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**DOCTOR OF PHILOSOPHY (PhD) BUSINESS MANAGEMENT**

**FINANCIAL RISK MANAGEMENT AND DECISION-MAKING**

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1. **Introduction**

Risk is a factor that should be considered when conducting business (Kazojc and Miciula (2019). Deventer et al. (2013) define risk management as "the discipline that clearly shows management the risks and returns of every major strategic decision at both the institutional level and the transaction level". The authors aver that risk management discipline shows how to change strategy to bring the risk-return trade-off into line with the institution's best long and short-term interests. In their view, risk management includes overlapping and inseparable subdisciplines, such as credit risk, market risk, asset and liability management, liquidity risk, capital allocation, regulatory capital calculations, operational risk, performance measurement, and transfer pricing. According to Srivivasan and Kamalakannan (2018,p. 445), financial risks include market, credit, operational risk, and liquidity risks, and these risks are interconnected and have interdependencies and complexity. Furthermore, financial risk is the possibility that the ultimate financial results will show variances with planned or expected outcomes (Peng & Huang, 2020). According to Olabisi et al. (2020), "risk is a primary threat which can turn into an opportunity if well managed."

Globalization has increased awareness about risk management." According to Singh and Hong (2020), "Under conditions of uncertainty, management decision-making is more likely to be cautious until visible forms of risk emerge, and prudent response mechanisms are in place." Furthermore, although information is now readily available through the internet, information asymmetry (Jamel et al., 2021) still exists with the information required in decision-making, making risk management important. This information asymmetry could lead to excessive risk being taken by a corporation's agency. Therefore a governance mechanism is necessary to ensure a risk-return trade-off. According to Halim et al. (2017), a Risk Management Committee provides such a mechanism. Furthermore, firm performance should not be ad hoc or volatile to maintain a firm reputation in its environment. Since globalization has made the business environment uncertain, erratic, and competitive, governance mechanisms that include risk management are now more critical. Therefore, it is essential for" a business to understand risks it faces and put adequate mitigation strategies to prevent, reduce or deal with risks" (Halim et al., pp. 285).

Large firms have resources to implement risk management standards according to industry standards, such as Sarbanes Oxley (SOX) and COSO. However, the level of resources limits similar standards implementation in SMEs. However, in the recent past, the Business Risk Management Intervention Tool (SBRMIT) has been developed for SMEs to commence risk management as every business faces risks in its operations (Kruger and Meyer, 2021).

1. **Financial Risk Management and Decision-Making**

All businesses face risks in their decisions, which is hastened by globalization in which businesses operate in different environments. According to Nagy (2017 pp. 48), the risk exists when many outcomes exist for each alternative, and some probabilities can be ordered to those. The author posits that taking risk decisions depends on the amount of money one controls or has in the bank account. Each business needs to implement an effective risk management program to support optimal decision-making (Noja et .al, 2021). Furthermore, governance is a significant risk management factor because board decisions will facilitate an optimal risk strategy with consequences on the returns and survival of the business. Noja et al. (pp. 8 of 20) aver that financial risk management correlates positively with financial performance. The authors aver that corporate governance and sustainability development activities of companies operating in financial services and financial performance are positively associated. Therefore risk management is essential in decision-making by the management of a business.

The Ontario Public Service performance measurement policy states that "what gets measured, gets done." Financial risks need to have quantifiable measures and accurate risk forecasting (Righi et al., 2018). However, the process of measuring and modeling financial risk is cumbersome because the statistical properties of the phenomenon being modeled change under observation (PP. 104). The authors also contend that methods of measurement that consider real properties of financial data present better measurement results. Moreover, "inside the organization, the disclosure of risk and its management becomes a source of principles for organizing and managing with important implications for how organizations are represented, managed, and governed, and for how they respond to actors in their environment" (pp.105). In addition, management is increasingly relying upon risk management to manage cash flows and other organizational activities. According to the authors, apparently, quantification and measurement have become central to risk mapping and risk landscaping techniques, which aim to provide an overall view of an organization's risk profile. Therefore statistical and mathematical models of measuring risks to support decision making are essential but not the only ones.

Risk encompasses current and future events. For example, changes in the environment can cause a threat to any significant entity, which has a contagion effect on service delivery (Gonzi et al., 2019). Risks present threats and opportunities to business outcomes. Rapid changes in the business environment create risks to the organization that requires management decision-making to continue surviving. The management role could be overwhelming, but the authors suggest that a method to overcome stagnation in decision-making circles is to adopt a bottom-up approach quickly. Communicate verbally to staff regarding the situation, set limits on possible project outcomes, set new barriers for innovation, address capacity, network with a diverse range of stakeholders, and overcome resistance in implementation.

Each organization has stakeholders, and the stakeholder theory identifies that managing the business in the interest of stakeholders will minimize the agency theory problem. According to Fraczkiewicz-Wronka et al. (2021), the organizational decision-making process has many interdependencies that need to be considered before reaching an optimal decision favorable to a majority of the stakeholders. Furthermore, the authors aver that each organization needs liquidity to survive, and this cash flow is associated with the ability to manage risks. Using a sample of 103 Polish hospitals operating as primary health providers, the authors found that risk management practices positively correlate with financial stability. In addition, the authors observe that risk is part of financial decision-making and requires documented process to enable identification, monitoring, and management.

We agree with the authors because the writer's current employer, the Ontario Public Service Enterprise (OPS) Risk Management framework, follows Fraczkiewicz-Wronka et al. (2021) and lays out a process to identify risks, measure risk, and monitor, including mitigation strategy. According to the OPS Enterprise Risk management Directive (<https://www.ontario.ca/page/enterprise-risk-management-directive>), the OPS has a system to proactively and systematically understand and manage risks in order to make strategic decisions that contribute to the achievement of the organization's objectives. Furthermore, the Directive is a governance and accountability framework that requires risk identification, assessment, plan & action, and monitoring and reporting. Identifying risk requires a clear definition of risk because the risk is not a four-lettered word as it appears. Heckmann & Nickel (2017) define risk as unexpected incidents and their impacts on the underlying system. The authors clarify risk using examples of the supply chain industry. They posit that incidents like outages, labor strikes, supplier glitches, epidemics, or terrorist attacks may impact smooth business operations in one part of the world and cause contagion effects to the rest of the world. In decision-making, supply chain risk analysis is impacted by the risk objective, risk-attitude of the decision-maker, and the risk exposition of the underlying supply chain (Heckmann & Nickel, 2017 pp. 99). We agree with the authors' contention that making well-informed decisions requires risk analysis.

Business intelligence and Information Technology capabilities have brought to the forefront financial risk as a crucial part of financial decision-making. These tools support accurate financial decision-making (Srivivasan and Kamalakannan, 2018, pp. 453). Furthermore, financial risk evaluation is critically important for businesses to identify potential financial risks, provide a basis for financial risk management and prevent or reduce losses (Peng and Huang, 2020). According to the authors, organizations should measure and mitigate risks and as the adage goes, even not doing anything about risk is also a risk management strategy. Financial risks affect the value of a firm due to uncertainties of organizations facing problems in matching supply and demand (Li and Arreola-Risa, 2019). In financial decision-making, one of the key models to help measure risks and decision-making is the Capital Assets Pricing Model (CAPM). According to the authors, CAPM helps measure the residual risk and supports decisions about systematic risks or non-diversifiable risks. Typically CAPM would be helpful in portfolio risk management and not a single asset management.

Khan (2017) investigated financial tolerance with multiple risk assessments. The author found that uncertain environments significantly affect financial tolerance. Furthermore, "culture dimensions, for example, female and uncertainty avoidance impact the risk tolerance and financial decision-making." The author identified the factors that impact financial risk tolerance as personality, cognitive style, decision-making style, and characteristics of an individual (pp. 21). Hence, in financial risk decision-making, many factors are essential ingredients. The author found that individuals who preferred autonomy to structure were more tolerant of risk than those who preferred structure. In addition, inexperienced individuals found investment risks safe, and hyper-vigilant individuals were averse to speculative risk. Garcia-Bernabeu et al. (2019) also agree that financial decision-making takes place in a complex environment with many risk criteria and alternatives, which increases financial risk decision-making. The authors argue that while considering financial risks in Renewable Energy spheres, non-financial risks are essential because they eventually lead to financial risk. Moreover, the authors suggest that non-financial risks could be quantified and included in the financial risk decision-making model making financial risk decision-making complete and leading to total risk management. Luo and Wu (2018) discuss that warranty is a financial risk management tool with most durable goods. The need to optimize warranty policy through minimizing product profit introduces profitability uncertainty, and therefore financial risk consideration is required.

1. **Importance of Financial Risk Management**

According to Deventer et al. (2013), financial risk management is managing the financial variables that affect the entails identifying, assessing, and monitoring financial risks of an enterprise. The authors identify that financial risk management is part and parcel of prudently managing a business. Globalization and availability of information technology capabilities have increased financial risk management's importance. Furthermore, according to the authors, globalization has increased competition, and companies can use financial risk decision-making to develop sustainable competitive advantages. Additionally, there is increased awareness of the importance of financial risk management within organizations, and fintech technology is driving adoption. The authors also stipulate that financial risk management is a catalyst and enabler for strategic management. Lee (2019) examined the determinants of the intensity of derivatives usage in a sample of listed firms in Asia and found that derivatives users tend to have higher foreign exchange exposure, higher debt and short-term liquidity, more incredible options, and higher operating profits. Implicitly, prudent financial risk management is essential to financial health. According to the author, financial risk management through derivatives can reduce financial distress costs, reduce cash flow volatility, and increase the value of a firm. Furthermore, effective risk management will reduce risks that businesses can face, increasing financial results (Tran et al., 2019). According to the authors, adequate control of risks reduces business losses by reducing operating costs and enhancing financial performance.

Corporate diversification is a risk management tool because it helps reduce portfolio risks. Effective risk management strategies arising from diversification will reduce capital requirements for running a business (Mehmood, Hunjra, and Chani (2019). The authors contend that corporate governance positively correlates with financial risk management, enhancing firm financial performance. A company's capital structure will accommodate only a certain amount of debt capital beyond which the risk is unbearable and begins to impact a firm's value negatively. Therefore, a risk-return trade-off is essential in financial risk management decisions. In Capital structure theory, firms may be financed by debt or equity. The capital structure adopted by managers reflects the risk management strategy. The authors aver that the manufacturing sector in Pakistan relies more on debt financing. An effective risk management structure will utilize an optional capital structure and enhance the value of a firm. Batsakis et al. (2018) also found that international diversification positively correlates with the performance of the target firms in the pot-acquisition period.

According to Ma, Pan, and Stubben (2020), executives' choice of risker firm policies can increase the probability of excellent outcomes in sports that win tournaments. Incidentally, judicious risk management can lead to better returns even at higher-than-normal risks, especially tournament management. Managing risks has increased in importance, with hedging emerging as a key risk management tool (Kozol and Oran, 2021). Using a sample of 537 cross-border mergers and acquisitions conducted over 14 different developed European companies between 2007 and 2019, the authors found that acquirers with effective risk management have higher cumulative abnormal returns than those without risk management systems. Moreover, taking over a foreign firm considerably changes the target firm's financial exposure. The authors posit that "managing financial risk more effectively is a way for companies to build shareholder value."

Financial risk management is of strategic management importance in supply chain networks. Singh and Hong (2020) contend that complex global supply chains increase the risk of disruptions in the system and related impacts on financial performance. Effective risk management will help prepare and mitigate adverse events that constitute disastrous risks without stifling routine competitive requirements (pp. 723). In addition, the absence of strategic risk management may limit a firm from engaging in long-term and proactive supply chain management and resorting to crisis management. According to agency theory, various corporate governance structures support managing the risks of information asymmetry between various agents (Jamel et al., 2021). In this regard, the interest of any agency depends on the risk that management takes. Management should consider risk-stakeholder interest trade-offs in managing the interests of stakeholders. The authors established a positive relationship between the concentration of capital and managerial ownership and risk management and a negative relationship between concretion of capital and managerial ownership and financial performance.

Corporate governance plays a vital role in risk management processes. According to Halim et al. (2017), the risk management committee affects financial performance. The authors contend that the risk management committee is the intervening variable in the relationship between corporate governance, firm size, and financial reporting on firm performance. In addition, an effective risk management system helps companies achieve business objectives, improve their financial reporting and safeguard their reputation (pp. 273). Further, as the adage goes, high return means high risks. A Risk Management Committee ensures a risk-return trade-off and therefore measured firm performance. Villers, Jia, and Li (2021) underscore the importance of risk governance frameworks. In their study of 1466 firms firm-year observations from 2007 to 2015, the authors found that the presence of board committees dedicated only to risk management is associated with better environmental performance. Furthermore, the authors found that the benefits of risk management committees extend to non-financial performance, which some have linked to the long-term shareholder value.

Financial risk management increases business sustainability (Olabisi et al., 2020). According to these authors, the financial risk caused by variation in interests rates, currency exchange rates, default, and poor liquidity management may cause harmful effects on the profitability and sustainability of a business. Furthermore, Enterprise Risk Management (ERM) could create a competitive advantage and enhance overall firm performance (Saeidi et al.,2021).

1. **Financial Risk management Tools and Techniques**

According to Kruger and Meyer (2021), large firms have risk management formalized and structured through compliance with industry standards. Within the Ontario Public Service, a risk management framework based on COSO is in place. The same could hardly be true for SMEs with little or no resources to mount an extensive risk management framework, and we argue that risk management in SMEs is put on the back of priorities. "SMEs do not have equivalent motivation to comply with risk standards due to their size of operations." Large firms have also used a stochastic risk management model in managing risk. According to Xiao and Chen (2020), the stochastic risk model provides that the UTC bidding strategy's total expected profit and the Conditional Value at Risk (CVaR) are maximized simultaneously. They were considering risk management, where the risk preference of a financial participant is characterized by using a risk aversion parameter. Adeyonu et al. (2021) examined the risk perceptions and management strategies among poultry farmers in South-West Nigeria and found that farmers adopt disease prevention and financial management strategies to manage business risks. Therefore, appropriate business strategies can act as good to mitigate and manage business risks.

Another technique that is frequently used in financial risk management is simulation. According to Sarani and Ahmadi (2018), the Simulation technique pressure test is used to evaluate the reactions of the assets basket to various situations. The authors used three pressure tests (historical, hybrid, and hypothetical) pressure scenarios to simulate the process of joint formation of risk factors over time. The Authors indicate that using simulation pressure test techniques can help understand the sources and effects of different risks. Diversification is a well-established risk management technique. The simulation pressure test is used to mitigate unsystematic portfolio risk in financial markets (Agic-Sabeta, 2017). The author also identified that portfolio insurance is another risk management tool that can be used to reduce systematic risks. Similarly, Meyer, Characklis, and Brown (2017) note that a portfolio of binary index-insurance contracts can be used to manage and mitigate risk in hydropower production. In addition, the authors also posit that financial instruments are commonly used to hedge risks in electricity prices, fuel costs, and electricity demand. Organizational learning has been credited as a risk mitigation strategy (Singh and Hong, 2020). Index-based longevity hedging strategies can also be used to manage interest rate risks as they have the advantage of efficiency, liquidity, and lower costs (Sherries, Xu, and Ziveyi (2020).

According to Saeidi et al. (2021), knowledge management is an essential tool because employees' knowledge and awareness of risk enhance risk management. The authors note that "companies that have people who genuinely have adequate knowledge regarding their job, role, responsibilities and the organization's objectives could reduce risks of human action and fraud ."Further, IT status is an important influence on risk management. The authors found that IT can generate a relevant connection between risk management and business performance by offering data gathering and storage in a secure manner (pp. 142).

1. **Gender Differences in Financial Risk management**

The influence of gender in management has been a subject of study by many scholars in recent. Bui and Long (2021) examined the influence of firm variables and demographic, human capital characteristics of owners/managers on a firm's value-added, labor productivity, and empowerment creation. There were no significant differences between men and women. Women better exercise the risk-return trade-off matrix leading to the better financial performance of a firm. Furthermore, male business leaders mitigate financial risks through a bank's assistance, whereas women business leaders emphasize the role of society (Ludmila, Lubor, and Dimitris, 2017). The authors argue that SMEs have limited room to maneuver the capital structure; therefore, reliance on banks for assistance leads to higher interest rates and higher financial risks. Therefore, women leaders help reduce the financial risk for SMEs by considering society as sour of resources rather than banks (pp. 37). Furthermore, women are generally more risk-averse than men. Interestingly, the authors point out that banks consider women less creditworthy than men and, in our view, increase the financial risk for money lead organizations.

Xie, Page, and Hardgy (2017) note a significant gender balance on financial trading floors and found that the gender gap in risk attitudes increases under moderate time pressure. According to the authors, men believe that they are more competent than men, are more overconfident, and trade more often. The authors conclude that males are less risk-averse than females, leading to more participants on the trading floor. Moreover, Barasinka and Schafer (2018) established that Italian women refrain from stock market participation more than their self-reported risk tolerance levels. Nevertheless, those women who take steps to invest in the stock market hold the same investments as men, and therefore, it can be inconclusive to suggest that men are savvier in investing in stock markets. We agree with the authors' observation that female investment behavior is shaped by the gender role prescriptions that society assigns to women (pp. 1042).

In addition, Booysen and Guvuriro (2021) add their voice to gender debate by indicating that in the case of greater financial decision-making power in couples being assigned to wives rather than husbands, per capita household expenditure of education increases significantly. This is in line with the adage which says educating a woman is the same as educating the whole village. Furthermore, where the decision-making lay with wives, expenditure was higher on education, personal items, healthcare, utilities, and non-food items. Implicitly the financial risk decision-making is different based on the gender of the decision-maker. Mishra and Mishra (2016) also posit that "above-average risk tolerance is more associated with greater materialism, younger age, and male gender. However, a variety of characteristics comprising materialism, age, gender, and the ratio of earnings to total family members discriminate between the risk tolerance levels of individual investors". Therefore men show greater financial risk tolerance compared with women. According to Mustafa, Awais, and Aziz (2020), women exhibit adverse effects on boards due to their risk-averse behavior, lower confidence, weak decisions, and less board control, which affects the firm value. Using panel data for four Asian economies – China, Malaysia, Pakistan, and India, for the period 2010-2018, the authors found a negative effect of board gender diversity. Women in family firms hurt dividend announcement and attributed this to the possible lack of critical mass of women in management in the Asian family businesses. Similarly, Tannawati (2019) avers that business management entails making decisions about risks and that gender diversity positively influences company decisions. However, the authors researching gender diversity in Indonesia found that gender diversity slightly negatively affects corporate risk-taking.

Osmani and Okunade (2021) posit that the decision-making processes and outcomes of male and female household heads differ due to gender-based differences in preferences. According to the authors, male and female heads tend to interpret health risks differently, and that they have differences in underlying risk consideration in decision-making. Arguably, the gender differences lead to differences in decision-making in risk situations for women and men.

1. **Interest Rate Risk Management**

Interest rate risk is prevalent in many financial management decisions. In accounting terms, it is the company's risk due to carrying cash and cash equivalent instruments (Guan and Liang, 2016). According to Cheng, Hodder, and Watkins (2017), interest rate risk is the sensitivity of earnings and equity value to interest rate changes. The authors argue that interest rate risk is inevitable in the banking sector. However, a trade-off is required because high levels can lead to losses when rates change sharply in an adverse direction, threatening bank solvency. Furthermore, interest rate risk and inflation play a big role in determining the risk-rate trade-off decisions (Pan and Xiao, 2017).

Guan and Liang (2016) argue that the pension manager has to hedge interest rate risk to optimize the quality of wealth at retirement. Besides, interest rate risk is associated with many parts of economic performance. Liu and Chen (2016) contend that an increase in interest rate risk in Taiwan led to interactive effects on house prices, interest rates, and stock markets. During the 2008 financial crisis, the interest rate risk impact on the economy cannot be over-emphasized. According to Liu and Chen (2016), changes in interest rates influence the ability of individuals and businesses to repay loans interest which leads to poor performance of the economy as banks incur losses and restrict credit. Managing interest rate risk is more critical in the banking industry as most industry income is derived from the interest rate. Ozdemir and Sudarsana (2016) aver that managing interest rate risk in the banking sector is management by considering "the trade-off between short-term income volatility and the long-term economic value of equity (EVE) volatility ."The authors note that banks' Asset-Liability Management (ALM) function is responsible for managing the structural interest rate risks using a risk-return framework subject to constraints of a risk appetite without taking any position on future interest rate movement. Statistical methods such as VaR and EaR are also used to measure and manage interest rate risk (pp. 375). Moreover, the authors note that many banks also use simulation-based approaches to reflect the actual variety of potential interest rate movements realistically. Lian, Ma, and Wang (2018) suggest that interest rate swaps provide an instrument to hedge stochastic movements in interest rates by exchanging floating-rate payments linked to short-term rates with fixed swap rates and vice versa. Nevertheless, swaps' risk management is risky because swapping floating rates for fixed rates frees up resources when interest rates rise, yet opposite movements create financial commitments and push them close to expensive equity and default (pp. 3022). Despite this risk, the use of interest rate derivatives is on the increase (Bashir et al. (, 2020), and therefore, these instruments will increasingly be used to manage interest rate risks.

Since the onset of the coronavirus pandemic, all banks and countries lowered interests to the lowest ever in history. In Canada, lower interest rates have led to overbidding in the housing market and increased housing prices due to increased demand. Economists suggest that lower interests have led to overvaluation of the home prices and that Canada is a bubble situation. However, this suspicion has not resulted in the actual cooling of the market. The trend is consistent with Lian, Ma, and Wang (2018), who argue that individuals have a greater appetite for risk-taking when low-interest rates. The authors found evidence that people in the low-interest rate condition invest significantly more in risky assets than those in the higher interest condition group. In addition, Bretscher, Schmid, and Vedolin (2018) posit that adverse movement in interest rate uncertainty predicts significant slows down in actual activity. As we saw during the coronavirus pandemic, the Bank of Canada maintained interest rate stability to stabilize the economy, and the health risk already exposed the economy to cyclical movement.

1. **Currency Risk Management**

Currency risks are essential to countries and investors, and exposure to different countries impacts trade. While many studies have examined exchange rate fluctuations and their impacts, there is still debate on exchange rate volatility and currency risk in international investment (Ioana, Alexandra, and Lucian, 2021). The authors classify currency exposure risk and its impact as "

1. Transaction exposure – It is the risk that companies take when currency exchange rates fluctuate, and a firm has already undertaken a financial obligation, and the payment is denominated in a foreign currency.
2. Translation exposure – is the risk that the firm's equities, liabilities, assets, or income will change in value because of the exchange rate changes (Anghelache, Anghel, and Grigorescu, 2019)
3. Economic exposure, on the other hand, is the present value of the firm being modified due to changes in future cash flows, cost of capital, foreign investments and earnings caused by unexpected currency fluctuations."

The classifications are helpful for accounting purposes. Furthermore, currency risk can cause significant losses and large profits (Kazojc and Miciula, 2019). Moreover, currency risk can bring a series of elements that can be positive in terms of trading or negative stress the need to include currency risk management in strategic and integrated management processes (Anghelanche, Anghel, and Grigorescu, 2019). In addition, according to Kunkler (2021), currency exchange risk arises from the variance of movements in the associated exchange rate between domestic and foreign currencies.

According to Ioana, Alexandra, and Lucian (2021), investment in international markets exposes investors to currencies exchange risks (i.e., foreign investments are prone to the risk of currencies' value changing). "Currency volatility is characterized by frequent and rapid changes to exchange rates in the foreign exchange (forex) markets" (pp. 163). The authors mention some of the tools of managing currency exchange risk as selling or forwarding currency contracts. Furthermore, the authors observe that currency risk can also be minimized by buying currency alternatives or obtaining foreign currency to fund investments. Forward transactions, foreign exchange options, and option structures are frequently used to manage foreign exchange risks (Kazojc and Miciula, 2019). In China, the central bank manages currency risk mainly using quantitative management tools that entail foreign exchange reserves and short-term capital controls (Peng and Kang, 2020). The authors report that the central bank also uses price management tools which entail exchange rate expectation intervention, adjustment to exchange rates formation mechanism, and improvement of foreign exchange trading market (pp. 727). In addition, as observed by Johnson and Staveley-O'Carroll (2020), when currency returns offered are positively correlated, hedging is not possible. The best an investor can do is rely upon spreading the risk. We argue that the concept of spreading risks, while not heavily discussed in academic literature, can be considered similar to risk diversification.

Boudoukh et al. (2019) explored optimal currency exposure in international equity portfolios through the lens of a modified mean-variance optimization framework and found that effective currency hedging is achieved by using a full-blown optimized approach that takes advantage of different abilities of currencies to hedge both equity risks and each other. Management incentives are also used to manage currency risk through hedging. Chen, Guan, and Tang (2020) investigated whether executive' pension incentive motivates firm risk management in a sample of multination companies and found that a higher level of pension incentive is associated with a higher probability of adopting currency hedging strategy. According to Anghelanche, Anghel, and Grigorescu (2019), the banking company can use prudential regulations to ensure risk coverage through its funds and adjustment of currency position to suppress long or short positions applying currency risk coverage to reduce impact of exchange rate volatility. The importance of currency risk management in the banking system emanates from the contagion effect theory (meaning what impacts one bank may lead to the collapse of the banking system). Gabauer (2020) established that the Swiss franc and the Euro are net transmitters of shocks, whereas the British pound and Japanese yen are net volatility receivers of shock in the forex markets. We argue that countries worldwide should coordinate currency risk management collaboratively due to contagion effects. Besides, currency risk impacts the value of a firm and, consequently, the value of a firm's shares. Furthermore, exchange volatility has a significant effect on the stock exchange price shares (Mrhari and Daoui, 2017).

Countries are also exposed to currency risks similar to individuals or businesses. According to Congoz et al. (2020), "a sovereign asset and liability management framework for managing foreign currency risk requires a joint analysis of (i) the external liabilities from a country's debt and (ii) the foreign exchange assets of its central bank ."According to the authors, natural hedge and macro hedging are strategies to mitigate sovereign currency risks. The natural hedge ensures the availability of the required amount of foreign currency for external debt payments in the liquidity tranche. In contrast, macro hedging ensures risk mitigation by adjusting the debt portfolio's cost and structure with currency composition, maximizing the risk-adjusted return of the country's international reserves.

1. **Credit Risk Management**

Credit risk is prevalent in any industry that provides services or sells goods credit. The banking industry faces greater credit risk due to the nature of its business. According to Schwarcz (2018), financial credit risks can be secured transactions directly secured by collateral or indirectly secured through securitizations. While we agree with the author that credit risk could be mitigated by securitization, the evidence of collapse of the housing market in the U.S in 2008 illustrates that securitization should be monitored through a regulatory framework. According to the author, regulating collateralization levels need to address how collateral should be valued. Furthermore, these concepts are complex for the public to understand and question how these instruments can be used to mitigate credit risks.

On the other hand, credit default swaps can also be used to manage credit risks. Wu, Lv, and Sun (2018) investigated the credit risk measurement of PPP project financing and the pricing of risk mitigation instruments and found that some optimization methods are also proposed to derive the probability of default. Ardia, Guerrouaz, and Rey (2020) provide that stress testing the aggregated rate of default of retail mortgages as a form of credit risk management. Default resulting from higher credit risks is also part of the business. Therefore, most businesses that provide services and goods on credit should also have processes to collect delinquent accounts. According to Blaschczok, Verster, and Broderick (2018), innovations are required for the collection industry to enhance the performance of the collection agencies. A compelling collection process can minimize credit losses for a business. We argue that economic circumstances are essential because, when the economy is growing, defaults are minimized and when the economy is in crisis, the defaults increase unless government intervention is put in place. The maritime industry, like any other industry, faces credit risks. According to Guo (2020), the maritime industry witnesses high credit risks due to large amounts of capital and a long period of occupation in the supply chain transportation systems. The author contends that financial insurance can be used to mitigate credit risks in the maritime industry. In Canada, personal security interests are ordinarily accepted as possible mitigation on credit default. Given the importance of credit markets in the economy, Castellano and Dubovec (2018) note that national regulators should adapt their domestic regulatory environment so that security interests in personal property could serve more effectively as credit protection within the banking sector. The authors posit that secured transactions laws and prudential regulations are essential for creating and distributing credit necessary for economic performance. Inevitably, credit risk leads to bankruptcy, and registering the security of the borrower's assets may lead to partial or complete recovery depending on the bankruptcy rules in a country.

Credit scores are significant to granting credit within the Canadian credit markets. Mao et al. (2021) aver that improved neural network technology has enabled online credit risk rating enabling SMEs to access credit. Benard, Ruschendorf, and Vanduffel (2017) observe the need to measure credit risk to minimize losses accurately. The authors also argue that VaR computed in typical credit models by financial institutions do not necessarily reflect actual risks and are difficult to compare because Base Accord II allows each institution to use its model.

1. **Commodity Risk Management**

Several factors drive uncertainty in the commodities market. According to Wen and Wang (2021), "Static and dynamic correlations consistently reveal a high level of co-movement in the stock market, unstable and generally weak dynamic correlations both in the commodities sector and across the two markets ."The authors posit that commodity futures (for example, gold futures) can be used to mitigate risk in the commodity market. Erratic swings occurred in commodities markets during the coronavirus pandemic necessitating consideration of commodity risk. Empirical studies stipulate that a three-factor model measures commodity market risk. However, Schone and Spinler (2017) argue that the three-factor model is insufficient to model the joint dynamics of futures and options pricing in the commodity markets. The authors found that a universal model for commodity futures and options will require more than three independent sources of uncertainty to capture the joint dynamics of both contract types accurately. Furthermore, the commodities markets pricing eludes the supply-demand economic models. The movement of metal futures prices is susceptible to geographic monopoly ground rents due to their non-renewable nature (Wei et al., 2021). The authors analyzed the impacts of three contingent events on the metal futures markets. They concluded that investor attention could effectively transfer the impact of events to the metal futures markets (pp 13).

Supply chain risk is an essential consideration in commodity markets. According to Keilhacker and Minner (2017), recycling can reduce supply unavailability risk. While the author's argument is plausible, we argue that the coronavirus pandemic impacted world commodity markets immensely. Other factors impact commodity markets, such as the transportation system hitches recently witnessed in the Suez canal, worth further investigation. Moreover, there was a lack of container release in one of the U.S ports, causing a massive problem in delivering commodities in a Californian port.

Zhang and Wei (2020) put forward a commodity trade business management platform that "can provide dynamic migration support for visualized multimedia data of commodity trade business," leading to management of risks of commodity trade business. Commodity derivatives are another instrument used to manage commodity risks. According to Staritz et al. (2018), a commodity chain approach is adopted since this allows for the analysis of interactions between changes taking place on international derivatives markets and the organization and functioning of the physical market. In addition, the authors observe that international commodity trading houses (clearinghouses) play a critical role in commodity risk mitigations because they contribute to changes in price dynamics on a commodity derivatives exchange. The cereals market is particularly vulnerable to commodity risks. The cereals market is further impacted by weather variability, outputs and input markets uncertainty, and various other risks associated with Agriculture (pp. 8). The authors also note that Agricultural producers are also impacted by institutional risks which flow through to local and international commodity markets. Climate change and related risks such as floods, droughts, epidemics, storage, and transportation costs impact agricultural production, prices of harvests (Hung, 2020, pp. ). Commodity futures are essential instruments to mitigate commodity risks (Hung, 2020). According to the authors, when commodity markets become uncertain or more volatile, the investors prefer to use commodity futures contracts to hedge their spot positions to reduce overall market risks. Moreover, the pricing and hedging of multi-asset options is a significant issue in commodity energy markets (Descharte, 2016).

1. **Conclusion**

Risk management is an essential financial risk decision-making factor. Risk is inherent in most business decisions, and some classify risks into credit risk, market risk, asset and liability management, liquidity risk, capital allocation, regulatory capital calculations, operational risk, performance measurement, and transfer pricing (Deventer et al., 2013, Kazojc and Miciula, 2019, Srivivasan and Kamalakannan, 2018). Furthermore, globalization has increased awareness about risk management." According to Singh and Hong (2020), "Under conditions of uncertainty, management decision-making is more likely to be cautious until visible forms of risk emerge, and prudent response mechanisms are put in place". Furthermore, although information is now readily available through the internet, information asymmetry (Jamel et al., 2021) still exists with the information required in decision-making, making risk management important. Because globalization has made the business environment uncertain, erratic, and competitive, governance mechanisms that include risk management are now more critical. Therefore, it is essential for" a business to understand risks it faces and put adequate mitigation strategies to prevent, reduce or deal with risks" (Halim et al., pp. 285).

An effective governance and risk management system needs to be in place to support management risks mitigation and management (Noja et al., 2021). Further, to support effective financial risks decision-making, financial risks need to be quantified, and risks accurately forecasted (Right et al., 2018). In addition, the organization should utilize a knowledge management process to ensure staff and management are aware of the risk that impact the organization and how they can be monitored and reported. Several instruments and tools are available to mitigate various risks, for example, forward contracts, options, and interest rate swaps. Effective risk management strategies will reduce risks that businesses face improving business results (Tran et al., 2019).

1. **Bibliography**

Anghelanche, C., Angel, M. G., & Grigorescu, D. L. (2019). Currency risk amangement model. *Theoretical and Applied Economics*, 21-34.

Ardia, D., Guerrouaz, A., & Rey, J. (2018). Macroeconomic stress-testing of mortgage default rate using a vector error correction model and entropy pooling. *Insurance and Rik Management, 83*(3-4), 115-133.

Batsakis, G., Wood, G., Azar, G., & Singh, S. (2018). International diversification and firm performance in the post-acquisition period: A resource dependence perspective. *Journal of Business Research, 93*(2018), 151-159.

Bernard, C., Ruschendorf, L., & Vanduffel, S. (2017). Value-at-risk bounds with variance constraints. *The Journal of Risk and Insurance, 84*(3), 923-959.

Blaschzok, V., Verster, T., & Broderick, A. (2018). Review of innovations in the South African collection industry. *S.Afr J Sci, 114*(7/8), 9 pages. doi:https://dx.doi.org/10.17159/sajs.2018/2017036

Boudoukh, J., Richardson, M., Thapar, A., & Wang, F. (2019). Optimal currency hedging for international equity portfolios. *Financial Analysis Journal, 75*(4), 65-83.

Cangoz, M., Sulla, O., Wang, C. L., & Dychala, C. (2020). A joint foreign currency risk management approach for sovereign assets and liabilities. *Journal of Applied Business and Economics, 22*(10), 154-184.

Castellano, G. G., & Dubovec, M. (2018). Credit creation:Reconciling legal and regulatory incentives. *Asian Institute of International Financial law* (pp. 63-85). Warwick School of Law.

Chen, J., Guan, Y., & Tang, I. (2020). Optimal contracting of pension incentive: Evidence of currency risk management in multinational companies. *Journal of Risk and Financial Management, 13*(24), 1-29.

Deschatre, T. (2016). On the control of the difference between two Brownian motions: An application of energy markets modeling. *De Gruyter Open, 2016*(4), 161-183.

Deventer, D. R., Imai, K., & Mesler, M. (2013). *Advanced financial risk management [electronic resource] : tools and techniques for integrated credit risk and interest rate risk management* (2nd ed.). Singapore, Malaysia: Wiley.

Fraczkiewicz-Wronka, A., Ingram, T., Karolina, S.M., & Tworek, P. (2021). Risk management and financial stability in the polish public hospitals: The moderating effect of the stakeholders' engagement in the decision-making. *Risks, 9*(87), 1-23.

Gabauer, D. (2020). Volatility impulse response analysis for DCC-GARCH models: The role of volatility transmission mechanisms. *Journal of Forecasting, 2020*(39), 788-796.

Garcia-Bernabeu, A., Mayor-Victoria, F., Bravo, M., & Pla-Santamaria, D. (2019). Financial risk management in renewable enrgy projects: A multicriteria approach. *Journal of Management Information and Decision Sciences, 22*(4), 60-371.

Giruc, P. (2016, September). Basics on commodities risk management for grains trading. *Journal of Finance and Financial law, III*(3), 7-19.

Gonzi, R. D., Grima, S., Kizilkaya, M., & Spiteri, J. (2019). The Dali model in risk management practice: The case of financial services firms. *Journal of Risk and Financial Management, 12*(169), 1-15.

Guo, J. (2020). Credit risk management and control in a Maritime supply chain trade network. *Journal of Costal research, SI*(106), 109-12.

Halim, E. H., Mustika, G., Sari, R. N., Anugerah, R., & Mohd-Sanusi, Z. (2017). Corporate governance practices and financial performance: The mediating effect of risk management committe at manufacturing firms. *Journal of International Studies, 10*(4), 272-289.

Heckmann, I., & Nickel, S. (2017). Rethinking supply chain risk analysis - common flaws & main elements. *Supply Chain Forum: An International Journal, 18*(2), 84-95. doi:https://doin.org/10.1080/16258312.1348871

Hung, J.C. (2020, Jun). An empirical study of commodity inventory effect on risk management. *Journal of Accounting,Finance & Management Strategy, 15*(1), 159194.

Jamel, L., Albogami, H. E., Abdulaal, M. A., & Aljohani, N. A. (2021). Do agency conflicts between managers and shareholders affect corporate risk management and financial performance of Saudi firms? *Journal of Investment Compliance, 22*(1), 58-73.

Johnson, P., & Staveley-O'Carrol. (2020). An exchange rate risk experiment with multiple currencies. *The Journal of Economic Education, 51*(1), 19-30.

Kazojc, K., & Miciula, I. (2019). Currency trends in currency risk management by Polish shipbuilding enterprises. *Research Papers of Wroclaw University of Economics, 65*(2), 165-182.

Keilhacker, M. L., & Minner, S. (2017). Supply chain risk management for critical commodities: A system dynamics model for the case of the rare earth elements. *Resources,Conservations & Recycling, 125*(2017), 349-362.

Khan, S. N. (2017). Financial risk tolerance: Analysis of investor's cognitive, decision-making styles and cultural effects. *Journal of Finance, Accounting and Management, 8*(1), 20-38.

Kozol, E., & Oran, J. (2021). Financial risk management and firm performance: Evidence from European cross-border mergers and acquisitions. *Marmara Universites Oneri Dergisi, 16*(56), 701-718.

Kunkler, M. (2021). Currency hedging for single-currency equity portfolios: Does cross-asset risk matter? *Global Finance Journal, 49*(2021), 1-13.

Lee, K.W. (2019). The usage of derivatives in corporate financial risk management and firm performance. *International Journal of Business, 24*(2), 113-131.

Li, B., & Arreola-Risa, A. (2017). Financial risk,inventory decision and process improvement for a firm with random capacity. *European Journal of Operational Research, 260*(2017), 183-194.

Luo, M., & Wu, S. (2018). A value-at-risk approach to optimisation of warranty policy. *European Journal of Operational Research, 267*(2018), 513-522.

Ma, M., Pan, J., & Stubben, S. R. (2020). The effect of local tournament incentives on firms' performance, risk-taking decisions, and financial reporting decisions. *The Accounting Review, 95*(2), 283-309.

Mao, Y., Wang, Z., Li, X., Li, C., & Wang, H. (2021). Construction and application of the online finance credit risk rating model based on the artificial neural network. *Hindawi Discrete Dynamics in Nature and Society*, 11 pages.

Memood, R., Hunjra, A. I., & Chani, M. I. (2019). The impact of corporate diversification and financial structure of firm performance: Evidence from South Asian Countries. *Journal of Risk and Financial Management, 12*(49), 1-27.

Mrhari, E. M., & Daoui, D. (2017). Analysis of the exchange rate volatility influence on the share price: Morocco, as case study. *Journal of Public Administration, Finance and Law*(12), 114-127.

Nagy, V. (2017). The role of amount of money in risk-taking. *Copenican Journal of Finance & Accounting, 6*(2), 45-58.

Nason, R., & Chard, B. K. (2018). *Essentials of financial risk management : practical concepts for the general manager.* New York, New York: Business Expert Pres.

Noja, G. G., Thalassinos, E., Cristea, M., & Grecu, I. M. (2021). The interplay between board characteristics, financial performance, and risk management disclosure in the financial services sector: new emperical evidence from Europe. *Journal of Risk and Financial Management, 14*(79), 1-20.

Peng, X., & Huang, H. (2020). Fuzzy decision making method based on COCOSO with critic for financial risk evaluation. *Technological and Economic Development of Economy, 26*(4), 695-724.

Peng, Y., & Kang, W. (2021). RMB currency risk management after China's '8.11'exchange rate reforms. *Applied Economics Ltters, 28*(9), 727-730.

Radu, L., Horbet, A., & Belascu, L. (2021). Romanian equity investments and currency risk: A Euro-based perspective. *Studies in Business and Economics, 16*(1), 162-176.

Righi, M. B., Muller, F. M., Silveira, V. G., & Viera, K. M. (2018). The effect of organizational studies on financial risk measures estimation. *Review of Business Management, 21*(1), 103-117.

Schone, M. F., & Spinler, S. (2017). A four-factor stochastic volatility model of commodity prices. *Rev Deriy Res, 2017*(20), 135-165.

Schwarcz, S. L. (2018). Secured transactions and financial stability: Regulatory challenges. \_\_\_\_\_\_ 45-62.

Singh, N. P., & Hong, P. C. (2020). Impact of strategic and operational risk management practices on firm performance: An emperical investigation. *European Management Journal, 38*(2020), 723-735.

Srinivasan, S., & Kamalakannan, T. (2018). Multi criteria decision making in financial risk management with a multi-objective generic algorithm. *Comput Econ, 2018*(52), 443-457.

Staritz, C., Newman, S., Troster, B., & Plank, L. (2018). Financialization and global commodity chains: Distribution implications for cotton in Sub-Saharan Africa. *Development and Change, 49*(3), 815-842.

Tran, H. L., Bui, V. H., Phan, T. T., Dau, X. C., & Tran, M. D. (2019). The impact of corporate social responsibility and risk management on financial performance: The case of Vietnamese textile firms. *Management Science Letters, 9*(2019), 1029-1036.

Villers, C. d., Jia, J., & Li, Z. (2021). Are boards' risk management committes associated with firms' environmental performance. *The British Accounting and Review*, 1-21.

Wei, H., Guo, Y., & Cheng, H. (2021). The impact of events on metal futures based on the perspectives of Google trends. *Resources Policy, 74*(2021), 13 pages.

Wen, D., & Wang, Y. (2021). Volatility linkages between stock and commodity markets revisited:industry perspectives and portfolio implications. *Resources Policy, 71*(2021), 17 pages.

Wu, M., Lv, W., & Sun, Q. (2018). Optimizing price of credit default swaps for dynamic project system of public-private partnership. *Hindawi Discret Dynamics in Nature and Society*, 1-10.

Zhang, H., & Wei, Z. (2020). Risk management of commodity trade business based on deep learning and parallel processing of visual multimedia big data. *Multimedia Tools and Applications, 79*, 9331-9349.