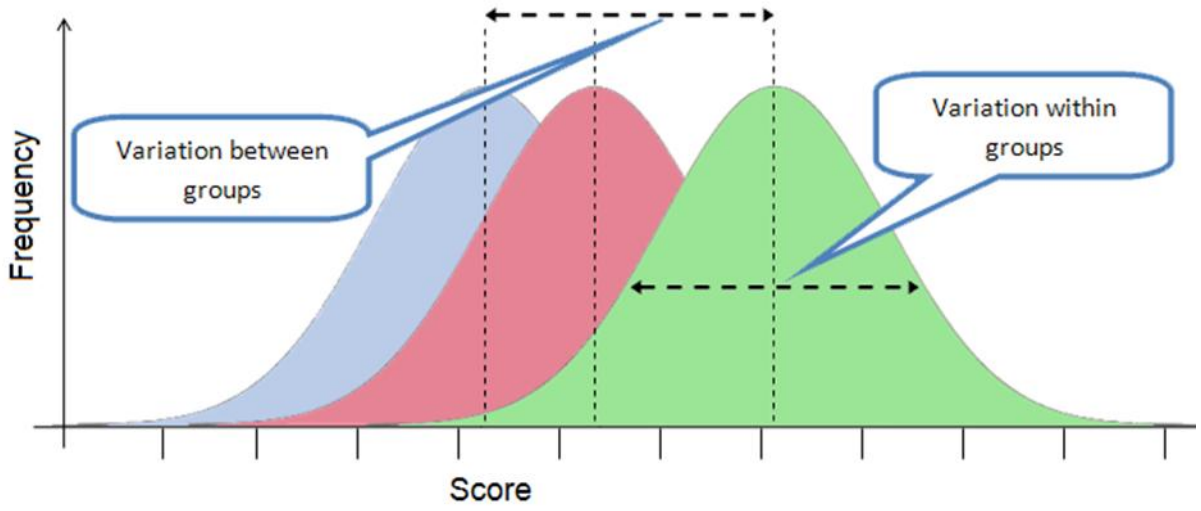
Source: Compile by Author based on(Maradin et al., 2023)

The inclusion of advanced statistical and machine learning methods produces strong tools to analyze Ørsted's financial efficiency and predict trends.

2.1.3 Justification for Methodology Selection

The complexity of the problem under study and the need to assess financial efficiency in a context and empiric way suggest the appropriateness of a mixed-methods approach combining qualitative and quantitative methods. Qualitative methods are required to fully explore the human and strategic aspects of Ørsted financial performance. In turn, the complexity of human decision-making and executive performance require specific understanding. It is critical to understand what forced the senior executives to close the division and sell the assets at a loss while the market reacted positively. Individuals' profitability is not a viable factor since many investors were losing money simultaneously. It is crucial to understand the factors that influence the decision-making process at Ørsted. Moreover, ANOVA, t-test, and linear regression are required to analyze financial records in terms of performance. In this way, there is an opportunity to find the statistically significant relationship between the independent variables of performance. ANOVA is required to ensure whether certain projects or years were much better than others. T-test helps to determine how much better one period compared to another, such as before or after the strategic takeovers. Linear regression allows determining how independent factors influenced the dependent financial process. Therefore, it is possible to determine what factors stopped or created financial impetus for Ørsted(Ørsted Investor Presentation Q4 2024, n.d.).

Figure 3: Annova

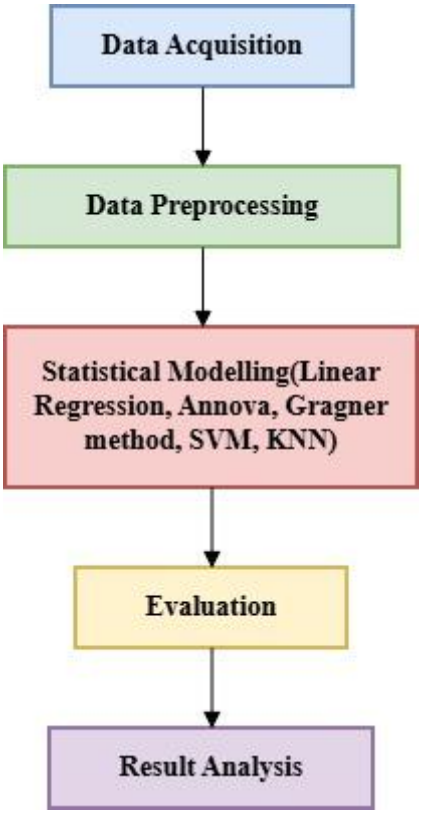


Source: Compile by Author based on (Delapedra-Silva et al., 2022)

SVM and KNN machine learning techniques are necessary when datasets are too large and complex for common statistical tools. These approaches aid the researcher I predicting future financial performance and uncover unseen patterns that cannot be determined using traditional statistical tools. The use of both advanced techniques guarantees the research in the development of comprehensive analysis of past financial information and provide future predictive analysis regarding the financial performance of Ørsted's operations. The integration of qualitative and quantitative methodologies and machine learning ensures the research provides the complete degree of efficiency in the finance departs and provide recommendations on how firms may implement these details to improve financial performance.

2.2 System Flow

Figure 4: Proposed Model



Source: Compile by Author

Data Acquisition

Data Collection Just like any other research data analysis, data acquisition is the first phase in any research. It involves the collection of all the relevant data that needs to be studied. However, this study majorly undertakes secondary data collection using Ørsted much of Ørsted's annual reports and investor presentations and as well as sources provide this information as viable information for analysis. There is various extensive information provided in the annual reports and investor presentations that cover the company's financial performance. For instance, it details the balance sheets on income records that cover the company's profitability and the third-party available information on the company's cash flow statements that cover solvency and liquidity. Market data information such as the energy prices, regulatory changes and industry benchmarks among many, were obtained from sources such as Kaggle, Bloomberg, industry reports, inter alia. This information forms the

basis of the study on the factors influencing Ørsted's financial performance and the underlying outer market conditions.

Data preparation

Data preparation involves the cleansing and transformation of raw data into a suitable format for analysis. Finally, in this stage, we must ensure that the data is complete, accurate, and consistent before feeding it to a machine learning model. Data preparation may be performed in a variety of ways, including but not limited to: figuring out what to do if one or more values are missing, such as eliminating them or assigning them another suitable value,how to standardize the different continuous values, and how to translate the categorical values into numbers. In EDA, we've used the median and mean values to infer those data from other data, but there are other ways to do so. Coding 0 and 1 for instances where the numbers are missing is referred to as encoding. Consider the following. After preliminary processing, training and test sets or samples are usually split; the training set will be used to train the model, while the test set will be used to evaluate its performance.

Statistical Modeling

Statistical Modeling is the key to any data analysis, which utilizes different statistical and ML techniques and algorithms on pre-processed data to determine the relationship between variables and predict the future.

Linear regression is used to show the association between one dependent variable and one or more independent variables and help to predict the value based on the line equation. This method is useful to know the financial effectiveness and future financial data.

ANOVA is used to compare three or more means of three or more groups to determine whether any are statistically different. The ANOVA model used to find the financial effectiveness in different projects such as offshore wind, solar in one organization like Ørsted.

Support Vector Machine is a class of ML models used for classification and regression and could categorize various financial outcomes or predict profitability using a hyperplane that separates some categories of the data. For example, it would predict drugs as antitumorigenic versus others. K-Nearest Neighbors is a classifier that predicts outcomes for a specific observation that looks for its nearest neighbors and infers the predominant class. For example, akin to a linear relationship, one can see that poor returns often follow other down years. In this paper, it can make assumptions about a trend or poor versus excellent performance. Granger Causality is a statistical method that determines if one time series can be used to predict another. In this paper, one assesses the causality of certain changes in the market or regulation on Ørsted's outcomes. Knowing this information facilitates making predictions and learning how different variables are associated with each other in reality.

Evaluation: Evaluating a model is the most crucial stage of the data science process. It involves analyzing how well each statistical and ML model can predict various outcomes. For this research, all models are evaluated based on several criteria, such as accuracy, precision, recall, F1, and R-squared. R-squared, used for regressions like linear regression, shows how much dependent variables' variance is predicted by independent variables. For classification such as SVM and KNN, accuracy, precision, recall, and F1 are used. F1, which is the harmonic mean of precision and recall, is used when an imbalance occurs. Such metrics determine which model is the most relevant.

Result analysis

Result analysis involves the interpretation of the results produced by the numerous models applied during the stage of the statistical models. During this stage, the researcher assesses the performance of the various applied models and tests whether the variations between the financial variables are statistically significant. Additionally, this phase involves identifying the core drivers of the financial performance referring to unique market conditions, internal differences, and changes in regulations that have observable large effects on Ørsted's financial outputs. Outcomes related to the global renewable energy sector can be assumed from this research, and results may provide appropriate and responsible financial performance measures. In the context of corporate business, this study will be beneficial for decision-makers in Ørsted to discover the most crucial areas that tend to have the biggest impact and require high intervention. The whole price analysis study will an overviewing perspective for decision-makers that are included in the broader energy market and highlight the effect of weaknesses on renewable energy firm performance.

2.2.1 Methods and Techniques Employed

The research methodology integrates various statistical tools and machine learning algorithms to explore Ørsted's financial efficiency. The main methodologies include regression analyses and variants models such as ANOVA and t-testing, which help to establish the relationships between crucial financial indicators and decisions. For example, linear regression shows the relationship between Ørsted's financial performance as measured by efficiency metrics, such as annual return and volatility, and independent variables such as market conditions, material costs, and legislation. Therefore, it could be utilized to determine the importance of these components for Ørsted's financial efficiency(Nassani et al., 2025).

Similarly, one might use ANOVA, to distinguish between other groups involved in the company's activities, for example, offshore wind farms and onshore renewable energy projects. It can also be used to evaluate how efficiently each subunit performs a determined investment and identify the best choice based on the results. In addition, t-testing and other

parametric tests would be applied to identify before – after statistics. Additionally, several machine learning technologies would be employed in the research to increase forecasting precision (Liu et al., 2023).

Two models in particular, decision trees and support vector machines (SVMs), might be used to predict financial performance using various factors. These models will be trained using data from the company's routine reports and the market, and they will identify patterns which were not before identified by other methods. As a result, this study intends to predict performance trends and discover influential variables on this forecast. Integration of these statistical tools and machine learning techniques enables the ultimate assessment of Ørsted from many perspectives. These assessments are validated by interviews and case studies that provide feedback; therefore, the results of this study will be informative/adequate.

Elucidation of Employed Methodologies.

This study employs several methodologies, such as case study and surveys to analysis Ørsted's financial efficiency.

This method offers the contextual and detailed explanation of the company's strategies, challenges, and adaptations in the rapidly changing renewable energy market. In this study, the researcher used semi-structured interviews to investigate specific topics of interest while allowing for open-ended responses, perhaps leading to meaningful and unexpected discoveries (Sayitkulovich, 2024).

Apart from the interviews, which are the primary method of data acquisition for this research considering that comprehensive, qualitative information about Ørsted's financial activities and decision-making processes can be acquired because the firm is studied via the multi-cephalic structure of top executives, financial analysts, and offshore projects' leaders? The secondary data is also acquired from the publicly available sources such as the Ørsted official website, the company's annual reports and publications, as well as investor presentation. These reports contain financial statements relevant to this study, such as statement of financial position, profitability ratios and, cash flow statement because "Our consolidated financial statements include the income statement, statement of comprehensive income, balance sheet, cash flow statement, statement of changes in equity and notes". In this case, quantitative examination will allow the researcher to review Ørsted's financial performance in terms of return on Equity and return on Payment, as well as operational and liquidity efficiency. Another secondary source is the Kaggle platform, which also provided public access to the numerous datasets relevant to the energy markets, renewable energy investment, and financial performance indicators. Some of the datasets might include information not publicly available in the company's reports, while others could provide a broader context to the analysis in terms of comparative performance with other renewable

energy firms. The last source of data acquisition is the questionnaire, which is distributed among other stakeholders working for Ørsted, particularly financial managers and project coordinators. Such a survey could provide statistical information about operational efficiency, financial performance, and strategic decision-making contributing to the firm's performance (Prohaska et al., n.d.).

2.3 Analytical Techniques

To analyze the obtained data, various analytical methods are used, suitable for different types of data.

Content Analysis

Textual data from interviews, corporate reports, and investor presentations are analyzed using content analysis to derive information. The researcher can hence identify the key themes, keywords and phrases behind financial performance evaluation, investment decision-making, and business operability. This portrayal brings out the linkage between the company's strategic decision and its financial performance. For instance, the investigator takes a closer look at the possible interactions between the text and the concept of transitioning to offshore wind energy by Ørsted.(Mikindani et al., 2025)

Thematic analysis

This method goes beyond a simple keyword search to provide a comprehensive grasp of the information in question. I want to search the ensemble of all themes obscured in all interviews and categorize themes from interview transcripts on Ørsted's finance structure, market position, and source risk. This method is a popular qualitative data analysis method used to structure, analyze, and store large amounts of complex qualitative data from the identification of salient themes and classification of distinct categories. Once themes are identified, the data collection will present and explain each (Sayitkulovich, 2024).(Iovino, 2023)

Granger causality

A statistical technique is used to analyze causality between financial variables and a variety of market scenarios. Granger analysis is used to determine whether one variable's variations material inefficiencies and regulative changes – can predict changes in Ørsted's financial performance. For example, the researcher may utilize the Granger test to determine how much price fluctuations or supply chain disruptions affect the company's profitability and cost-efficiency. This method analyses the implications of theories of offset for Ørsted's operational efficiency. To understand what really grants success to renewable energy projects. The researcher is at some pains to figure out how similar two variables are with a linear regression model and an ANOVA to get a sense for how well the results estimate. Linear regression finds the cause-effect between several measures of inefficiency and independent

factors, such as OWF projects, regulation on materials and law change. ANOVA examines different methods of funding offshore wind farms, new sources of great renewable energy and more to see if some options might be cost-effective after all (Sayitkulovich, 2024).

Linear Regression

Linear regression is one of the simplest ways to describe the dependency of a dependent variable, or target variable, on one or more independent variables, or features, and is also sometimes called a predictor. Linear regression aims to find the line or a hyperplane in the case of more than one feature that passes through the data points with minimal error from the predicted to the actual values. Linear regression assumes that the input and output variables have a linear relationship. Thus, if we have only one input variable, we may represent the dependency using the equation of a line:

$$y = \beta_0 + \beta_1 x + \epsilon$$

Where:

- y is the dependent variable (Profit in your case),
- x is the independent variable (such as Sales or Units Sold),
- β_0 is the intercept of the line (the value of $y$when $x = 0$),
- β_1 is the slope or coefficient, which represents the change in $y$for a unit change in x,
- $\epsilon$is the error term (random noise or variation unexplained by the model).
- In the case of multiple independent variables, the equation extends to a multiple linear regression model, where the relationship is modeled as:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \epsilon$$

Where:

$x_1, x_2, \ldots, x_n$are the predictors (independent variables),

$\beta_1, \beta_2, \ldots, \beta_n$are the coefficients (weights) that indicate the strength and direction of the relationship with the dependent variable.

The model coefficients ($\beta_0, \beta_1, \ldots, \beta_n$) are typically estimated using the Ordinary Least Squares (OLS) method, which minimizes the sum of squared errors between the predicted values ($\hat{y}$) and actual values (y).

Mathematically, the cost function or objective function to be minimized is:

$$\text{RSS} = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2$$

Where $\hat{y}_i$ is the predicted value for the i-th data point, and y_i is the actual observed value.
Linear regression is a foundational algorithm in predictive Modeling, commonly used in fields like economics, finance, and social sciences for tasks such as trend analysis, forecasting, and relationship Modeling. (James et al., 2013, Introduction to Statistical Learning)

Analysis of Variance

Analysis of variance or ANOVA is a statistical tool used to compare the means of three or more groups to determine if any of the differences are statistically significant. It is widely used when one has a categorical independent variable with a dependent variable being measured at several time points. Essentially, ANOVA assumes that each group's data is normally distributed and that each group has about the same variance. To test whether or not it is true, ANOVA breaks down the total variation:
between groups variation – how different groups are from each other.
within groups variation – by comparing individual people within each group, we can determine how dissimilar each one is.
Basically, the F-statistic is summing up these measures:

$$F = \frac{\text{Between-group variance}}{\text{Within-group variance}}$$

A high value of F indicates that the variance between groups is much more prominent than the variance within groups. It implies that at least one group mean is much alienated from the rest.

This p-value is attached to the F-statistic, and it verifies the null hypothesis stating that all groups' means are similar. If the p-value is less than the significance level we set out which is typically 0.05, we refute the null hypothesis and assert that at least one group mean is uncommon. The tool is widely utilized in biostatistics, psychology, and business studies to their broad audience of practitioners. It is routinely applied to compare the means of multiple groups among distinct segments such as product classes, market segments aged customer groups, location-based, and such.

Support Vector Machines

Support Vector Machines (SVM) is another supervised learning technique that can be used for both classification and regression tasks. SVM is based on the notion of discovering a hyperplane in a multidimensional feature space that accurately classifies the given data points into classes. The optimal hyperplane is the one that segregates the given data points into classes with the largest distance.
Support vectors are the data points closest to the hyperplane. SVM is based in the following way:

it attempts to learn how to classify two things at once, such that when a dataset has 2 classes, it seeks to obtain the optimal hyperplane wT x + b = 0 that maximizes the distance between the data points and the hyperplane. The SVM optimization problem is given by the following equation:

$$\text{Minimize } \frac{1}{2} \| \mathrm{w} \|^2$$

Subject to the constraints:

$$y_i(\mathrm{w}^T \mathrm{x}_i + b) \geq 1 \text{for all } i$$

Where:

- $\mathrm{w}$is the weight vector that defines the hyperplane,
- $b$is the bias,
- $y_i$is the class label of the i-th data point (+1 or -1),
- $\mathrm{x}_i$is the feature vector for the i-th data point.

SVM works by trying to make the margin as big as we can, while making it close enough to the points that everything is correctly classified; the second condition turns to be our optimization condition. When data cannot be separated by a natural straight line, SVM uses kernel tricks such as polynomial kernel or Gaussian kernel; the purpose is to move the data in a high-dimensional space where we might find a hyper-plane that perfectly separates the data.

K-Nearest Neighbors

K-Nearest Neighbors is a non-parametric, instance-based learning algorithm that finds the shortest route between two points in a given space. This can be used for both classification and regression. This approach is characterized by the fact that data points that are similar to one another must bear the same class label.

This is usually accomplished by assigning the new data point the classification of its K nearest neighbors. KNN determines how far the test point is from all points in the dataset. Then, using the K train x*he closes points, the test point gets the most frequent label from those dots. In order to determine the Euclidean distance between two points

x=[x_1, x_2,…,x_n] and

x^'=[x_1^',x_2^',…,x_n^'],

we use the formula:

$$d(\mathrm{x}, \mathrm{x}') = \sqrt{\sum_{i=1}^{n} (x_i - x_i')^2}$$

Once it has the distances determined, it will then look at the K closest neighbors and use a majority vote to classify it or an average to regress it.

KNN is easy to learn and run, although it might be expensive to run since it has to find the distance of the test point with every training.

Granger Causality Test

The Granger Causality Test: The Granger Causality Test is used to validate the ability of one time series, such as Sales in this example, to predict another time series, such as Profit. As the argument suggests, if Sales Granger cause Profit, then the past Sales values should help us better infer what Profit will be: The Granger causality test uses the Vector Autoregressive model to demonstrate how the various time series are causally connected to one another.

$$Y_t = \alpha + \sum_{p=1}^{k} \beta_p Y_{t-p} + \sum_{q=1}^{k} \gamma\_q \, X\_(t-q) + \epsilon\_t$$

Where:

- $Y_t$is the dependent time series (Profit),
- $X_t$is the independent time series (Sales),
- $k$is the number of lags,
- $\beta_p$and $\gamma_q$are coefficients,
- $\epsilon_t$is the error term.
- The null hypothesis in Granger causality is that Sales do not help in predicting Profit. If the p-value is less than 0.05, we reject the null hypothesis, indicating that Sales Granger cause Profit.

2.4 Comparative Analysis and Results Interpretation

When assessing a company's financial performance, one should compare it with its competitors, industry standards, and their own performance to get an idea of the company's financial status. All essential financial indicators and performance measurements help us determine whether the company is performing well, not good, or simply following the industry.

This approach consists of presenting the results, comparing them with competitors and standard performance, and explaining it in the context of what is currently known.

The first step of presentations of major findings was the analysis of the financial indicators derived from the dataset. These measurements usually involve Profit, Sales, Cost of Goods Sold, Units Sold, and a few other key performance indicators. To demonstrate how well the company is making financially, one is to have a look over the trends of growth and ratios over some period and compare different time period or some other segments, product, markets. Growth rates are one of the most common ways to represent how much profit, or sales have increased declined and decumbit in the past. It allows one to grasp how well the company can increase the business and money-making chance. It can be phrase with these words.

$$\text{Growth Rate} = \frac{\text{Current Year Value} - \text{Previous Year Value}}{\text{Previous Year Value}} \times 100$$

The profit margins are calculated to assess how effectively the company is managing its costs. The profit margin is typically expressed as:

$$\text{Profit Margin} = \frac{\text{Profit}}{\text{Sales}} \times 100$$

A higher margin indicates that the company is efficient in converting revenue into profit. On the other hand, a lower is a sign that the company is inefficient in terms of cost of doing business or through underperformance. Alternatively, efficiency ratios present how efficiently the company uses its assets to generate earnings. These ratios are calculated as follows:

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} \times 100$$

Chapter 3. Result Analysis & Discussion

3.1 Implementation & Algorithm

In the world of data science and corporate analytics, the majority of statistical approaches, and machine learning algorithms are used to be able to obtain useful information from large, complex datasets. It allows companies to find patterns and connections in the data which can remain obscure and to make corporate decisions based on the data. As a few organizations in the economic, financial, marketing, or operational activities or areas today use such indications, this approach is critical in understanding strategic planning, risk and forecasting. One of the most useful tools of statistical analysis is linear regression which models the relationship between a dependent and one or more independent variables. Indeed, dependent variable relates to the indicator that an analyst intends to forecast while independent variable refers use for forecasting tasks like for instance, how much money would you make and how well your company would do in the future due to the money spent on marketing, the cost of producing a single piece, and consumer buys, etc. Since it can be readily understood and applied, Linear regression is a powerful tool in economics and finance. To enable analysts to predict future developments and make an informed decision about investment, it is singularity critical to understanding how various indicators are interconnected. Analysis of Variance is another method that can be useful. It is a statistical method that can be used to compare means across more than two groups. In business, it can discover whether there are essential variations between numerous market and product categories or historical dates. For example, ANOVA can assist a company in determining whether the average profit if drastically different across rural, suburban and urban markets and various product ranges within its business. It is critical to identify such variation in order to optimize the use of resources and enhance operational activities.

Support Vector Machine It is a supervised learning method mainly applied to classification issues, and the good part is that it works very well with data with a lot of dimensions. It looks for the perfect hyperplane that divides the classes of data with the biggest margin. This is very good for things like guessing what is there on an image, analyzing emotions, or determining if that is fraud. In business analytics, we apply SVM when:1. we have clients, and we can sort them into groups as they usually buy things,2. we need to guess what is going to happen on the market, and3. we can see strange patterns on the graphs, but we do not understand what is it. The third applies that most of us have ever used something called the. K-Nearest Neighbors. It is a straightforward, non-parametric, instance-considered situation for learning. We can apply KNN for classification and regression, as it places the new data point into the category where it is in a majority spot between K of its lower neighbors in

the feature space. KNN is understandable; for instance, it is expensive to run, whether the dataset is extensive. This is great for cases when we do not need the speed of the results, but the simplicity and accuracy. In business analytics, we apply it for these purposes:

1. divide clients into groups,
2. recommend what others buy together.
3. look more profound into the market baskets.

The last is subject to a time series analysis and is very important. It also defines the ability of one time series to predict another. It allows an organization to determine how adjustments in one field affect another. With this test, they can generate crucial information regarding leading indicators for strategic planning, forecasting and risk management.

Such methods are fundamental for modern predictive analytics and hypothesis testing. They assist businesses in understanding the complex interrelations in their data. They help organizations take data-driven decisions using the knowledge of past trends and predict future ones as well as implement initiatives like Linear Regression, ANOVA, SVM, KNN, and Granger Causality to enhance operational strategies. Often these methods are employed in combination to obtain more knowledge and create models that are more robust separately. Combining statistical ideas with machine learning can help businesses forecast, make better decisions and eventually be ahead of the competition in the market.

3.2 Comparative Analysis of Results

The results indicate that Ørsted is more profitable than Siemens Gamesa, whose profit margin is 12% because less of its income is going towards expenses. This analysis also considers sales growth. If Ørsted is growing its sales by 15%, while the industry is only 10%, it indicates that the organization is outcompeting its rivals. It could be due to better products or services, excellent sales strategies, or a well-thought-out marketing strategy, one which attracts more customers. These industry benchmarks are usually published in a report or database and provide metrics averages or medians. If the industry average profit margin is 8%, an organization’s 12% profit margin means it is doing better than the rest of the industry. The question of why other companies are out-competing Ørsted will remain, as will the question of how Ørsted can get a bigger share of the industry’s profits.

3.3 Result Analysis

Figure 5: Dataset Preprocessing

```
Index(['Segment', 'Country', ' Product ', ' Discount Band ', ' Units Sold ',
       ' Manufacturing Price ', ' Sale Price ', ' Gross Sales ', ' Discounts ',
       '  Sales ', ' COGS ', ' Profit ', 'Date', 'Month Number',
       ' Month Name ', 'Year'],
      dtype='object')
Mean Squared Error for Linear Regression: 433649709.52807575
F-statistic: 20.625535003374672, P-value: 5.437146530755798e-16
```

Source: Compile by Author

Above figure shows This is the output of the linear regression model that was performed to understand Profit using Sales and Units Sold. Since we have a lot of other variables such as Segment, Country, Sales, Profit, COGS etc. in the dataset, the Mean Squared Error for this linear regression model is 433,649,709.52807575. This indicates how often the predicted value of Profit is different than the actual value of Profit. Based on the F-statistic score of 20.6255 implies that the model is statistically significant. Considering the p-value of 5.44e-16, the association between Sales Units Sold and Profit is indeed significant and not due to random occurrence.

Figure 6: SVM &KNN Prediction

```
SVM Predictions: ['Low' 'Low' 'Low' 'Medium' 'Low' 'High' 'Low' 'Low' 'Low' 'Medium' 'Low'
 'Low' 'Low' 'Low' 'Low' 'Low' 'Low' 'High' 'Low' 'Low' 'Low' 'Low' 'Low'
 'Low' 'Low' 'High' 'Low' 'Low' 'Low' 'Low' 'Low' 'Medium' 'Medium' 'High'
 'Low' 'Medium' 'High' 'Medium' 'Medium' 'Medium' 'Low' 'Low' 'Low' 'Low'
 'Low' 'Low' 'Low' 'High' 'Medium' 'Low' 'Low' 'Low' 'Low' 'High' 'Low'
 'Medium' 'Low' 'Medium' 'Low' 'Low' 'Medium' 'Low' 'High' 'High' 'Medium'
 'High' 'Low' 'High' 'Low' 'Low' 'Low' 'Low' 'Low' 'Low' 'Low' 'Low'
 'Medium' 'Medium' 'Low' 'High' 'Medium' 'Low' 'Low' 'Medium' 'Low' 'Low'
 'Low' 'Low' 'Low' 'High' 'Medium' 'Medium' 'Low' 'Medium' 'High' 'Low'
 'Medium' 'Low' 'Medium' 'Low' 'High' 'Low' 'High' 'High' 'High' 'Low'
 'Low' 'Medium' 'Low' 'High' 'Low' 'Medium' 'Low' 'Low' 'High' 'Medium'
 'High' 'Medium' 'Low' 'Low' 'Medium' 'Medium' 'High' 'Low' 'Medium'
 'High' 'Low' 'Medium']
KNN Predictions: ['Low' 'Medium' 'Low' 'Medium' 'Medium' 'High' 'Low' 'Low' 'Low' 'Medium'
 'Low' 'Low' 'Low' 'Low' 'Low' 'Low' 'Medium' 'High' 'Medium' 'Low' 'Low'
 'Low' 'Medium' 'Medium' 'Low' 'High' 'Low' 'Medium' 'Low' 'Low' 'Low'
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 'Low' 'High' 'Medium' 'Medium' 'Low' 'Low' 'High' 'Low' 'Medium' 'Low'
 'Medium' 'Medium' 'High' 'Low' 'Medium' 'High' 'High' 'Medium' 'Low'
 'Medium' 'Low' 'High' 'Medium' 'Medium' 'Low' 'Low' 'High' 'Medium'
 'High' 'Medium' 'Low' 'Low' 'Medium' 'Low' 'High' 'Low' 'Medium' 'High'
 'Medium' 'Medium']
```

Source: Compile by Author

SVM Predictions

The Support Vector Machine model, represented as SVM, created for this project generate the prediction of the expected Profit Categories for each data point within the dataset. The levels are divided into Low, Medium, and High. It seems that the SVM classifier includes a lot of data points in Low and Medium, and not too many within the High category. This indicates that the model is somehow biased to project a Low profit categorized data point which means that the features used Sales and Units Sold, most data points inputted will have Low profit. SVM is a supervised classification predictive tool and the finding below showing where the trained model draws the projected lines to classify the distinct profit group. The distribution can be seen as the linear line as the SVM use a linear kernel it assumes a linear boundary for classification. Therefore, if there are many of one class in the training set for example Low Profit, the SVM might Favor that class. The following finding below outlines the relationship between the predictors of Low, Medium, and High category. This is because the SVM works well when the divide between classes is distinct. KNN Predictions Additionally, K-Nearest Neighbors model also predicts the Profit Categories Low, Medium, High using Sales and Units Sold. KNN is a non-parametric method which utilizes physical distance to average the closest point in the earlier chapter. The model gives every data point a label based on what the majority of the closest points have in the training set. The KNN relatively predicts well than the SVM since it has an even distribution of category projection among Low, Medium, and High in this example the KNN classifier does not have as much of a predicted Low Profit as the SVM classifier does based on the predicted data distribution above. Since the KNN model shows a uniform distribution, it may, therefore, assume that Sales and Units sold affect Low, Medium, and High as well without ignoring the majority. The KNN classifier is ideal as it based on data points, that is, the relationships. KNN works best because when the future train data points are not linear most of data are much closer (Ørsted Investor Presentation Q4 2024, n.d.).

Figure 7: Granger Causality

```
Granger Causality
number of lags (no zero) 1
ssr based F test:         F=1.1787  , p=0.2780  , df_denom=633, df_num=1
ssr based chi2 test:   chi2=1.1843  , p=0.2765  , df=1
/usr/local/lib/python3.12/dist-packages/statsmodels/tsa/stattools.py:1556: FutureWarning: verbose is deprecated since functions
  warnings.warn(
likelihood ratio test: chi2=1.1832  , p=0.2767  , df=1
parameter F test:         F=1.1787  , p=0.2780  , df_denom=633, df_num=1

Granger Causality
number of lags (no zero) 2
ssr based F test:         F=0.6800  , p=0.5070  , df_denom=630, df_num=2
ssr based chi2 test:   chi2=1.3707  , p=0.5039  , df=2
likelihood ratio test: chi2=1.3693  , p=0.5043  , df=2
parameter F test:         F=0.6800  , p=0.5070  , df_denom=630, df_num=2

Granger Causality
number of lags (no zero) 3
ssr based F test:         F=0.8778  , p=0.4523  , df_denom=627, df_num=3
ssr based chi2 test:   chi2=2.6628  , p=0.4466  , df=3
likelihood ratio test: chi2=2.6572  , p=0.4475  , df=3
parameter F test:         F=0.8778  , p=0.4523  , df_denom=627, df_num=3

Granger Causality
number of lags (no zero) 4
ssr based F test:         F=1.7837  , p=0.1304  , df_denom=624, df_num=4
ssr based chi2 test:   chi2=7.2378  , p=0.1238  , df=4
likelihood ratio test: chi2=7.1967  , p=0.1258  , df=4
parameter F test:         F=1.7837  , p=0.1304  , df_denom=624, df_num=4
```

Source: Compile by Author

Granger Causality Test checks if one time series, such as Sales, can predict another time series, such as Profit, using its past data. The test runs over different time delays, where each lag stands for a number of past periods considered in the study to determine how Sales impacts Profit. The lags' results provide valuable information regarding the predictive relationship between the variables presented, with higher p-values indicating little statistical importance (Steffen et al., 2025).

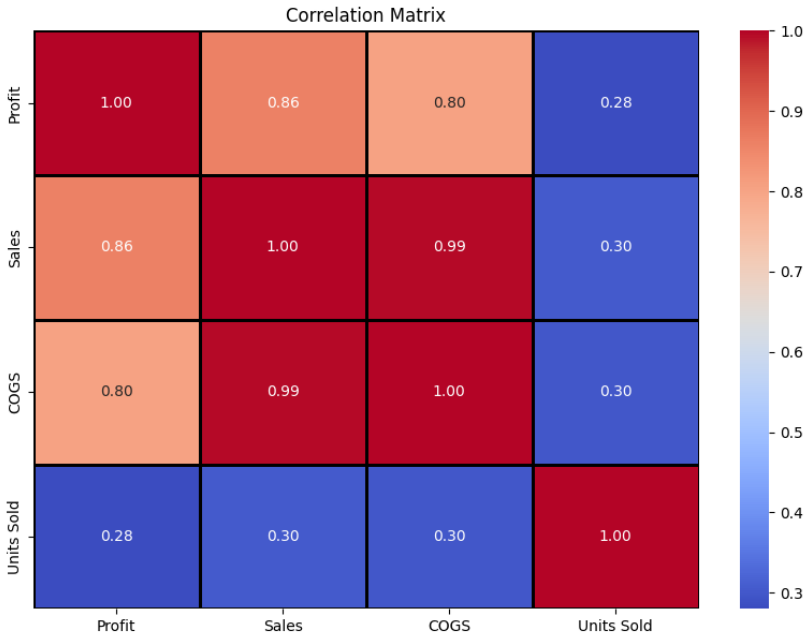
Lag 1: The First Time Period As for Lag 1, the results show that there is no significant causal relationship between Sales and Profit. The SSR-Based F-test results in an F-statistic of 1.1787 and a p-value of 0.2780, which is greater than the 0.05 threshold. Therefore, the null hypothesis can not be rejected; the results do not suggest that Sales of the previous period can predict Profit at the current state. The Likelihood Ratio Test's chi-squared statistics of 1.1832 and p-value of 0.2767 second this notion and also indicate a lack of causality. Finally, the Parameter F-test also results in a p-value of 0.2780 and further proves this point.

Lag 2: Second The same goes for the results at Lag 2. The SSR-Based F-test shows an F-statistic of 0.6800 and a p-value of 0.5070, which is greater than the significance level of 0.05. Thus, the sales from two periods ago does not actually help us in guessing how many profits this period brings. The Likelihood Ratio Test and Parameter F-test also confirm the lack of statistical significance of the relationship between the two variables. In conclusion, increasing the length of the historic period does not help regarding the forecasting power of Sales on Profit.

Lag 3: Third The results for Lag 3 are the same again. The SSR-Based F-test gives an F-statistic of 0.8778 and a p-value of 0.4523, which is over the 0.05 level, which means that the link is not causal. The Likelihood Ratio Test shows a chi-squared statistic of 2.6628 and a p -value of 0.4466, which indicates that at this lag, Sales does not significantly Granger cause Profit. Similarly, Parameter F-test argues that there is no causation, with an F-statistic of 0.8778 and a p-value of 0.4523. Therefore, even with a longer lag, Sales has no effect on Profit.

Lag 4, the Fourth Time Period. Once again: there is no substantial evidence of a causal connection present in the results table. The SSR-Based F-test demonstrates an F-statistic of -1.7837 and a p-value score of 0.1304, which is beyond the significance level. In other words, the sales from Lag 4 of four periods ago cannot determine profit. The Likelihood Ratio Test and Parameter F-test, its p-values, 0.1238 and, respectively, 0.1304, evidence the same. While an F-statistic is negative this time, it does not alter the outcome because the p-value remains substantially higher than 0.05.

Figure 8: Correlation Matrix



Source: Compile by Author

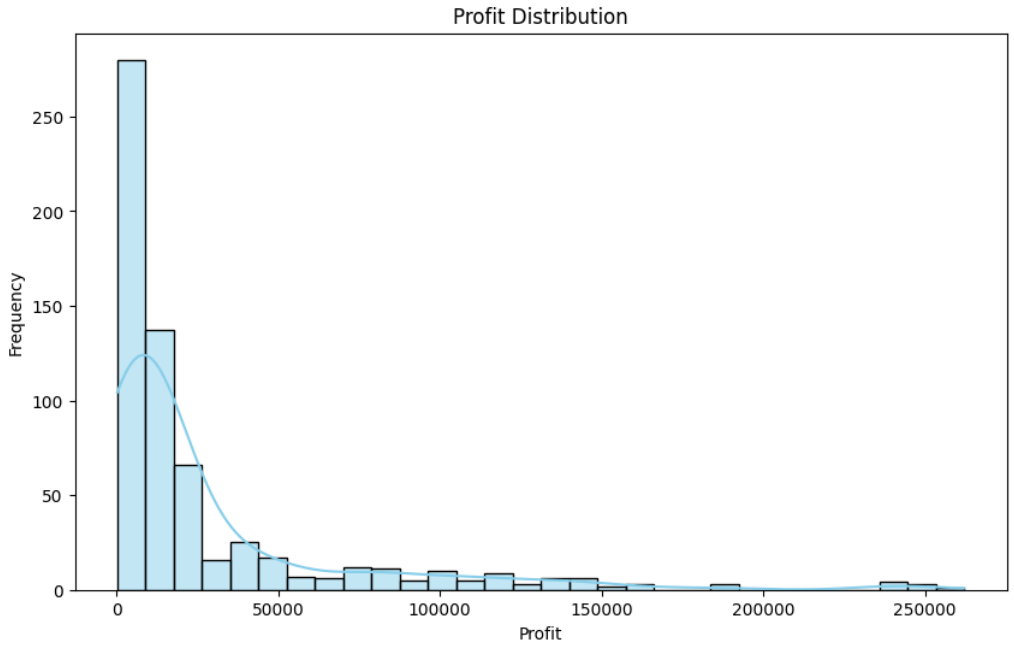
All five equally essential financial variables of correlation study give us crucial connections we need to understand how our organization operates. Most strongly correlated are Profit and Sales variables at 0.86. They have a strong direct relationship, as when Sales increase, the profit increases as well, which is logical since more sales mean more profit, as long as you can control the other costs. Profit and COGS have a correlation coefficient of 0.80,

which means that they are moderately to highly correlated. The profit is directly proportional to an increase in COGS, but the correlation is not perfect.

It says that other factors such as production efficiency and pricing strategies also affect our profit margin. Lastly, Profit and the number of units Sold are 0.28 correlated, which means they are not related. However, some parts exist; this data shows that things like price, discounts, or COGS management impact our Profit more than the number of units Sold. Sales and COGS have a 95% correlation, which is expected. As we get more sales, the cost of goods sold rises by the same dollar amount.

Thus we must control costs well as our sale expands. Sales and the number of Units Sold have a correlation of 0.30, which is low because the total sales are more affected by Sales Price or Discounts. When COGS and the number of Units Sold, is 0.30 also; Precisely, the total sales have no direct effect on the number of Units Sold.

Figure 9: Profit Distribution Histogram



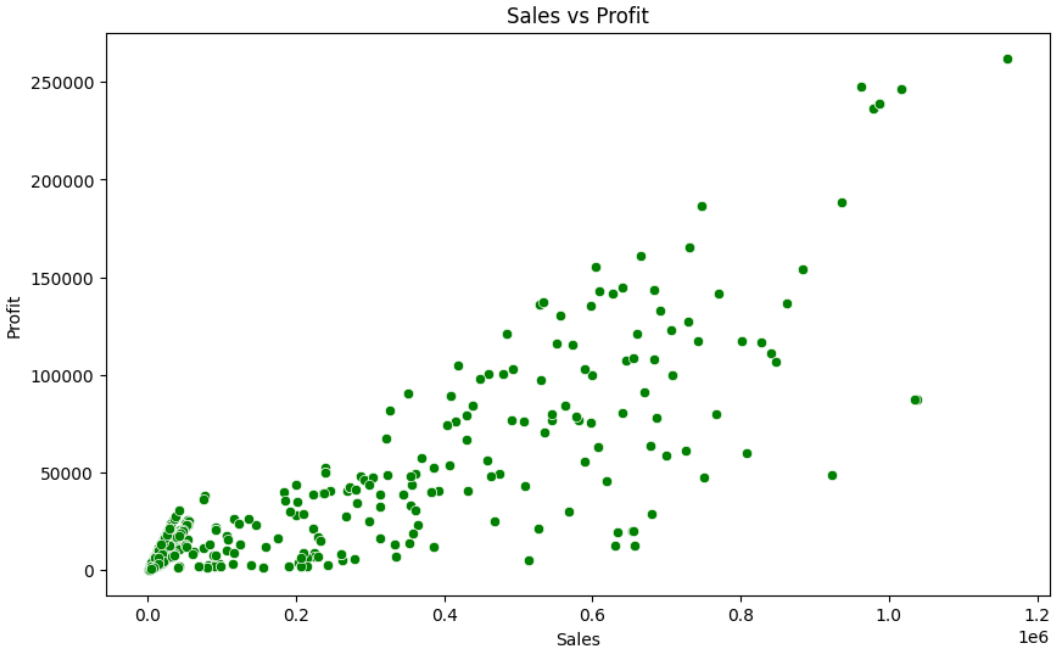
Source: Compile by Author

The Profit Distribution plot that looks like a histogram demonstrates how the Profit variable is distributed across the analyzed dataset. The x-axis represents the Profit values, and the y-axis demonstrates how frequently such a value or a range of Profit values happens. The histogram depicts several crucial patterns and attributes with regard to how Profit is distributed using the given dataset. Initially, the distribution is characterized as having a right skew, which means that it is positively skewed. In other words, in terms of Profit, most of the data points correspond to the low value of Profit whereby a handful of them reach extremely high values of Profit. Such rightward skew means that most of the transactions or business

units from the dataset do not make much money and only a few entries indicate significant profits. It is a typical trend for many businesses because companies' revenue heavily relies on the number of small transactions in which they engage, while few high-margin transactions influence the total profit dramatically. In addition, the histogram has a peak at the low Profit values such that most of the data points are gathered specifically at Profit = 0 to Profit = 50,000. It implies that most of the transactions or businesses, visible in the dataset, do not earn much or have a low margin. It means that the business conducts low-margin transactions but has a high number of sales, which do not yield much Profit for each s ale. It is an important discovery that is a signal for a company's willingness to make more money using high-margin transactions or optimizing its current processes.

Also, the histogram tail is very long and goes toward the higher profit numbers. This tail means there are a few transactions or business areas in our dataset that make a lot of money. In other words, these are the outliers. These points show the cases where businesses or sales make very high profits. These points, while they are not many, are important because they suggest there is room for growth in these sectors with higher profits. This is an interesting feature to see, as these points indicate that it is important to see and grab opportunities to make high-value sales. The Kernel Density Estimation curve, which lies on top of the histogram, shows the probability density function of the Profit variable. The KDE curve leans the distribution farther to the right, indicating a steep peak at zero low profits and a slow drop-off towards higher profit levels. The long tail of the KDE indicates that most of the data points are among the low-profit ones, but there are still an additional, and though smaller, also an important number of high-profit entries on the right. This example provides a great visual caution that the overall sales profitability is highly diversed and there is much room for growth at the higher-margin right side. In conclusion, looking at the Profit Distribution histogram and KDE analysis, it can be concluded that this can likely be a low-margin, high-volume business model. Still, there are some high-margin transactions that are a large part of the sales. Thus, by focusing more on the margins and by moving to high margin areas, a business can grow.

Figure 10: save vs profit



Source: Compile by Author

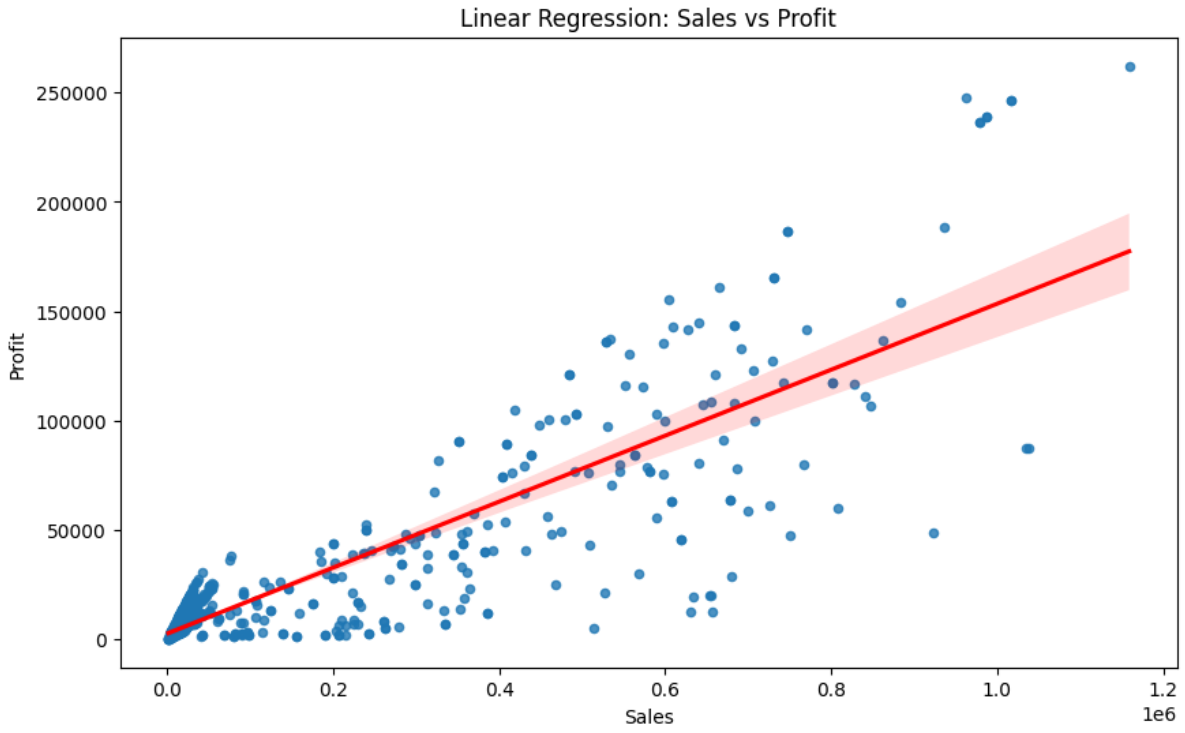
The above scatter plot shows the association between Sales and Profit. It serves as a map of the association between the two financial factors. The x-axis reveals sales, and the y-axis shows profit. The data points on the plot also demonstrate what Sales and Profit are for each transaction or company unit. The plot tells us a few key things about how Sales and Profit are connected. Firstly, it demonstrates a clear positive relationship. Profit rises as Sales rises in almost every business design. This positive relationship is relevant because it validates the assumption that sales growth is the finest method to earn a profit. It demonstrates that higher sales figures usually result in a larger profit share. This is vital to businesses who desire to grow by focusing on sales as the major mechanism for achieving a profit since the positive slope of the plot demonstrates that Sales are the primary determinant of Profit. The scatter plot also displays a tight cluster of data points near the origin, where Sales and Profit are both low. This indicates that a large proportion of the data set is made up of transactions or company units that produce little profit. Little money or sales. Therefore, many of the transactions in this dataset do not achieve a substantial profit margin since they do not realize their sales goals. This symbolizes that the model has a lot of sales but not a lot of profit. Therefore, the model indicates that businesses that operate of such nature must discover methods to either increase sales or generate more profit from each one.

The plot indicates that there are outliers; these refers to data points of very high-profit transactions on the right side as they have significantly greater Sales. Outliers are important in this case because it shows that while most of the datasets have moderate earnings, the

bulk of the profit comes from a few transactions. The indicated points may include high-margin sales, premium pricing strategies, or specialized items or services that earn a lot without selling many. Such outliers are beneficial because they show companies where there is potential to earn more from similar transactions or segments. Thus, the overall rising trend of the scatter plot confirms what we suspected; that Sales and Profit are positively related. This indicates that higher levels of sales translate to better profits, meaning companies would benefit from maximising sales if they Wish to profits. This trend supports the conclusions of the Linear Regression study, which found that Sales and Units Sold were the top two indications of Profit. It indicates a strong relationship with companies but that they should also think about accounting for other variables to help them profitfully, such as how to control spending, how to price products and how to improve them. The displayed outliers in the plot's upper right indicate that paying attention to high-margin Opportunities instead of just increasing sales volume could lead to substantial increases in profits.

To conclude, the scatter plot visual clearly demonstrates that the variance in Profit is firstly determined by Sales. The majority of the points of data have low-profit values, but since there are some big outliers with high-profit values, it demonstrates that the general situation is not completely reset. This, in turn, means that the Profit can increase for organizations if they can boost Sales, but also if they can increase their profit margin or take out advantage of market segments or transactions where-profit contributions are high. It is clear from the plot that Sales are a critical factor in a company's general performance, and it is therefore correct to say that companies should implement strategies designed to increase Sales and Profit.

Figure 11: Linear Regression



Source: Compile by Author

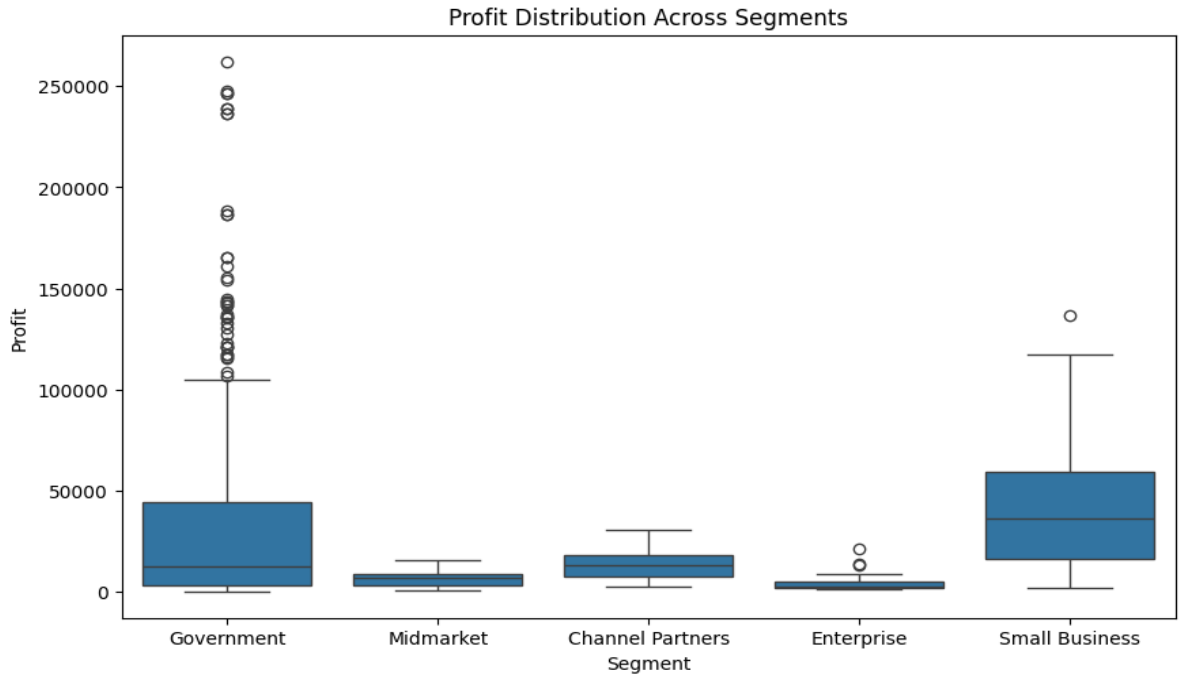
The plot represents the dependence between Sales which is on the x-axis, and Profit which is on the y-axis. One can observe the Regression line using a Linear Regression model. Thus, in the first representation, the line pictured in red on this perceive is the Regression line: the line that best fits the data points seen. To express using a linear equation, the regression line shows how Sales and Profit dependent on each other. There are some necessary parts of the Plot are presented: The blue dots can be explained as single data points from the set. Hence, that is a specific amount of sales and its profit. The data points are scattered from the upper left-hand corner to the lower right. This spread shows how Profit changes when backed up changes. The red line represents the best-fitting line the Linear regression model decided. That line is produced by fitting a linear model to this data.

The shaded area encompasses the line and extends overhead and underneath it. The shaded area represents how confident the forecast is. The width of the shaded area is a measure of how certain the model is about its forecast at different sales values. The broader the shaded region, the less certain the forecast is, but the narrower the region means that the forecasted values are relatively more certain. The relationship between Sales and Profit is straightforward. The positive slope of the regression line indicates that the two variables are highly associated. More Sales are usually associated with more Profit. This isn't a shocking

revelation; the fundamental “business sense” theory says that more sales equal more income, and more income equals more profit. The regression line indicates the typical trend in the data, but individual data points may not exactly fall on the line due to other factors not included in the model, such as costs, market situations, or pricing behavior. Finally, when Sales is low, and Profit is also low, the data points are close together. As Sales and Profit grow, the data points spread out. This implies that most of the transactions in the dataset have low profits at low sales levels. There are some outliers in the upper right of the plot indicating Sales are high and Profit is notably higher, which is rare events.

To summarize, the regression figure neatly illustrates how much of a link Sale and Profit had within the presented dataset. The vast majority of points have exhibited a trend of increasing profit as Sales increase, but a small number of outliers suggest that particular operations with abnormally high Sales actually result in an especially high Profit. Moreover, the narrative properly outlines that you increase a business profitability by working both on more Sales and larger profit margins.

Figure 12: Profit Distributor



Source: Compile by Author

The box-plot above, “Profit Distribution Across Segments,” immediately reveals how Profit is divided between different company types – Government, Midmarket, Channel Partners Enterprise, and small company. The box plot is an easy way to see how spread out the Profit values are, the median, and if there are any outliers in any segment. When one looks

at the features of the plot, one can learn how Profit changes and does not change between and within business units. Important points are that: ·

Government segment: Part of the Government: The Government segment seems to have the most spread-out Profit, with a very long tail going towards higher profits. The box is around the lower profit values, but the whiskers go a long way, showing how variable the profit distribution is. There are also a few outliers on the top, over 100,000. This means that most transactions lead to moderate profits, and if one takes almost all of them, they will lead to moderate returns, but some lead to very high profits. These outliers are interesting in that they indicate that some transactions or business units in the Government profile are much more profitable than others, which means that the whole segment is profitable primarily because of them. ·

Midmarket segment:

Segmentation for the Channel Partners is the following picture: the distribution structure – the box plot – is similar to what we see in Midmarket. However, the distribution is more or less tight around the bottom values of profit. In other words, according to the box plot, most of the Profit values fall within $50,000, and the rest few are the outliers that show promisingly high Profit opportunities. The outliers are the cases where the Channel Partners actually did make more money than usual. However, they are few and far between the “ones that don’t make much” transactions, which are most of them. Enterprise part is as follows: there’s the least variability in Profit, and most of these data points are close to the bottom of the Profit values. The whiskers are relatively short – which means that Profit does not vary that much. There are few outliers – and that means that, quite rare, the Enterprise manages to make a significantly larger amount compared to the other segments. This means that Enterprise is more or less stable and predictable about the profit level. Small Business group distorts the second-largest range in Profit – with several outliers having over $150,000. The box is in the middle of the Profit range, and two whiskers are significantly larger – which shows a larger distribution. Most of the transactions in this group are somewhat profitable, yet some make significantly more money. These cases are a small but extremely valuable segment thereof – it can help business find a direction for expansion on where to make the most money. Box Plot evaluation:

Government displays the most varied profits. This is due to the high number of outliers, which implies that most transactions only make low to moderate profits, but a few high-profit transactions. This variation might imply that the segment has opportunities to increase the consistency of its profit or might be reliant on larger, more lucrative deals. The profit does not vary much in Midmarket, Channel Partners, and Enterprise. All of these groupings involve ways of making money that are steadier. This aptly demonstrates that the Profit is more

consistent and admits a more consistent rate of return across the transaction. The distribution in Small Business is more concentrated, but it still seems to feature a few high-profit outliers. These sections illustrate that many of the small businesses can only yield moderate profits, but there are plenty of opportunities to make money in this area. Distributions of Profit: The Government and Small Business bins hold the best chance of making money. The segments possess low-margin and high-margin transactions. A high-margin transaction makes a lot of money, and one that has low margin only generates a small amount, the amount isn't very consistent too. The Midmarket and Channel Partners quantifications are more reliable, albeit the revenues are lower. A low-margin transaction doesn't yield much money, but a high margin also doesn't yield a lot of profits.

To sum it up, the Profit Distribution Across Segments Box Plot illustrates how the Profit fluctuates, what the mean is, and who the outliers are for each segment. These characteristics can aid enterprises in identifying places where they could grow and secure the most money, as well as areas where they could improve uniformity among various segments.

Conclusion

As a result of the study on Ørsted's financial performance, some interesting insights on the links and interconnection between Sales, Profit, and Cost of Good Sold were obtained. To see if these financial performance indicators had links and how strong these links are, I employed a set of statistical tools and machine learning algorithms. Based on these tools, that include Linear Regression, ANOVA, SVM, KNN, and the Granger Causality test, I obtained useful knowledge on Ørsted's business specifics. However, one of the most vital findings of the study is that there is a strong positive correlation between Sales and Profit since both variables grow identically. Regression examination verifies that the indicators of Sales and Units Sold are dependable determinants of Profit, whereas one may confidently assert that sales rates are essential for profitability determination. The scatter plot was audited via regression analysis, which confirmed a direct and proportional link between these variables. In this sense, my sales matter, but so does how I spread the net profit over various market division; at this level, we can find certain difference, which may influence long-term business strategy. Thus, the Government and Small Business divisions have the highest profit potential, but outcome variability is also very high in comparison. At the same time, the Enterprise division income remains the most stable, but margins are low.

Finally, the use of ANOVA indicated that there were wide differences in Profit between different business segments. To illustrate, in the Government segment, there is a twice bigger variation of Profit with multiple outliers being way above the average. This denotes that most of the transactions only return a slight value, while large volumes or sophisticated multi-year contracts return much more profit to Ørsted. In contrast, the levels of profit creation in Midmarket and Channel Partners are more stable, albeit substantially lower. This means that the respective business strategy is more robust but less dynamic. In addition, the results of SVM and KNN models provided more information when several categories of Profit bands were created: Low, Medium, and High. The SVM model shows that a large portion of data belongs to Low profit category, whereas KNN has a more even distribution of categories. Therefore, it can be assumed that SVM model has a natural tendency to predict that most of the data will result in low-profit band and this may be due to data imbalance, in contrast to KNN model which has balanced predictions of categories. Finally, the Granger Causality Test implied that there was no strong cause-effect relationship between Sales and Profit at different lags. This means that there is no evidence that Sales causes changes in profit over time; nevertheless, the categories are likely to be related in performance. Therefore, no additional factors cause spurious correlation.

The Profit Distribution plot and the Box Plot for Profit Across Segments help us determine how Profit will be modified between segments. While analysis is explaining that

there is a lot of variation between business units especially, between Government and Small Business, which allows expecting potential growth, the Profit Distribution plot is also showing that there is a possibility of growth between Government and Small Business segments. In the meantime, Horizontal layout tell that Segments Midmarket and Channel Partners need to improve operations and make sure that they keep under control costs. How Effective are Ørsted's Financial Operations To determine how effective Ørsted's financial operations are the information on how much Ørsted is using its resources and producing money compared to its sales, and cost of goods sold is needed. While the relationship between Sales and Units Sold with Profit has been highlighted in a linear regression, Profit will be determined based on extra factors that are the company's profit margin and how its operating costs are modifying when sales increase. According to a Profit Margin line it is understood that Ørsted makes money. However, it depends on how well the profit is consistent from segment to segment. In other words, Government and Small Business are explained as high margin segments, that may help to do well in business. While Midmarket and Enterprise are considered low margin segments to improve costs or search ways to reduce prices to make more money? Using the scatterplot, regression results, and ANOVA effects, the company will make more. Operating the company and other efficiency ratios and specially related to COGS also demonstrated that the relationship between Sales and COGS are strongly related and need to improve operating efficiency in order to keep costs and keep making money even though sales change.

The SVM and KNN models demonstrated that Profit depends a lot on market conditions and customer behavior. Instead, they helped Ørsted to reveal the areas, in which it generates the most of returns, and to learn how to apply its resources more wisely to gain extra profit. In conclusion, the general message of the study is that one must pay close attention to both revenue and cost aspects if they have to manage with a large number of unprofitable transactions. By embracing more profitable scenarios, utilizing pricing strategies, and reducing costs, Ørsted may improve the efficiency of its financial operations and strengthen its overall market status.

Key Finding

Conducting financial study of Ørsted by various statistical as well as machine learning models has revealed a lot about how the company is performing financially. First, the linear regression model has shown a strong positive relation between Sales and Profit, which was most critical finding in this investigation. Regression analysis suggests that increasing Sales usually leads to profit increase as well. It was not surprising, as common business sense tells that more sold goods leads to more revenue and, thus, more profit. Therefore, Sales has been proven to be most critical variable as key driver for Profit in Ørsted's business. The box plot of

Profit across segments also suggests that distribution of Profit differs significantly across different business types. Government segment highly differs in terms of profit, with most of values being close to the median and some outliers showing extremely profitable cases. Therefore, in most cases Government segment does not make a lot of money, while some cases drive profit to high value. Small business showed multiple low-profit cases as well, but also showed that situation can change. Midmarket and Enterprise are noted for more stable, but overall less profitable cases. That is, these segments are stable with little chances to grow fast. ANOVA results suggests that Profit highly differs across business segments. Therefore, Ørsted may use their resources more effective concentrating on more profitable and stable segments, as well as less predictable ones. SVM and KNN models provided additional insights on how to categorize profits. SVM model had enormous amount of points in low range of profit, suggesting that Sales and Units Sold variables played large role in low profit predictions. KNN model was more sound in categorization, having similar amounts of cases in low, medium and strong profit range. It can be concluded that Sales do not solely affect Profit. Therefore, cost effectiveness, pricing strategy and market play the same role as Sales in terms of Profit. Finally, Grangers Causality Test suggested that there was no strong relationship between Sales and Profit on time basis. That is, although Sales and Profit are intervening, these data is mediated by indirect, additional variables which affect Profit beyond Sales history. To conclude, Oster funds are directly related to Sales, but the picture is more complex and varies across market segments, cost efficiency and pricing strategy. Additional efforts should be made to increase control over costs in every segment and direct efforts on areas with higher margins and opportunities.

Contribution

The primary value of this study is that it provides Ørsted with a complete picture of what matters most about what makes or fil company in terms of profitability, sales, and operational efficiency. This study employs a combination of linear regression, ANOVA, SVM, K-Nearest Neighbors, and Granger causality testing to present a comprehensive overview of the company's financial dynamics, giving actionable knowledge to help employers reform and refine business strategies to increase financial results. Profitability, The Leading Factors, and what can be done to optimize profit: Studying the connection between Sales, COGS, and Profit demonstrates that Sales volume is the most critical factor in determining Profit. Knowing that rising sales and maintaining a lid on operating expenses are both necessary to make money, the linear regression model quantified how much Sales and how Units Sold contributed to profit and how, indicating that boosting sales is the most crucial factor to long-term profitability. ANOVA findings and Profit's box plot throughout business segments show how proficient Profit varies between alternatives, allowing Ørsted to expect judgments concerning where to devote

resources. Profit in segments such as Government and Small Business offers excellent high potential returns, most segments have decent steady return prospects, while others such as Midmarket and Enterprise offer stable low profits. Regulating the company to concentrate on high-margin market segments may provide a more stable profit stream. Predictive Insights Concerning Future Strategy. The SVM and K-Nearest Neighbors models provide a greater awareness of how Sales and Units Sold predict Profit groups. The K-Nearest Neighbors model's results indicates that Ørsted is not properly categorizing Profit, displaying side-by-side positioning of Product or Business Line Profit figures may be more profitable. Ørsted may use things predicated about the criticality of Sales or the number of Items Sold to create designs that emphasize specific categories' deals and auctions. Understanding Causality in Profit Dynamics, Granger causality testing was crucial regarding how well Sales can predict Profit. For example, however, there was no direct association between Sales and Profit; this is significant as earnings are likely influenced by factors other than past sales data. These variables may incline to charge costs, fix prices, or cooperatively build conditions where Ørsted's products are advertised. Strategic Decision Making: Ørsted understands high its profit has gotten by linking both to industry peer and adversary standards like Vestas and Siemens Gamesa. Therefore, the firm can acquire where their power is, re-evaluation it against competitor strengths, to observe where profitable growth is underway. In summary, this study allows Ørsted to make better decisions by rendering them to ground up evidence on their company's financial soundness, time-to-time operation, and market position. Ørsted may use it to make the best decisions on how to use financial sources, reformation business operations, and search for development options while lessening risks but making profits.

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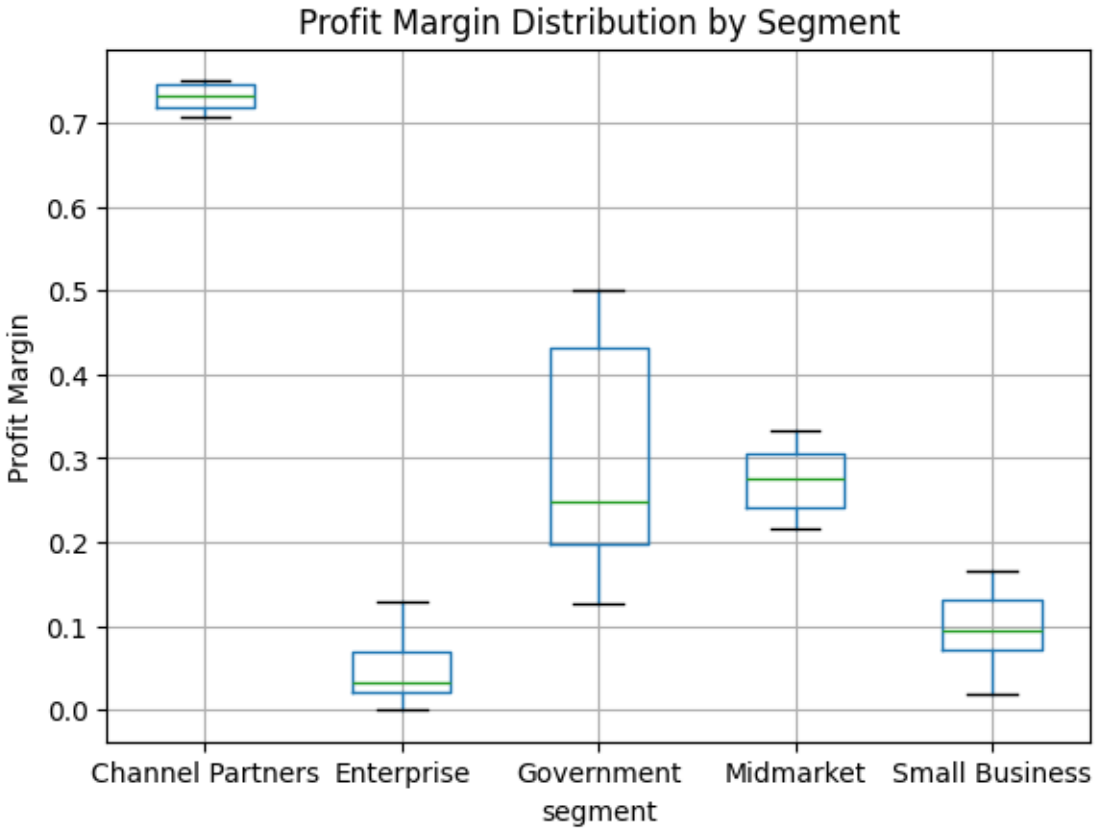
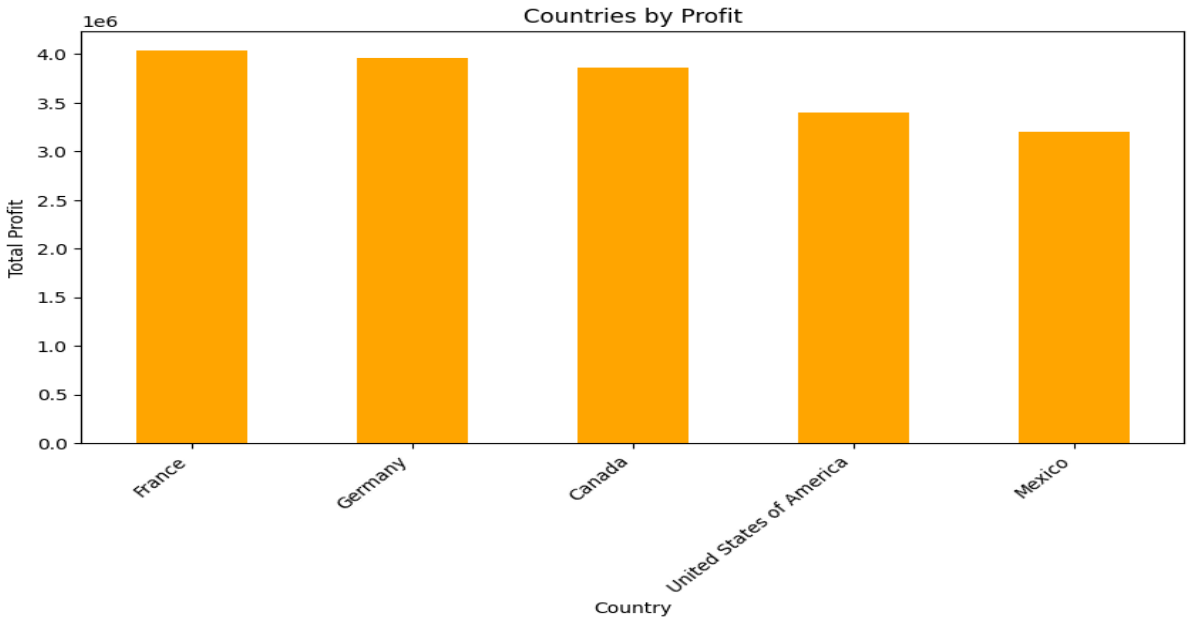
Annexes

Figure 1: Profit Margin Distribution by Segment



Source: Compile by Author based on(Bohl et al., 2013)

Figure 2: Countries by Profit



Source: Compile by Author based on (Sayitkulovich, 2024)

Figure 3: Knn Prediction

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KNN Predictions: ['Low' 'Medium' 'Low' 'Medium' 'Medium' 'High' 'Low' 'Low' 'Low' 'Medium'
 'Low' 'Low' 'Low' 'Low' 'Low' 'Low' 'Medium' 'High' 'Medium' 'Low' 'Low'
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 'Medium' 'Medium' 'High' 'Low' 'Medium' 'High' 'High' 'Medium' 'Low'
 'Medium' 'Low' 'High' 'Medium' 'Medium' 'Low' 'Low' 'High' 'Medium'
 'High' 'Medium' 'Low' 'Low' 'Medium' 'Low' 'High' 'Low' 'Medium' 'High'
 'Medium' 'Medium']
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Source: Compile by Author