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John Deere Construction Equipment - Strategic Audit

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John Deere – Construction Equipment
Strategic Audit

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Abstract

John Deere construction equipment is an operating segment of the equipment manufacturing giant John Deere Corporation. The company is considered the second largest construction equipment manufacturer in the world. This report seeks to understand the operating environment of John Deere's construction equipment manufacturing segment, its resources, its competitive advantages, and its future challenges. This analysis uses both PESTEL and Porter's Five Forces analyses to evaluate the external environment. Additionally, strategic recommendations and explanations are offered into how John Deere can effectively navigate the challenges facing the construction equipment manufacturing industry in the near future.

Key Words: John Deere, John Deere Corp., John Deere construction equipment, strategic audit, construction equipment manufacturing, PESTEL, Porter's Five Force's

History of John Deere

John Deere, a multinational corporation with operations in over 30 countries, started in 1837 when a man, by the same name, created the first "successful self-scouring steel plow in Grand Detour, Illinois" (National Investors Hall of Fame). Fast forward 190 years, the company is one of the oldest in the United States with roughly 70,000 employees across the world. Since its creation, John Deere has expanded beyond steel plows to manufacturing a portfolio of enterprise and consumer assets such as tractors, mowers, construction equipment, forestry and lodging machines, sports turf products and agriculture machines. The company's main revenue driver is the sale of equipment and machines. A secondary revenue driver was unveiled in 2020 called the Smart Industrial Operating Model focused on agriculture and construction efficiency and sustainability (John Deere Corp. 10-K, 2022, p.2). This model involves a particular focus on production systems, technology, and lifecycle solutions (i.e., aftermarket product support). The company is very active in the asset markets by participating in several acquisitions of operating assets and entities as well as majority and minority investments across many different types of companies. Relevant 2022 financial data for the enterprise consists of $57.6B in revenue, $43.4B in expenses, $7.1B of net income, and $23.38 in diluted earnings per share.

John Deere divides its operations into four business segments products & precision agriculture, small agriculture & turf, construction & forestry, and financial services. The construction and forestry segment "Defines, develops, and delivers a broad range of machines and technology solutions to unlock customer value on job sites, including earthmoving, forestry, and roadbuilding production systems" (John Deere Corp. 10-K, 2022, p.2).

The primary products of the Construction & Forestry segment include crawler dozers and loaders, four-wheel-drive loaders, excavators, skid-steer loaders, milling machines, and log

harvesters (John Deere Corp. 10-K, 2022, p.2). These products are sold under the John Deere brand name as well as Wirten Group brand names that include Wirtgen, Vögele, Hamm, Kleemann, Benninghoven, and Ciber. According to International Construction News, John Deere is the number 3 overall provider of construction equipment in the world due to its acquisition of Wirtgen Brands (Brown, 2020). One unique product offered by John Deere in this segment is its advanced connectivity and telematics solutions segment designed to improve worksite efficiency and management through technological performance (John Deere Corp. 10-K, 2022, p.5). It should be noted that John Deere has a financing segment operated under the construction and forestry segment that helps provide customers with the capital they need to obtain mission critical equipment.

This strategic audit will focus primarily on John Deere's construction equipment sales and solutions. Relevant 2022 financial data for this business line includes net sales of $12.5B and operating profit of $2B, representing a segment level operating margin of 16.1% (John Deere Corp. 10-K, 2022, p.31). John Deere gives an honest outlook in its 2022 annual report stating that construction equipment sales are expected to be flat in 2023 (John Deere Corp. 10-K, 2022, p.3).

PESTEL Analysis

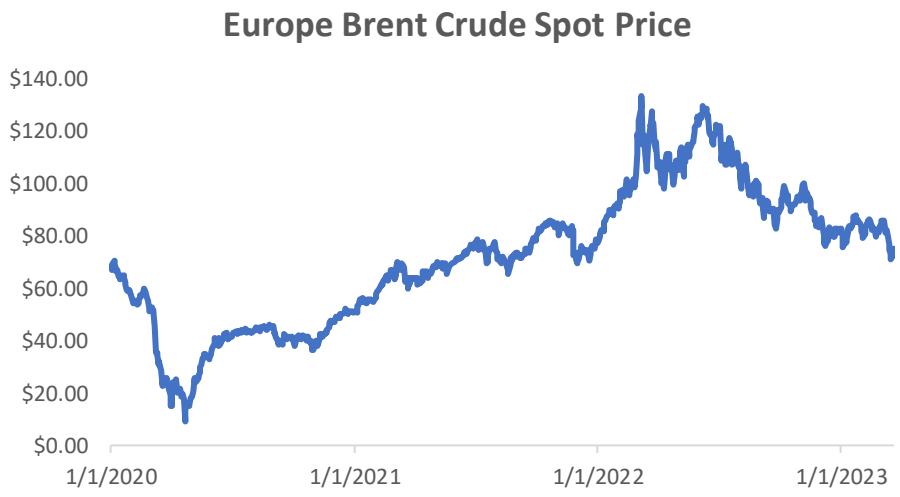
To effectively analyze the challenges facing John Deere, a PESTEL analysis will be used to examine its external operating environment. PESTEL focuses on six factors that influence a company's business environment. These are factors are political, economic, social, technological, environmental, and legal factors. It is important to examine the macro-environment of a firm to get an accurate view of the state of the industry and the possible head or tailwinds companies face within the industry. Some advantages of a PESTEL analysis include it provides an advance

warning of potential threats and opportunities, it encourages businesses to consider the external environment in which they operate, and the analysis can help organizations understand external trends (Barrington, 2021).

Political

John Deere is subject to several political risks. As a multinational corporation, it is subject to the political volatility of over 30 different countries (John Deere Corp. 10-K, 2022, p.15). It is subject to governmental policies in these countries including tax laws, foreign trade policy, labor laws, terrorism and military threats, environmental laws, and fiscal policy. The war in Ukraine is having an adverse effect on construction equipment sales in Russia and Belarus (John Deere Corp. 10-K, 2022, p.14). Developments in US-China trade relations have negatively impacted the company, as well (John Deere Corp. 10-K, 2022, p.15). The dramatic increase in the price of oil over the last 3 years has hurt demand for products across all business segments (John Deere Corp. 10-K, 2022, p.37). However, oil prices are beginning to stabilize suggesting these risk factors are being mitigated. See Figure 1 below.

Figure 1. Europe Brent Crude spot prices 1/2020 to 3/2023 (Spot Prices for Crude Oil, 2023).



Social

The social factors having the most effect on the construction equipment manufacturing industry are worker treatment and brand image. John Deere is committed to following its Code of Business Conduct in accordance with the highest ethical standards (John Deere Corp. 10-K, 2022, p.10). This code governs the way John Deere treats employees. This includes safety management systems that utilize a balanced score card that considers injury/illness corrective action, near-miss corrective action, employee risk reduction, and risk assessment projects (John Deere Corp. 10-K, 2022, p,11). Additionally, John Deere is committed to diversity, equity, and inclusion. The company believes it is pertinent to its long-term success (John Deere Corp. 10-K, 2022, p.11). It partners with several different DEI organizations including the National Society of Black Engineers, the Society of Women Engineers, and the Society of Hispanic Engineers, among other organizations. Both the Code of Conduct and partnerships with professional minority organizations are standard across the industry as seen when examining competitors' websites and filings.

Economic

There are many different economic risks for the construction equipment manufacturing industry. Globally, this business segment is primarily driven by the levels of new residential, commercial, and public construction demand (John Deere Corp 10-K, 2022, p.37). With interest rates increasing, it is expected that construction equipment manufacturers are going to have to find alternative revenue sources. This could likely come from developing cost-saving electric equipment. With these market dynamics, the industry is projected to grow at a compound annual growth rate of 17.5% between now and 2028 (Vantage Market Research, 2022).

General economic conditions also influence industry. John Deere suspects that inflation will have an adverse effect on the construction equipment segment until tamed (John Deere Corp. 10-K, 2022, p.16). With a rise in inflation comes the mentioned rise in interest rates and in increased cost financing John Deere operations, thus negatively affecting cash flow. Additionally, the prices of commodities, specifically oil and gas, have a massive effect on the industry as these are required to run equipment (John Deere Corp. 10-K, 2022, p.37). If the prices of these inputs increase, customer demand falls. The prices of other commodities such as steel, wood, iron, and copper also influence John Deere's construction equipment operations as these are inputs into the manufacturing process. If the price of these items goes up, the more expensive it is for John Deere to make the equipment.

Technological

The construction equipment manufacturing industry is seeing technological adoption at all levels. The trend towards electric equipment is both a sustainability and technology advancement. There is a specific push toward "The electrification of skid steers, compact excavators, and compact loaders" (Floyd, 2022). All three products are major aspects of John Deere's construction equipment portfolio. More technological trends include sensors to improve safety and cyber security software (Floyd, 2022). Additionally, there is a push to incorporate telematics, the long-distance transformation of computerized information into mega-construction equipment potentially leading to the harvesting and selling of construction data. (Global Market Insights, 2023).

Environmental

Environmental sustainability is a current topic in the industry. Consumers are increasingly concerned with the environmental effects of the products they are using and how those products are produced. Mike Brennan, author of the article *Sustainability in Equipment Operations*, states, "Sustainability or 'greening the fleet' within construction equipment asset management has transcended into one of the leading initiatives of many organizations around the world" (Brennan, 2021). People are not just worried about exhaust emissions coming from the equipment. Customers are also beginning to take a holistic look considering fuels and lubricants, maintenance facilities, mobility, and other aspects of equipment operation (Brennan, 2021). John Deere can successfully navigate the environmental challenges of today's society through its Smart Industrial Operating Model that focuses on construction equipment efficiency and sustainability.

Legal

As mentioned, John Deere has construction equipment manufacturing operations across the globe. This means it is subject to the laws and regulations of all the countries where operations are located. This is also true for multinational competitors. For example, stricter pollution regulation at the municipal, regional, and global levels for heavy machinery are being implemented in Europe and China (Vantage Market Research, 2022). These restrictions will require the altering of certain products across the industry, and those who can develop equipment that reduce emission and noise pollution will succeed (Vantage Market Research, 2022). John Deere, and its competitors, need to make sure they obey laws relating to equal opportunity employment, the environment, labor, privacy and data protection, advertising, and equipment

safety, among others. Additionally, it must consider the risks of potential future legislation that could affect its business.

Porter's Five Forces

A Porter's Five Forces analysis will be used to examine the construction equipment manufacturing industry's competitive structure and will give an understanding into who holds the "power" in this industry. Porter's Five Forces was developed in 1979 by American economist, Michael Porter. The Porter's Five Forces analysis "Is a critical element of strategic analysis that helps companies decide how to shape the balance of competitive forces [within their industry] to maximize profitability" (Kleweno, 2022). The five elements of the analysis are industry rivalry, threat of new entrants, threat of substitution, bargaining power of suppliers, and bargaining power of buyers. Some advantages of the Porter's Five Forces analysis are "It enables organizations to identify which firms are in control and set rules, provides company strategists with insight and a baseline to evaluate the company's strengths and weaknesses, it provides a holistic overview of any industry, and it helps strategists discover non-obvious opportunities that positively affect growth" (Kleweno, 2022).

Industry Rivalry

The level of rivalry is high in the construction equipment manufacturing industry. The industry is competitive globally with large players including Caterpillar, CNH Industries, Komastsu Ltd., Zoomlion, Sany Heavy Industry Co, Xuzhou Construction Machinery Group, and Hitachi (Brown, 2022). Six of the ten largest construction equipment manufacturers in the world, by revenue, are headquartered in Asia and two are located in the United States (Global Data). The two in the United States are Caterpillar and John Deere. It should be noted that John

Deere competes heavily with Caterpillar, especially in the United States. Caterpillar is considered the largest construction equipment company in the world with revenues of over $59 billion in 2022. In 2021, the top 10 construction equipment manufacturers saw an average revenue growth of 11.3% (Global Data). One factor that contributed to this was the access construction equipment companies had to cheap financing for operations due to low interest rates, the easing of COVID-19 related restrictions, and global interest in infrastructure investments (Jensen, 2021). Companies differentiate themselves through marketing, quality of products, brand image, product innovation, product diversification, and acquisitions.

As mentioned, there are plenty of construction equipment manufacturers across the globe that produce equipment that is utilized in the same, or equivalent way, as John Deere's. However, there are many factors that come into play when a customer is choosing who can supply the construction equipment they need. This includes the work that needs to be done, transportation, regulatory, and environmental requirements. Some things a customer would need to ask themselves before switching construction equipment providers includes: "Can the competitor provide the equipment I need to get the specific job done? Will switching equipment providers require longer and more expensive transportation? Does the competitor's product satisfy the regulatory requirements of the location of construction? Does the competitor's product satisfy the environmental requirements of the location of construction? There are issues to be considered when a customer considers switching equipment providers.

Threat of New Entrants

The potential for new entrants into the construction equipment manufacturing industry is extremely low. Any prospective new entrant into the industry would need a large amount of capital to manufacture industrial size construction equipment. John Deere, and its competitors,

also enjoy established distribution channels that help lower large expensive transportation costs. Large firms have economies of scale that allow them to defend and expand their market share. Additionally, it would take a potential new entrant decades to scale to the level of production of John Deere. Not only is the equipment expensive to manufacture, but it also takes months to complete.

Threat of Substitution

The threat of substitution in the construction equipment manufacturing industry is low. There are no substitute products available for industrial sized construction equipment.

Bargaining Power of Suppliers

The bargaining power of suppliers in this industry is moderate to low. The large, multinational corporations that operate in this industry understand the need to diversify suppliers to mitigate supply chain risk. This includes raw materials suppliers as well as replacement parts suppliers. The COVID-19 pandemic, and subsequent supply chain constraints, amplified this and showed how firms that did not have diversified supply chains inevitably failed. Another reason the bargaining power of suppliers is low is that the construction equipment industry is concentrated on a small number of large firms. This small number of firms has bargaining power as the suppliers have limited outlets to sell the products they produce. This makes them heavily reliable on the industry.

The bargaining power of suppliers for John Deere is also moderate to low. John Deere buys its manufacturing and replacement parts from many different vendors across the world over various markets (John Deere Corp. 10-K, 2022, p. 9). John Deere does not rely heavily on any individual supplier of raw materials. This is standard across the industry. These large

construction equipment companies have operations large enough where they understand they need to diversify suppliers. Those who do not will inevitably fail. It is interesting to point out that John Deere has a dynamic raw materials strategy that monitors and ensures availability of supplies, prevents concentration buying, manages costs, avoids restrictive supply agreements, and coordinates delivery of purchases.

Bargaining Power of Buyers

The bargaining power of buyers is considered moderate because the buyers in this industry tend to be medium to large companies meaning, depending on who the specific buyer is, the loss of their business could have a significant impact on revenues. Additionally, these buyers do not buy in large volumes and are scattered across the globe, suggesting low buyer power.

The buyers of John Deere construction equipment products have moderate bargaining power. Its buyers are concentrated in the construction, mining, energy, and forestry industries. John Deere provides customers in these industries with equipment that is necessary for their operations and cannot be easily obtained, meaning they are not as price sensitive as other industries. Also, John Deere customers do not pose a threat of backward integration due to the nature of entering the construction equipment manufacturing industry. As mentioned in the threat of substitute products section, there is a moderate possibility of high switching costs in the industry. John Deere can mitigate the bargaining power of buyers through its established brand image and product differentiation.

Strategy & Objectives

John Deere credits the success of its company to four core values: integrity, quality, commitment, and innovation. Recently, the company felt its business was not aligned to these

values, and in 2020, the company announced its new Deere Smart Industrial Strategy (John Deere, 2020). This new operating model puts a focus on the integration of smart technology with John Deere's legacy of manufacturing excellence (John Deere, 2020). The company is putting a strategic focus on the life cycle of its products including efficient manufacturing processes, appropriate incorporation of technology in equipment and enterprise integration of John Deere's aftermarket and support capabilities for its customers.

According to John Deere's latest annual filing, "The equipment operations' manufacturing strategy involves the implementation of appropriate levels of technology and automation to allow manufacturing process to remain profitable at varying production levels" (John Deere Corp. 10-K, 2022, p.6). John H. Stone, President of the Construction Equipment segment, says, "John Deere's Construction [and Forestry] Division will now more fully leverage technology and lifecycle solutions for the future" (John Deere, 2020). It is not surprising to see John Deere putting more of an emphasis on the life cycle of its products, including service, maintenance, software upgrades, and other continuous improvements, as its construction equipment portfolio is comprised of enterprise level assets that are expensive and require frequent attention and maintenance.

For John Deere to adequately monitor the success of its Smart Industrial Strategy, the company created the Leap Ambitions key performance indicators report. These are yearly measures that monitor the sustainability, success, and effectiveness of its new operating model (Bedord, 2022). The Leap Ambitions goals highlight how "Customers can do more with less" (John Deere Corp. Sustainability Report, 2022, p.25). These measures will be used across all John Deere business divisions with the efficacy of each division monitored separately.

Relevant key performance objectives for John Deere relating to its construction equipment division include “By 2026: deliver 20 or more electric and hybrid-electric product models, increase Smart Grade earthmoving control adoption by 50%, and increase precision roadbuilding solutions adoption by 85%.” (Bedord, 2022). See Figure 2 below. For reference, Smart Grade earthmoving adoption was 32% in 2022 and precision roadbuilding solutions adoption was 82.5% in 2022 (John Deere Corp. Sustainability Report, 2022, p.25). It is obvious the company is combining customer value with sustainability initiatives. It can be concluded that the company is trying to capitalize on changing customer preferences as sustainability of products and their effects on the environment is becoming increasingly important in the minds of consumers, especially in the international markets.

Figure 2. Key Performance Objectives (Bedord, 2022)

Competitive Advantages

John Deere has many different competitive advantages in its construction equipment segment that allow it to retain a significant market share. The most important, and effective, of these competitive advantages being the John Deere brand name. Not only has the recognizable yellow deer been seen in 160 countries, across agriculture, construction, lawn care, and forestry equipment, but the John Deere name has always been associated with quality products and service for over 120 years. Blog for Builders, a frequently visited website by individuals in the construction industry, wrote a summary article on the opinions of John Deer construction equipment users saying, "When it comes to reviews, John Deere is no stranger to positive feedback from professional contractors. John Deere's equipment is praised for its ability to tackle tough jobs, easy-to-use controls, and comfortable operation. John Deere's construction equipment also has a reputation for being dependable and durable" (Blog for Builders, 2023). This combination of a frequently observed logo by consumers and consistent delivery of quality products and service can be attributed to why John Deere is the second largest construction equipment manufacturer in the world by revenue (Global Data).

John Deere also enjoys competitive advantages related to its patents, trademarks, copyrights, and trade secrets. According to the 2022 10-K filing, John Deere owns a substantial number of protected intangible assets and expects the number to grow as it pursues more technological innovation (John Deere Corp. 10-K, 2022, p.8). Additionally, the company retains the legal security of many distinct aspects of its identity and recognition such as the leaping deer logo, and the green and yellow combination. The company mentions how it puts a significant amount of effort into "Furthering [its] competitive position by filing patent applications in the U.S. and internationally, to protect technology and improvements considered important to the business"

(John Deere Corp. 10-K, 2022, p.8). The company makes a specific note saying that it is true that, in aggregate, the rights under its patent and licenses are critical to its operations and competitive position, however, it does not regard any business line being dependent upon any single patent or group of patents (John Deere Corp. 10-K, 2022, p.8). This is important as it shows the company is aware of intellectual property risk and is frequently monitoring effectiveness of its patents, trademarks, copyrights, and trade secrets towards its competitive advantage. It should also be noted that the intellectual property portfolio includes both products for consumers and proprietary products and processes used in manufacturing. The value of John Deere's intangible assets in 2022 was $1.218 billion (it should be noted that the company only provides an aggregate value for all intangible assets across all business lines). For comparison, Caterpillar, John Deere's largest competitor and the largest construction equipment provider globally by revenue, valued its intangible assets at $758 million in 2022 (Caterpillar Inc. 10-K, 2022, p.52).

Due to over 180 years of operating success and efficiency, John Deere has established strong cost advantages and dealership networks. John Deere's vertically integrated business model has led it to establishing strong manufacturing capabilities that allow it to control production costs while also maintaining a high degree of quality (Burman, 2023). John Deere's success in vertical integration has also allowed it to create positive relationships with raw materials suppliers. John Deere is a major customer of many of its raw materials suppliers, allowing the company to enjoy strong buyer power and enact beneficial cost advantages relative to its competitors, when purchasing raw materials.

One last competitive advantage established by John Deere is its strong dealer network that turns products and services into revenue. The company has over 1,600 independent dealerships

in North America, and more than 3,800 worldwide (Burman, 2023). These dealerships are responsible for marketing and selling John Deere products and services, as well as providing key support and maintenance for the equipment (Burman, 2023).

Resources Leading to a Sustainable Competitive Advantage

To maintain its competitive advantage, John Deere needs to continue to be an industry leader in innovation and technology adoption. Since its inception over 180 years ago, the company has always been willing to adapt to the preferences of consumers and continually manufacture products that solve the customers' problems. It is clear, today, that the driving force behind efficient manufacturing is the adoption of technology and processes that lead to lower costs for the producer and still bring the necessary value to the consumer. The firms with sustainable competitive advantages in the construction equipment manufacturing industry are the ones that own the cost advantages and continually find ways to lower input costs and increase margins. As explained previously, John Deere holds one of the largest shares of revenue for the industry and enjoys significant cost advantages through supplier relationships and dealership success. Additionally, it has technologies and resources in place to help it continue to find ways to sustain a competitive advantage. This includes its expanding product and intellectual property portfolios, Leap Ambitions key performance indicators, and Deere Smart Industrial Operating Model. The effective utilization and continuous improvement of these concepts will allow John Deere's construction manufacturing segment to sustain its established competitive advantages.

Challenges and Future Positioning

Technology

Technology adoption, for enterprises, has exploded at an exponential rate since the early 2000s. Firms have found several different ways that technology lowers costs, increases efficiency, increases product value, or lowers redundancy, among many other useful cases. Additionally, consumer preferences have shifted towards technology and technological solutions for problems. That means the most well-off firms are those that address consumer preferences the best and quickest. Firms in the construction equipment manufacturing industry have already begun incorporating the most up-to-date tech in their products and are starting to find ways to solve additional consumer problems through technological innovation. Additionally, construction equipment manufacturing firms are beginning to focus on data collection, and interpretation through the use of their products to help construction companies make more informed decisions about their projects (Global Market Insights, 2023).

John Deere is already in an excellent position in terms of technological adoption and innovation. As discussed previously, the company has many different technology-based initiatives already underway that are creating its products and manufacturing processes more efficiently. Additionally, the company is having no problem adjusting its approach to consumer preferences. For example, John Deere recently announced the electrification of over 20 models of construction equipment (John Deere Corp, 2022). According to Derek Muller, product manager for electrification, “We’ve [John Deere] started this journey to solve customer pain points and deliver value… through our electric lineup of products, we’ll look to solve for those by reducing operational and maintenance costs” (John Deere Corp., 2022). This announcement was followed by John Deere’s 2022 acquisition of Kreisel Electric, an Austrian battery company

producing electric batteries for cars. It is clear that John Deere is fully embracing the shift towards technology, and it is seemingly in a strong position.

One recommendation for John Deere would be analyzing the possible returns from investment in data harvesting and distribution. As mentioned, there has been increased attention towards data and the interpretations that can be drawn from effective analysis of data. There seems to be opportunity within the construction equipment manufacturing industry in terms of creating supplementary products to be included with equipment that can gather data from construction projects. Not only could this data be useful for the specific projects it was taken from, but this data could also be harvested and sold to inform other individuals working on similar or relevant construction projects of their own. There has been increased interest in this idea from construction equipment manufacturing companies, however, firms have taken little significant action (Global Market Insights, 2023). This leaves an opportunity available for the taking. John Deere has the chance to be one of the first to incorporate this kind of potential revenue stream.

Supply Chain Issues

The construction equipment manufacturing industry is still recovering from the impacts of the COVID-19 pandemic and subsequent supply chain issues. According to an Association of Equipment Manufacturers survey, nearly all respondents said they still face supply chain issues with more than half experiencing continuously worsening supply chain conditions (Association of Equipment Manufacturers, 2023). The driving forces, they said, are current supply chain disruptions and workforce shortages.

John Deere is positioned excellently, relative to other construction equipment manufacturers, in terms of hedging supply chain risk. The company has long term agreements with hundreds of suppliers both in the United States and around the globe. This allows it to avoid the risks of working with one supplier or in one country. Additionally, John Deere has developed confidential contingency plans to minimize supply chain challenges that may impact its ability meet consumer demands (John Deere Corp. 10-K, 2022, p.29).

Interest Rates and Input Prices

The current economic environment is one characterized by uncertainty and volatility due to several varied factors. This is due, in part, to the dramatic increase in interest rates being seen across the world. In the case of the United States, interest rates have been increased at a faster pace than any time in history. With an increase in rates comes a decrease in economic investment, activity, and output. Also, an increase in interest rates means an increase in the cost to finance debt investments due to the higher interest rate expense that come with elevated rates. The elevated level of interest rates is something that John Deere will have to analyze and strategically plan for as most of its products are purchased through debt financing because of the large prices for enterprise level construction equipment. One of the reasons why there is an increase in interest rates is because of the increase in prices seen across industries. One of these that directly affects John Deere is the price of commodities used in its products. This includes steel, copper, iron, aluminum, and energy among other commodities. John Deere can minimize the effects of these elevated prices by continuously monitoring them in the market and by consistently evaluating its supplier agreements.

ESG

One last issue being faced by John Deere is its approach to environment, social, and governance (ESG) issues. Increasingly, society is beginning to focus on the importance of moral and ethical business practices that combine financial returns and a holistic view of stakeholder management. Consumers are finding importance in interacting with businesses that promote sustainability towards the environment, positive contributions to society, and effective and moral governance. This is a market-wide trend being seen across industries with a particular emphasis on the manufacturing industry and the processes companies use to create products.

John Deere is excellently positioned to navigate this issue. As mentioned, John Deere has already established its Smart Ambitions Strategy and Leap Ambition key performance indicators. This operating model and measurement tool not only tracks financial returns on different firm projects but also measures the effect of John Deere's manufacturing processes and products on the environment. This model was likely created in direct response to the change in consumer preferences. John Deere says it will continue to issue this yearly report publicly to all stakeholders so they can view the company's effects on the environment and society.

One strategic recommendation for John Deere is to continue to keep an emphasis on the combination of ESG and financial returns. John Deere has already found ways to invest in ESG initiatives while also continuing to generate a positive financial return. This is seen through the announcement of the electrification of over 20 different construction equipment models. Additionally, there are the risks of legislation in other countries regarding environmental considerations in the manufacturing process that could affect John Deere in the future. It would be in John Deere's best interest to continue exploring ways to make its products and processes

more environmentally friendly as it seems the future is one where company success will be at the intersection of successful stakeholder management and real financial returns.

References

Association of Equipment Manufacturers. (2023, March 28). *Construction equipment market outlook: Challenges persist, but long-term hopes remain high*. AEM. Retrieved May 1, 2023, from https://www.aem.org/news/construction-equipment-market-outlook-challenges-persist-but-longterm-hopes-remain-high.

Barrington, R. (2021, October 29). *What is a pestel analysis?* Oxford College of Marketing. Retrieved April 10, 2023, from https://blog.oxfordcollegeofmarketing.com/2016/06/30/pestel-analysis/

Bedord, L. (2022, March 10). *What's the next leap forward for John Deere?* Successful Farming. Retrieved April 13, 2023, from https://www.agriculture.com/news/machinery/what-s-the-next-leap-forward-for-john-deere

Blog for Builders. (2023, March 31). *John Deere Construction Equipment Reviews*. Blog for Builders. Retrieved May 1, 2023, from https://blogforbuilders.com/john-deere-reviews/

Brennan, M. (2021, May 26). Sustainability in equipment operations | construction equipment. Construction Equipment. Retrieved April 10, 2023, from https://www.constructionequipment.com/topical/green-resources/article/10758577/sustainability-in-equipment-operations

Brown, A. (2020, May 18). *World's top ten construction equipment manufacturers*. International Construction. Retrieved April 10, 2023, from https://www.international-construction.com/news/world-s-top-ten-construction-equipment-

manufacturers/1144045.article#:~:text=John%20Deere&text=This%20year%2C%20the%20company%20retains,%2C%20Kleemann%2C%20Vogele%20and%20Hamm.

Brown, A. (2022, June 13). *World's top 10 construction equipment manufacturers*. International Construction. Retrieved April 10, 2023, from https://www.international-construction.com/news/World-s-top-10-construction-equipment-manufacturers/8021295.article

Burman, H. (2023, April 18). *What is Deere & Company's Competitive Advantage (Moat)?* What is Deere & Company's Competitive Advantage. Retrieved May 1, 2023, from https://valueinvestorscentral.com/what-is-deere-companys-competitive-advantage/#:~:text=Deere%20%26%20Company%20has%20several%20competitive%20advantages%20that%20have%20helped%20it,company%20maintain%20its%20competitive%20position

Construction - construction equipment manufacturers by revenue. Construction - Construction Equipment Manufacturers by Revenue. (n.d.). Retrieved April 10, 2023, from https://www.globaldata.com/companies/top-companies-by-sector/construction/global-construction-equipment-manufacturers-by-revenue/

Electric Equipment: Helping Our Customers Overcome Their Biggest Challenges. John Deere US. (2022, November 28). Retrieved May 1, 2023, from https://www.deere.com/en/stories/featured/electric-equipment/

Focused on Unlocking Customer Value, Deere Announces New Operating Model. (2020, June 17). *John Deere US*. Retrieved May 1, 2023, from deere.com/en/news/all-news/2020jun17-

new-operating-model/#:~:text=The%20Deere%20Smart%20Industrial%20strategy,rapid%20introduction%20of%20new%20technologies.

Floyd, E. (2022, September 10). *Top 10 trends to impact construction industry in next decade*. ForConstructionPros.com. Retrieved April 10, 2023, from https://www.forconstructionpros.com/business/article/22432300/association-of-equipment-manufacturers-top-10-trends-to-impact-construction-industry-in-next-decade

Heavy Machinery Industry Megatrends 2023 and beyond. Global Market Insights Inc. (2023, January). Retrieved April 10, 2023, from https://www.gminsights.com/megatrends/heavy-machinery/3

Jensen, S. (2021, May 3). *Heavy Equipment Industry reports first quarter 2021 results*. OEM Off-Highway. Retrieved April 10, 2023, from https://www.oemoffhighway.com/market-analysis/article/21403734/heavy-equipment-industry-reports-first-quarter-2021-results#:~:text=OEMs%20and%20component%20manufacturers%20report,the%20first%20quarter%20of%202021.

Caterpillar Inc. (2023, December 31). Form 10-K retrieved from http://www.sec.gov/edgar.shtml

John Deere Corporation (2022, October 30). Form 10-K retrieved from http://www.sec.gov/edgar.shtml.

John Deere Corporation. (2022). *Sustainability Report 2022.* John Deere Corporation.

https://www.deere.com/en/our-company/sustainability/?CID=SEM_Brnd_enUS_GGLE&creative=Sustainability&gclid=CjwKCAjw0N6hBhAUEiwAXab-TSjz1nK-t4mgQ55X9n8jky2K3AGPNV7oT49Pjwc3OUw1l77tGa6bkhoCHsEQAvD_BwE

Kleweno, S. (2022, November 24). *Porter's Five forces (2023): The definitive overview (+ examples)*. Cascade. Retrieved April 10, 2023, from https://www.cascade.app/blog/porters-5-forces

National Investors Hall of Fame. (n.d.). *The John Deere Plow Invention and the NIHF inductee*. The John Deere Plow Invention and the NIHF Inductee. Retrieved April 10, 2023, from https://www.invent.org/inductees/john-deere

Spot prices for crude oil and petroleum products. (2023, March 10). Retrieved April 10, 2023, from https://www.eia.gov/dnav/pet/PET_PRI_SPT_S1_D.htm

Vantage Market Research. (2022, November 29). *Construction equipment market size & share to surpass $228.4 bn by 2028: Vantage Market Research*. GlobeNewswire News Room. Retrieved April 10, 2023, from https://www.globenewswire.com/en/news-release/2022/11/29/2563722/0/en/Top-News-Construction-Equipment-Market-Size-Share-to-Surpass-228-4-Bn-by-2028-Vantage-Market-Research.html