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# Risk Management of Multinational Strategic Enterprise: Creating Global Strategic Responsiveness

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## Abstract

This paper seeks to elucidate and discuss applied risk management questions through a theoretical and practical lens, presenting guidelines and cases in line with best practices within risk management. For board members, the paper seeks to provide a natural introduction to some of the central concepts within the risk function, hoping to encourage effective risk governance and the further integration of strategic management with risk management. For risk executives, the paper seeks to bring together many of the theoretical insights on which the risk management field is based and enrich them with practical observations. These observations will primarily take the form of cases from which lessons can be implemented to either emulate or avoid case companies' respective strengths or weaknesses.

The first section of the paper concerns transactional and operational exposure, together making up the economic exposure that a multinational firm faces. The section largely follows the generic risk management cycle in making suggestions for analyzing, monitoring, and managing economic exposures. Concrete frameworks include Bartram's regression analysis, gap analysis, value at risk (VaR), and breadth and depth, revealing the appropriate target areas for operational or financial hedging. The section finds that economic exposures stem partly from an increasingly globalized world where volatile exchange rates make effective risk responses relevant and beneficial. Furthermore, through the use of Ørsted as an illustrative case, it is revealed that the analysis tools complement each other in building an understanding of a firm's economic exposure and where to focus management.

The second section of the paper tackles the limitations and possibilities of ERM practices in addressing operating and strategic risks. The section focuses on first examining the central ERM practices of ISO31000 and COSO from a theoretical viewpoint and then exploring their implications from a practical perspective. The section finds that ERM practices have various possibilities and limitations in tackling operating and strategic risks, with success depending mainly on implementation efficacy. However, any assessment must consider the constant evolution of the approaches, especially moving toward the new strategic risk management paradigm.

The third section of the paper tackles how multinational enterprises should deal with and accommodate political and sovereign risks while structuring a resilient global value chain through foreign direct investment (FDI). The section first examines how political and sovereign risks can be captured in multinational capital budgeting, exploring methods such as NPV, payback, and real option valuation. The section then focuses on exploring the concept of a resilient global value chain (GVC), looking at the benefits, potential drawbacks, and how MNE's can develop resilience. The section finds that multinational capital budgeting and FDI are inextricably linked to resilience in the GVC. This resilience brings many benefits that help manage political and sovereign risks.

The final section of the paper tackles how an MNE should look to organize itself in order to adapt and respond to a turbulent global environment. The section focuses on first examining the literature within the field to make recommendations of crucial areas of focus, alongside practical suggestions with reference to values, ethical leadership, and organizational culture. The section finds that organizing for adaptability is challenging and involves critical practices within numerous areas, but it can also lead to performance benefits, especially in times of uncertainty and crisis.

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# **1. Transaction and Operating Exposures**

## **1.1 Introduction**

Propelled by the breakdown of Bretton Woods in 1973 (Bartram, 2008), heightened volatility in freely floating currencies has constituted a growing risk for multinational firms, as higher variance promotes financial distress, resulting in a lower market value for the MNE's (Andersen et al., 2014). Andersen (2006) is well-aligned with the work of Moffett et al. (2003), defining transaction and operating exposures as the components that constitute economic exposure, which comprises all potential future cash flow implications from changes in contracted or expected obligations denominated in foreign currencies (Andersen, 2006). Within this, transaction exposure stems from the settlement of existing financial obligations, whereas operating exposure embodies anticipated transactions that are, for the most part, not yet contracted. The distinction between the two is critical, with a fallacy-ridden tendency of focusing more on the typically short-to-medium term transaction exposures relative to the usually long-term operating exposures, which are often just as important, being common (ibid.).

## **1.2 Theoretical analysis, monitoring, and management of economic exposure**

To tackle their exposures, a multinational corporation can utilize the generic risk management cycle steps of analyze, monitor, and manage (Andersen, 2006). Starting with analysis, transaction exposures can be analyzed using gap analysis, Bartram's regression, and value at risk (VaR). In contrast, operating exposure can be estimated through breadth and depth. These tools also encourage monitoring by comparing figures to benchmarks or risk-appetite-based targets (Andersen et al., 2014).

Firstly, to analyze a firm's exposure to interest rates and exchange rates, gap analyses can be applied (Andersen, 2006). Interest rate gaps measure the difference between rate-sensitive assets and liabilities at book value on re-pricing dates via re-pricing gaps, and exchange rate gaps measure the mismatch between foreign-denominated receivables and payables over time through liquidity gaps (ibid.). A Major strength of gap analyses is the ease of comparing results to a meaningful base such as total assets and imposing maximum acceptable exposures based upon an MNEs risk appetite.

Complementary to this analysis, a firm can use Bartram's (2008) ex-post regression analysis to investigate whether statistically significant relationships exist between operating, financing, investing, or total cash flows and exchange rates while controlling for the change in term spread and short-term interest rates. From this, Bartram's strength lies in concreteness, with a lack of statistical significance indicating that the firm is managing its economic exposure effectively and vice versa (Bartram, 2008).

Synthesizing several risk factors into a quantitative figure, VaR expresses the size of the loss that a firm can expect to incur over a certain period with a specific probability (Andersen, 2006). Most firms utilize a 5% VaR, but can adjust the significance level to the desired degree of conservatism. However, the model depends upon a normal profit distribution and a representative choice of the time period, meaning the model should be applied with a degree of care (ibid.).

On the other hand, operating risk is more difficult to analyze and monitor due to its focus on uncontracted cash flows. However, it can be estimated through the breadth and depth of a given firm's subsidiaries, with a high breadth of foreign spread and low depth of subsidiary concentration within the two largest markets correlated to lower operational exposure and vice versa (Pantzalis, 2001).

Progressing from analyzing and monitoring, firms must also seek to manage exposures. Managing can be most easily done through financial and operating hedges, aiming to shift the profit to a leptokurtic distribution with a lower level of variance, as shown in appendix A (Moffett et al., 2003). Chowdhry and Howe (1999) argue that operational hedges are better at managing long-run operating exposure, whereas financial hedges are better at managing short-run transactional exposure. Hedges to manage operating exposure include diversifying the firm's financing or operating base alongside proactive policies that offset anticipated future exposures such as risk-sharing agreements or matching cash flows through natural hedges (Moffett et al., 2003). Antithetically, transaction risk can be managed more directly due to their generally contractual nature, allowing the MNE to use derivatives such as put options or futures (ibid.). Firms must remember that hedges come at a cost and only benefit if the gain from lower variance outweighs the cash reduction (ibid.).

### 1.3 Applied analysis, monitoring, and management of economic exposure

Jorion (1990) was one of the first to empirically test the phenomenon of exchange rate exposure among a sample of 287 US multinationals, finding that only 5.2% of the firms were significantly exposed to foreign exchange rates at a 5% significance level. This result reflects the empirical consensus that most multinational firms utilize hedging effectively to limit their exposures (Bartram, 2008).

Ørsted as an exemplary case further embodies this phenomenon, showing how the chief risk officer (CRO) and other risk analysts could employ the prior tools. Appendix B shows the results of a Bartram regression of cash flows against the key currencies of GBP and TWD while controlling for the change in the short-term interest rate and the term spread. The output shows no statistical significance, reflecting Ørsted's risk-sensitive culture, where all transactional exposures are analyzed, monitored, and managed by an in-house trading team, exemplified by a large protective currency put on GBP for the 'Hornsea wind farm' (Ørsted, 2020). Complimenting this analysis, appendix C shows a gap analysis for the firm. The re-pricing gap for GBP grew to DKK-7.68bn or a -0.21 ratio in 2020, which is actively hedged through interest rate swaps to convert loans into fixed rates (ibid.). The liquidity gap has also grown to DKK-3.01bn or a -0.447 ratio, with forwards used to lower variance, making it easier to raise cheap capital, something that is critical in the capital-intensive energy industry (ibid.).

Antithetically, through a depth and breadth analysis in appendix D, it can be seen that Ørsted is not globally diversified to the same degree as competitors in the energy sector. The firm has the lowest breadth and second-highest depth of the sample, suggesting that it should utilize operational hedges to a greater degree (Pantzalis, 2001). This need for a higher breadth and lower depth is something the firm is increasingly focusing on, creating a plan that targets organizational flexibility by creating more development subsidiaries, which act as natural hedges and enable currency borrowing (Ørsted, 2020).

Despite most MNE's being well hedged, numerous high-profile failures still exist. For example, Lehman Brothers characterized its risk controls as "*meaningful constraints on risk-taking*" (Andersen, 2010). However, as shown in appendix E, VaR increased by 158% in 1 year. Simultaneously, "*risk limits were repeatedly breached and not remedied*" (ibid.), in line with a culture that placed profits above careful and active risk management (ibid.). This case and a myriad of others highlight the importance for the next generation of risk managers to learn from past failures and integrate risk management with the strategic management, culture, and values of MNE's.

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## **2. ERM Practices to Tackle Operating and Strategic Risk**

### **2.1 Introduction**

Since the end of World War 2 in 1945, formal risk management has increasingly emerged as a concept, eventually being enriched with influences from finance and other practices. This notable development towards integration eventually set us on the path to modern practices such as COSO and ISO31000, which are today synonymous with '*enterprise risk management*' (ERM) (Andersen & Young, 2020). ERM is now undergoing a further paradigm shift, moving towards strategic risk management (SRM), aiming to capture upside risks, embrace risk management within MNE culture and highlight strategic and operational risks alongside casualties and economic exposures (Andersen et al., 2014).

Slywotzky and Drzik (2014) define strategic risk as "*the array of external events and trends that can devastate a company's growth trajectory and shareholder value,*" highlighting exogeneity and associated uncertainty. Uncertainty is present when "*expected outcomes of future events cannot be predicted as they are unique and often abrupt*" (Andersen & Young, 2020). Optimally, uncertainties should be tackled before they become risks (Andersen, 2012-2), with this proactive approach being highly relevant given the strategy-rooted failures of once-great MNE's such as Nokia and RadioShack

On the other hand, operating risks are primarily endogenous, with management largely depending upon how the MNE structures its operations (Moffett et al., 2003). This, too, is highly relevant, with the increasingly complex structures of MNE's leading to high risk-interrelatedness (Andersen, 2012-2) and cases such as Danske Bank's severe losses from laundering in their Estonian subsidiary.

### **2.2 Theoretical ERM practices to deal with operating and strategic risks**

ERM practices emerged as a way to aid chief risk officers and risk analysts in identifying and addressing different types of risk as they materialize on an individualized company basis. Within this context, ERM can be seen as adding additional layers to the generic risk management cycle, which is helpful due in part to the historical origin and focus area for the cycle primarily being on insurable risks. ERM adds structural, organizational, and managerial considerations, and its application is governed by factors such as systems, capabilities, organizing, leadership, and culture (Andersen, 2012-2), granting a view into an MNE's risk universe. Two essential ERM practices that apply these principles have grown over time on opposite sides of the Atlantic, COSO and ISO31000.

COSO has become the primary framework in the US, gaining popularity as a response to corporate scandals such as Enron (COSO, 2004). The practice utilizes a rules-based framework that can be arranged as a cube, guiding MNE's to achieving their objectives. The front of the cube highlights 8 key process steps, extending the generic risk management cycle. These 8 steps should be pursued with consideration given to the rest of the cube, the risk areas such as strategy and operations, as well as the hierarchical tiers that need to be engaged to ensure firm-wide risk involvement (COSO, 2004).

Antithetically, ISO31000 has been popularized in Europe since its launch in 2009, deploying a principles-based approach alongside a 10-step process of application (IRM, 2018). There are 8 principles espoused by ISO31000, with principles 1 to 5 providing guidance on how a risk management initiative should be designed and principles 6 to 8 relating to the risk management operation (ibid.).

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IRM (2018) claims that ISO31000 leads to benefits in tackling strategic and operating risks. In terms of strategy, a proactive approach to risk management is stated to lead to better decisions due to detailed risk analysis. On the other hand, operations are said to be improved due to actions taken to reduce the potential impacts of events that can cause disruptions. However, ISO31000 is heavily monetized, which may lead IRM to overestimate the possibilities and underestimate the limitations.

### **2.3 Applied ERM practices to deal with operating and strategic risks**

There are definite possibilities for ERM practices to tackle operating and strategic risks if applied correctly as a proactive approach to risk management. Firstly, ERM may allow a firm to leverage unique knowledge built through prior near misses and mistakes by involving the organization more broadly to create greater adaptability, especially in uncertain situations (Andersen et al., 2014). This possibility may be especially relevant in COSO, which explicitly highlights involving employees from all levels of the organization, from entity-level to subsidiaries (COSO, 2004). Furthermore, ERM practices, and ISO31000 especially, encourage the direct integration of strategic management and risk management. This integration assists firms in setting strategies and making informed decisions that methodically address risks, while capturing the synergies from process overlaps such as saved time and varied perspectives on issues (IRM, 2018). In addition, Christensen (2021) presents that bringing ERM practices into Chr. Hansen created a risk culture with a shared vocabulary that helped break down silos, achieving a core goal of ERM by ensuring that risk management is actively discussed, even when risk managers aren't around. Andersen et al. (2014) supports this idea, stating that a higher level of general organizational risk awareness facilitates proactivity and ease of spotting red flags.

Despite these possibilities, empirical evidence is mixed, with Paape and Spelke (2012) finding "*no evidence that application of the COSO framework improves risk management effectiveness.*" These empirical results can likely be attributed partly to the major limitations of ERM practices in dealing with strategic risks. Firstly, ERM has strong signs of being heavily influenced by psychological flaws and cognitive biases in key decision-makers, as concretely demonstrated by the 2008 banking crisis stemming more from judgmental biases than technical risk management (Andersen & Young, 2020). ERM also assumes that all strategic decisions stem from a rational process, where the strategy field has long realized that many of the most critical strategic decisions can, and possibly must, originate from informal practices which allow for more out of the box responses to strategic and operational risks (ibid.). Further to this, the focus on formal systems, controls, and practices within ERM frameworks can lead to frustration within the organization. This frustration may create resistance, which, if widespread enough, can create organizational inertia and a culture that doesn't seek to embrace change, instead resting on past successes (ibid.). An example can be seen with Nokia, where they didn't embrace the immense growth opportunity of smartphones, despite having all the necessary technology in place, partially due to a culture that focused on the status quo (Andersen, 2018).

With these limitations and possibilities, it is clear that ERM practices have potential but may be challenging to implement, as the impact is largely contingent upon compatibility with the MNE (Christensen, 2021). However, it is also essential to recognize that ERM practices are not static, with improvements such as a greater focus on organization-wide involvement in ISO31000 being common (Andersen & Young, 2020). In line with this, as the paradigm shift towards SRM continues, the possibilities and limitations of the ERM practices may improve and should be monitored by MNE's.

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### **3. Political and Sovereign Risks in Building Resilient FDI**

#### **3.1 Introduction**

When engaging in foreign direct investment (FDI), a business tends to move from a simpler to a more turbulent environment. A turbulent environment where strategies must be adapted to deal with the political and sovereign risks that are often inherent (Andersen et al., 2014). These risks are exogenous by nature and may strongly impact cash flows, meaning they must be considered a component in multinational investment decisions (Miller, 1992). An enabler of managing this increased exposure can be resilient global value chains (GVC) (McKinsey, 2019), with resilience being *"the ability to identify strategies that enable recovery to the original or a better state"* (Scholten & Schilder, 2015).

#### **3.2 Multinational capital budgeting through a political and sovereign risk lens**

Beyond a more turbulent environment with higher risk from factors such as agency costs, foreign exchange risks, and political and sovereign risks (Moffett et al., 2003), FDI is correlated to higher levels of complexity. Miller (1992) highlights the trade-off that reducing uncertainty in one dimension may increase exposure to another, alongside the potential cannibalization of sales. These effects mean that firms typically require new foreign investments to yield  $x\%$  over the domestic cost of capital, known as a hurdle rate or risk premium (Moffett et al., 2003). The level of the hurdle rate is an individual decision partially based on risk tolerance and appetite, but Damodaran's table factors can inform it. Damodaran aids in adjusting the discount rate based upon the credit default spread and total equity risk premium observed in nations relative to the US (Damodaran, 2020), with the limitation being that it is based on historical data, which may not be representative of the future. The hurdle rate can be applied either by directly adjusting cash flows or applying a WACC penalty using CAPM. Both of these are viable approaches<sup>1</sup> and will ultimately yield almost identical results (ibid.).

Furthermore, firms must evaluate projects compared to the returns of local bonds and competitors, as otherwise, they could merely either buy the bonds or shares in the competitors (Moffett et al., 2003). Given this, it is suggested to utilize a traditional capital budgeting method such as NPV, IRR, or payback, but to separate between project and parent valuation (ibid.). Most firms choose to look into both viewpoints, as the parent view allows the firm to get closest to the traditional NPV method, while the project view offers a closer approximation of the effect on consolidated earnings per share (ibid.). As an alternative, based on the principles that FDI investments often have long lives, cash flows in later years, and higher risk levels, real option valuation is suggested as a cross between decision-tree analysis and pure option-based valuation (ibid.). This method enables the valuation to capture the potential value of real options such as deferring, abandoning, switching, and altering capacity (ibid.).

Holmén & Pramborg (2009) find that when firms evaluate FDI, the use of the NPV method decreases, and the use of the payback method increases with political risk. This trend is observed mainly due to growing deliberation costs and exists despite the payback method being theoretically disadvantaged by ignoring the time value of money and cutting cash flows arbitrarily (ibid.). However, bounded rationality makes it difficult to accommodate political and sovereign risk in a hurdle rate, making it challenging to apply NPV (ibid.). This difficulty is shown by Caterpillar, where valuing the FDI option in China had high deliberation costs from collaboration with external stakeholders to understand costs and careful hurdle rate adjustments to accommodate risks (West & Waymire, 2012).

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<sup>1</sup> Many academics and financial analysts have preferences for one or the other, but there is no broad consensus, meaning that there is a degree of methodological flexibility.

### 3.3 Resilient global value chains through a political and sovereign risk lens

Regardless of capital budgeting methods, cross-border investments can enable firms to engage in strategic investments that create a resilient GVC. These resilient GVC's unlock potential benefits in tackling political and sovereign risks, while allowing for the optimal allocation of firm resources (Porter, 1985). A sizable benefit can stem from real options, which are directly linked to foreign operations serving as an operational hedge, as discussed in question 1 (Pantazis, 2001). The benefit of real options is derived from offsetting uncertainty by postponing actions until decision-makers can make informed decisions of whether to expand, defer, wait, or abandon a project (Chi et al., 2019). Consequently, this is especially relevant in FDI, where exogenous political and sovereign risks can be minimized by, for example, switching manufacturing locations within the GVC based on changes in conditions such as government policy (ibid.). Furthermore, a robust multinational presence can offer access to diverse overseas resources and diversify corporate activities, which in turn creates new opportunities that can enhance operational flexibility and responsiveness to uncertainty (Andersen, 2012-1). Empirically, Todo et al. (2015) find that the positive effects of extensive supply chains, such as support from trading partners and agglomeration, created greater resilience in responding to the exogenous risk of the Great East Japan Earthquake in 2011.

However, these benefits cannot be exponentially extended through continuous expansion. As a result of the disadvantages of multinationalism, such as liability of foreignness and increasing communication costs, there are indications of diminishing return effects where risk-averting and opportunity gaining effects progressively reduce in line with an increased multinational presence (Andersen, 2012-1). Furthermore, Palich et al. (2000) observe curvilinearity for some firms in the form of a reverse U-shape in the diversification-performance linkage, meaning a point can be reached where marginal costs exceed the marginal benefits. Given this, MNE's must not blindly expand to anywhere with a positive NPV or attractive payback; they must consider the ancillary GVC effects.

Risk managers or analysts looking to establish a resilient GVC could adopt several practices. Firstly, MNE's should engage in a peacebuilding approach that allows for relationship building, which can reduce risk at its source, rather than reacting once risks come up (Oetzel & Miklian, 2017). This notion is further supported empirically, with MNE's that encourage collaborative relationships and mutual dependency through information sharing and collaborative communication achieving high end-customer satisfaction, improved visibility, and lower cycle times (Scholten & Schilder, 2015). Furthermore, dynamic capabilities can aid in '*doing the right things*' by guiding managers in building a resilient GVC (Teece, 2014). MNE's with strong dynamic capabilities also exhibit market agility and low incremental costs of FDI (ibid.). Lastly, resilience in the form of balancing out harmful exogenous changes can be built through continuous expansion and contraction of business activities across locations, in part attempting to leverage the benefits of real options (Andersen, 2012-1).

Following COVID-19, 93% of global supply chain leaders plan to increase resilience, as shown in appendix F (McKinsey, 2020). The empirical impacts of these resilience practices are illustrated in the case of Nissan, where following a tsunami, the firm showed itself to be more resilient than competitors such as Toyota primarily due to a strong practice of sharing information throughout the GVC using information and communications technologies and closely collaborating with a globally decentralized supply chain structure (Schmidt & Simchi-Levi, 2013).

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## **4. Organizing a Corporate Structure to Respond and Adapt**

### **4.1 Introduction**

When investigating turbulent global market conditions, it is vital to establish the distinctions between risk, uncertainty, and unknowability. Uncertainty and risk are related to expected future events, but the outcomes of uncertainty cannot be estimated based on previous events, while risk outcomes can (Andersen & Young, 2020). However, unknowability differentiates itself from risk and uncertainty, in being defined as unknown unknowns, which cannot be foreseen to any degree (ibid.).

### **4.2 Theoretical corporate structuring to encourage responsiveness**

Dealing with uncertainty and unknowability cannot be handled solely by formal frameworks, requiring a propensity for proactive risk-management that responds and adapts to emerging conditions (Andersen et al., 2014). Dealing with unknowns may seem like a secondary task for MNE's, but Kogut (1984) argues that firms win through flexibility and arbitrage that abuses imperfect markets. Given this, turning uncertainties to your advantage is core to thriving over time (ibid.). In order to achieve this adaptability, core values, organizational culture, and ethical leadership play a critical role.

One source of inspiration for organizing an MNE stems from high-reliability organizations (HRO). HRO's operate under trying conditions yet manage to effectively manage the unexpected, with this being attributed partially to effective mindful management (Weick & Sutcliffe, 2001). Mindful management can often be ingrained into a firm's core values and involves noticing the unexpected while containing the development of threats through strong responses to weak signals (ibid.). Building an organization's mindfulness requires developing knowledge of business systems among employees while allocating resources to catching developments early (ibid.). In combination, these practices can create a democratized risk management culture and enable employees to engage in continuous monitoring and management from the frontline of an organization, something Christensen (2021) mentioned as a critical ingredient to the success of ERM in Christian Hansen.

Further to the notion of a democratized risk management culture, Andersen & Andersson (2017) advocate for managers to pursue a system of '*guided evolution*,' where lower-level managers are the instigators of new business while the central role of top management is to facilitate strategic initiatives (ibid.). This system enables informal information exchange across subsidiaries due to managers building their own natural social interfaces that enable the continuous integration of knowledge (ibid.). The information exchange is key to creating a risk management culture that values constructive conflict, with conflict among ideas leading to well-considered decisions (Schoemaker & Day, 2009). Precisely this process has some parallels to the HRO principle of letting authority and decision-making migrate to the managers or employees with the most expertise, cultivating diversity and effective responses based on knowledge exchange, rather than cognitive biases (Weick & Sutcliffe, 2001).

However, successful guided evolution also requires successful risk governance, with the board and executive committee often setting a firm's outwards espoused values, which, if not delivered, can lead to a loss of credibility and belief both internally and externally (Bourne et al., 2017). Effective risk governance should reflect a fiduciary duty to maintain accountability, authority, communication, and reporting mechanisms rather than self-interest, setting the right "tone from the top" (Andersen et al.,

2014). In addition, avoiding agency problems from the misalignment of incentives is a must. Failure to achieve this potentially leads to personal biases such as bolstering and distorted inference (Schoemaker & Day, 2009) alongside potential errors of the fourth kind (Mitroff & Silvers, 2010). Tackling agency problems in an MNE should involve monitoring by independent agencies such as auditors alongside incentive alignment policies such as product market competition (Andersen et al., 2014). Safeguards should also be employed, such as group debates and data analysis, to reduce the risk of red flag conditions manifesting in biases (Finkelstein et al., 2009). Another critical risk governance practice is the monitoring and potential challenge of the dominant logic keeping an MNE from adapting (Bettis & Prahalad, 1995). This is exemplified in Ørsted (formerly Dong Energy)<sup>2</sup>, where the dominant logic revolved around the centrality of the fossil fuels industry, which made the MNE deprioritize the risk of a green transition (Ørsted, 2020). However, this was unlearned and replaced by a dominant logic focused on renewables over an intensive period through actions such as adapting core and espoused values while promoting a new strategic direction induced by management (ibid.).

Emblematic of the turbulent and uncertain global market, corporate social responsibility (CSR) and ethical leadership are gaining a more significant focus in the risk universe of most firms. Husted (2005) finds a negative relationship between systematic risk and CSR, while investigation within crisis literature shows that maintaining a positive relationship and open communications with stakeholders can help prevent crises (Bundy et al., 2016). Additionally, CSR is not incompatible with profit, with some of the significant benefits relating to acting as a vehicle for innovation and fostering goodwill, which can later be leveraged as a real option to provide the strategic flexibility needed to adapt and respond (Husted, 2005). Lastly, a lack of ethical leadership can potentially be a significant risk, with high-profile crises such as Enron and BP stemming from a prioritization of profits above all else.

### 4.3 Applied corporate structuring to encourage responsiveness

Taking a practical perspective, regardless of firm performance, a turbulent global environment will likely lead to some events that transcend uncertainty to become crises, such as the recent example of COVID-19 for industries such as aviation and hospitality. These crises can be viewed either as damning or an opportunity for change, with adaptive and resilient firms often bouncing back from a crisis even stronger than prior by using them as opportunities to change (Andersen et al., 2014).

The dichotomy between firms that effectively respond and adapt to turbulent global markets, and those that don't, can most clearly be shown with Hyundai notably outperforming Toyota during the recall crisis of 2009 (Shim & Steers, 2012). Toyota's culture and leadership could be described as '*steady-state*,' highlighted by a lean and centralized approach (ibid.). On the other hand, Hyundai could be described as '*entrepreneurial*,' trying to be agile and dynamic, with risk-taking emphasized throughout the hierarchy to capitalize on uncertain environments. Toyota's rigid culture likely led to less flexibility in cases of crisis, with employees being disempowered culturally from capitalizing on risk in the way Hyundai does. Additionally, Toyota's comparatively centralized approach to leadership likely left the firm exposed to biases in executive decision-making and managers potentially not embodying ethical leadership by being less concerned about solving the crisis relative to keeping their jobs. Lastly, Hyundai had an open approach to stakeholder communication, meaning their reputation was not as severely impaired. In contrast, Toyota took months to admit to their mistakes, undercutting their espoused values of reliability and efficiency, causing severe reputational losses (ibid.).

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<sup>2</sup> Ørsted was formed in 2017 following the rebranding of Dong Energy. This was a part of cementing the transition in dominant logic away from centrality of fossil fuels and towards centrality of renewables.

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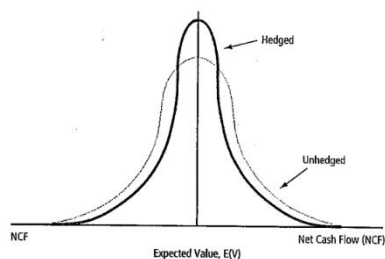
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## Appendix

### Appendix A: *Impact of Hedging*

Hedging moves the distribution from unhedged (normal) to hedged (leptokurtic). Leptokurtic distributions have lower variance and thicker tails. Hedging does not necessarily increase value, but it reduces variability around the mean, thereby reducing risk. It would directly increase the value if it shifted the mean of the distribution rightwards (which is possible in some cases)



**Figure 1.** Impact of hedging on the expected cash flow returns (Moffett et al., 2003)

### Appendix B: *Bartram's Regression*

#### Dependent variables:

- YoY Ørsted operating cash flow (2016 – 2020)
- YoY Ørsted investing cash flow (2016 – 2020)
- YoY Ørsted financing cash flow (2016 – 2020)
- YoY Ørsted total cash flow (2016 – 2020)

#### Control variables:

- Annualized change in short term interest rate (2016 – 2020)
- Annualized change in term spread (2016 – 2020)

#### Independent variables:

- Annualized change in DKK/GBP (2016 – 2020)
- Annualized change in DKK/TWD (2016 – 2020)

Regression performed using Bartram's (2008) regression formula. 4 separate regressions were performed, one for operating, investing, financing, and total cash flow, finding no statistically significant relationships with the control or independent variables.

	Intercept	DKK/GBP change	DKK/Taiwan change	Change in ST interest rate	Change in term spread
Operating CF	10301.83 (0.1655)	-3678.66 (0.9622)	-63640.66 (0.4614)	-588407.91 (0.8628)	-346145.51 (0.8084)
Investing CF	-21672.25 (0.1257)	78061.20322 (0.1580)	-57178.49181 (0.1945)	-1904998.394 (0.2708)	1320514.624 (0.1681)
Financing CF	-9405.74 (0.1620)	1216.71 (0.9860)	73523.12 (0.3822)	2733640.05 (0.4588)	-427952.82 (0.7417)
Total CF	1004.85 (0.8819)	-1845.34 (0.9903)	6861.89 (0.9604)	2076776.27 (0.7604)	-726338.01 (0.7953)

**Figure 2.** Bartram regression analysis (Ørsted., 2020, Orbis, 2021)

## Appendix C: Gap Analysis

The interest rate gap is the excess of interest-bearing assets over interest-bearing liabilities within a specific currency (in this case, GBP). Furthermore, the interest gap ratio is equal to the interest rate gap divided by assets, yielding a figure tied to assets as a baseline.

### Interest rate gap (re-pricing gap)

DKKm	2020	2019
Interest-bearing assets	36,766	36,839
Interest-bearing liabilities	44,447	43,428
<b>Interest Rate Gap</b>	<b>(7,681)</b>	<b>(6,589)</b>
<b>Interest Gap Ratio</b>	<b>-0.209</b>	<b>-0.179</b>

Figure 3. Interest rate gap (Ørsted., 2020)

The foreign exchange rate gap is the excess of trade receivables over trade payables. Furthermore, the exchange gap ratio is equal to the exchange rate gap divided by assets, yielding a figure tied to assets as a baseline.

### Foreign exchange rate gap (liquidity gap)

DKKm	2020	2019
Trade Receivables	6,732	8,140
Trade Payables	9,742	10,832
<b>Exchange Rate Gap</b>	<b>(3,010)</b>	<b>(2,692)</b>
<b>Exchange Gap Ratio</b>	<b>-0.447</b>	<b>-0.331</b>

Figure 4. Foreign exchange rate gap (Ørsted., 2020)

## Appendix D: Breadth and Depth

Breadth is calculated as the logarithm of the number of foreign countries. Thus, breadth serves as an indicator of the degree of a network's spread across foreign nations.

$$\text{LOG}(\text{Foreign Countries \#})$$

Depth is calculated as the number of foreign subsidiaries in the top 2 nations divided by the total number of foreign subsidiaries.

$$\frac{\text{Foreign subsidiaries in the top 2 nations \#}}{\text{Foreign subsidiaries \#}}$$

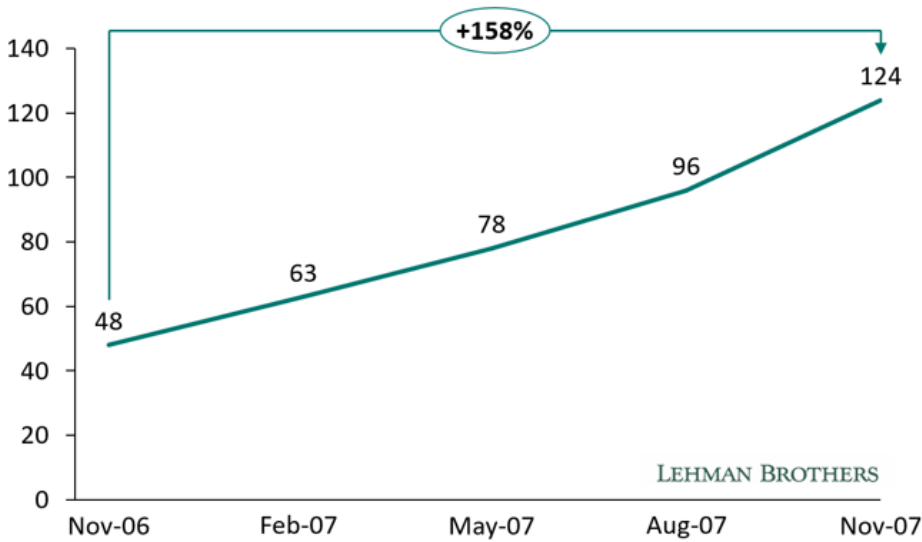
Breadth and depth of Ørsted relative to offshore wind industry competitors

	Ørsted (DK)	RWE (DE)	Engie (FR)	Iberdrola (ES)	Equinor (NO)	Vattenfall (SE)	Average
Foreign countries (#)	15	40	74	27	57	32	40.83333
Foreign subsidiaries (#)	476	711	2411	737	1398	1265	1166.333
Foreign subsidiaries in the top 2 nations (#)	357	381	1222	389	773	1020	690.3333
<b>Breadth</b>	<b>1.18</b>	<b>1.60</b>	<b>1.87</b>	<b>1.43</b>	<b>1.76</b>	<b>1.51</b>	<b>1.56</b>
<b>Depth</b>	<b>0.75</b>	<b>0.54</b>	<b>0.51</b>	<b>0.53</b>	<b>0.55</b>	<b>0.81</b>	<b>0.61</b>

*\*This paper does not include Pantzalis's (2001) proposed regression due to time constraints, but it is recommended as a natural next point of investigation and for practical usage\**

Figure 5. Depth and breadth calculation (Orbis, 2021)

**Appendix E: Average 3 months VaR Graph for Lehman Brothers (USD million)**



**Figure 6.** Average 3 months VaR for Lehman Brothers in USD million (Andersen, 2010)

**Appendix F: McKinsey Post COVID-19 Resilience Survey**



**Figure 7.** McKinsey post COVID-19 resilience survey (McKinsey, 2020)