# The Transformative Impact of Financial Technology (FinTech) on Regulatory Compliance in the Banking Sector

## Abstract

Financial Technology (FinTech) has emerged as a disruptive force in the banking sector, revolutionizing the way financial services are delivered and consumed. This review explores the transformative impact of FinTech on regulatory compliance within the banking industry. The integration of advanced technologies such as artificial intelligence, blockchain, and big data analytics has enabled financial institutions to enhance operational efficiency, improve customer experience, and expand market reach. However, these innovations have also posed unprecedented challenges to traditional regulatory frameworks designed to safeguard financial stability and consumer protection. This review examines how FinTech innovations have necessitated regulatory adaptation and evolution. It highlights the complexities introduced by novel financial products, digital payment systems, and decentralized finance (DeFi) platforms, which often operate beyond conventional regulatory boundaries. Regulatory compliance in areas such as anti-money laundering (AML), know your customer (KYC) requirements, and data privacy has become more intricate as FinTech solutions blur geographical and jurisdictional lines. Moreover, the strategies employed by regulatory bodies and financial institutions to address these challenges effectively. These include leveraging regulatory technology (RegTech) solutions for enhanced monitoring and compliance automation, fostering collaboration between regulators and industry stakeholders, and advocating for agile regulatory frameworks capable of accommodating rapid technological advancements. Looking ahead, the review anticipates ongoing shifts in regulatory paradigms to accommodate the transformative impact of FinTech. It emphasizes the importance of proactive regulatory approaches that balance innovation with risk management, ensuring the integrity and resilience of the banking sector amidst a rapidly evolving digital landscape. This provides a comprehensive overview of how FinTech is reshaping regulatory compliance in banking. It underscores the need for adaptive regulatory strategies and collaborative efforts to harness the full potential of FinTech while safeguarding financial stability and consumer trust.

**Keywords:** Financial technology; Regulatory compliance; Banking sector

## Introduction

Financial Technology, or FinTech, refers to the innovative use of technology in the design and delivery of financial services (Suryono et al., 2020). It encompasses a broad spectrum of applications, including mobile banking, peer-topeer lending, blockchain technology, and algorithmic trading. FinTech innovations aim to enhance efficiency, accessibility, and transparency in financial transactions, often challenging traditional banking models (Jarvis and Han, 2021).

Regulatory compliance plays a pivotal role in maintaining the integrity and stability of the banking sector (Borio et al., 2020). It ensures that financial institutions adhere to laws, regulations, and guidelines set forth by regulatory bodies to protect consumers, prevent financial crime, and maintain market confidence (Buttigieg et al., 2020). Compliance obligations encompass a wide range of areas, including anti-money laundering (AML), know your customer (KYC) requirements, data protection, and risk management practices (Zavoli, I. and King, 2021; Simpa et al., 2024).

The emergence of FinTech has revolutionized the financial landscape, offering unprecedented opportunities and posing new challenges for regulators and market participants alike (Murinde et al., 2022). Key transformative impacts of FinTech include. FinTech solutions have democratized access to financial services, particularly in underserved regions, through mobile and digital platforms (Pazarbasioglu et al., 2020). Automation and digitization of financial processes have streamlined operations, reducing costs and enhancing operational efficiency for both consumers and institutions (Lehmacher, 2021). FinTech has facilitated the development of novel financial products and services, such as roboadvisors, cryptocurrencies, and digital wallets, catering to evolving consumer preferences (Adejugbe, 2021; Dhingra et al., 2021). FinTech startups and tech giants have introduced disruptive business models that challenge traditional banking practices, prompting incumbents to innovate and adapt.

This review aims to delve into the intersection of FinTech and regulatory compliance within the banking sector. It will explore, examining the complexities and evolving nature of regulatory frameworks in response to FinTech innovations. Discussing best practices and regulatory strategies adopted by financial institutions to navigate compliance challenges (Bello et al., 2023). Analyzing how FinTech advancements are reshaping market dynamics, consumer behavior, and regulatory landscapes globally. Predicting future trends and potential regulatory developments in response to the ongoing evolution of FinTech. By exploring these facets, this review seeks to provide insights into how the synergy between FinTech innovation and regulatory compliance is shaping the future of the banking industry and financial markets worldwide.

## Understanding FinTech and Regulatory Compliance

Financial Technology (FinTech) has emerged as a transformative force in the financial services industry, revolutionizing the way transactions are conducted, investments are managed, and financial products are accessed (Imerman and Fabozzi, 2020; Ogunbiyi et al., 2024). This explores the intersection of FinTech and regulatory compliance, delving into the definition and components of FinTech, key aspects of regulatory compliance, and the dynamic relationship between innovation and regulation in the banking sector.

Digital payments refer to the electronic transfer of funds between individuals, businesses, and financial institutions (Agur et al., 2020; Seyi-Lande et al., 2024). FinTech has facilitated the proliferation of digital payment solutions, such as mobile wallets, payment gateways, and peer-to-peer (P2P) payment platforms. These technologies offer convenience, speed, and enhanced security compared to traditional payment methods. Blockchain technology underpins cryptocurrencies like Bitcoin and Ethereum, enabling secure and decentralized transactions (Yadav et al., 2022). Beyond cryptocurrencies, blockchain has applications in smart contracts, supply chain management, and identity verification, promising greater transparency and efficiency in financial transactions. Robo-advisors utilize algorithms and artificial intelligence to automate investment advisory services. These digital platforms provide personalized investment recommendations based on user preferences, risk tolerance, and financial goals. Robo-advisors appeal to tech-savvy investors seeking low-cost, automated portfolio management solutions. Peer-to-peer (P2P) lending platforms connect borrowers directly with lenders, bypassing traditional financial intermediaries. FinTech-powered P2P lending offers borrowers competitive interest rates and quick access to funds, while providing investors with diversified lending opportunities and potentially higher returns compared to traditional investments (Nembe et al., 2024; Scott et al., 2024).

Regulatory compliance in the FinTech sector encompasses adherence to laws, regulations, and guidelines established by governmental and international bodies (Lehmann, 2020). Key areas of compliance include anti-money laundering (AML), know your customer (KYC) requirements, data protection regulations (such as GDPR), consumer protection laws, and financial reporting standards (e.g., Basel III). Compliance with regulatory requirements is crucial for maintaining financial stability and market integrity. Regulatory frameworks mitigate systemic risks, protect consumer interests, and ensure fair competition within the financial industry. Non-compliance can result in financial penalties, reputational damage, and operational disruptions for financial institutions. Regulatory oversight of FinTech varies across jurisdictions, involving multiple regulatory bodies and frameworks. In the United States, for example, the Securities and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), and Federal Reserve play roles in regulating different aspects of FinTech. Internationally, organizations like the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) coordinate regulatory efforts to address global financial challenges (Servais, 2020; Okatta et al., 2024).

The rapid evolution of FinTech presents both opportunities and challenges for regulatory compliance (Oyeniran et al., 2024). FinTech innovations enhance financial inclusion by reaching underserved populations, improve operational efficiency through automation, and foster innovation in financial products and services (Raj and Upadhyay, 2020). Novel technologies like blockchain and cryptocurrencies pose regulatory challenges due to their decentralized nature and potential for misuse in illicit activities. Additionally, the cross-border nature of FinTech requires harmonized regulatory approaches to mitigate jurisdictional conflicts and regulatory arbitrage. FinTech represents a paradigm shift in the financial services industry, driven by technological advancements and changing consumer preferences. Regulatory compliance plays a pivotal role in safeguarding financial stability, protecting consumers, and promoting market integrity amidst rapid technological innovation (Rajaiah et al., 2022; Bello et al., 2023). As FinTech continues to evolve, regulatory frameworks must adapt to ensure effective oversight without stifling innovation. Collaborative efforts between regulators, industry stakeholders, and technology innovators are essential to navigate the complex landscape of FinTech and regulatory compliance successfully. By fostering a balanced approach to innovation and regulation, policymakers can harness the full potential of FinTech to drive economic growth, enhance financial inclusion, and uphold the resilience of the global financial system.

## The Role of FinTech in Enhancing Regulatory Compliance

Financial Technology (FinTech) is revolutionizing the landscape of regulatory compliance in the financial services industry, offering innovative solutions that streamline processes, improve efficiency, and enhance transparency (Omarova, 2024; Simpa et al., 2024). This explores the pivotal role of FinTech in regulatory compliance, focusing on automation and efficiency, improved data management and analytics, blockchain technology, and artificial intelligence (AI) and machine learning advancements.

FinTech facilitates automated compliance monitoring through software solutions that continuously track and analyze regulatory changes (Allen et al., 2021). These systems alert financial institutions to non-compliance issues in real-time, enabling prompt corrective actions. Automated monitoring reduces manual errors, minimizes operational costs, and ensures adherence to complex regulatory requirements. Real-time reporting tools provided by FinTech enable financial institutions to generate accurate and timely reports for regulatory authorities. Advanced data analytics capabilities allow for comprehensive risk assessments, trend analysis, and predictive modeling (Araz et al., 2020). Real-time data insights empower decision-makers to proactively manage compliance risks and regulatory obligations efficiently.

FinTech leverages big data analytics to process vast amounts of structured and unstructured data, extracting valuable insights for regulatory compliance (Adanma and Ogunbiyi, 2024). Predictive analytics algorithms forecast future trends and identify potential compliance issues before they escalate. By harnessing big data, financial institutions can optimize resource allocation, enhance operational efficiency, and improve decision-making processes. FinTech solutions enable more accurate and granular risk assessment through sophisticated risk management tools. These tools assess credit risks, market risks, operational risks, and compliance risks in real-time. By integrating historical data and predictive analytics, financial institutions can develop proactive risk mitigation strategies and strengthen their resilience to regulatory changes and market fluctuations (Adejugbe, 2019; Seyi-Lande et al., 2024).

Blockchain technology offers a decentralized and transparent ledger system that enhances transparency and auditability in financial transactions (Gokoglan et al., 2022). Each transaction recorded on the blockchain is immutable and timestamped, reducing the risk of fraud and ensuring compliance with regulatory requirements. The transparency of blockchain promotes trust among stakeholders and facilitates regulatory oversight without compromising data security (Rodríguez Bolívar et al., 2021). Smart contracts, powered by blockchain technology, automate and enforce contractual agreements without intermediaries. These self-executing contracts can incorporate regulatory compliance parameters, ensuring that parties adhere to predetermined terms and conditions. Smart contracts streamline compliance processes, reduce administrative burdens, and mitigate disputes through transparent and verifiable transactions (Yerram, 2022).

Artificial Intelligence (AI) enables FinTech platforms to develop intelligent compliance solutions that adapt to evolving regulatory landscapes (Elliott et al., 2021). Natural Language Processing (NLP) algorithms interpret regulatory texts, extracting relevant compliance requirements and updates. AI-driven compliance solutions automate document review, streamline due diligence processes, and ensure regulatory alignment across jurisdictions (Adelakun, 2023). Machine Learning algorithms analyze vast datasets to detect anomalies and patterns indicative of fraudulent activities. FinTech applications use machine learning models to enhance fraud detection, identity verification, and anti-money laundering (AML) efforts (Nembe et al., 2024). These predictive models improve accuracy in identifying suspicious transactions, reducing false positives and operational inefficiencies. FinTech plays a crucial role in enhancing regulatory compliance through automation, improved data management, blockchain technology, and AI-driven innovations. By embracing FinTech solutions, financial institutions can achieve operational excellence, mitigate compliance risks, and uphold regulatory standards effectively. The integration of advanced technologies not only enhances efficiency and transparency but also empowers financial institutions to navigate complex regulatory environments with agility and confidence (Ezeiefule et al., 2022). As FinTech continues to evolve, collaboration between regulators, industry stakeholders, and technology innovators is essential to foster innovation while maintaining regulatory integrity and consumer protection (Badea et al., 2021; Scott et al., 2024). By harnessing the transformative power of FinTech, the financial services industry can pave the way for a more resilient, secure, and compliant future.

## Challenges and Risks Associated with FinTech in Regulatory Compliance

Financial Technology (FinTech) has reshaped the landscape of regulatory compliance in the financial services industry, introducing innovative solutions that enhance efficiency, transparency, and accessibility (Barroso and Laborda, 2022; Okatta et al., 2024). However, along with these advancements come significant challenges and risks that must be addressed to ensure robust regulatory adherence and consumer protection. This explores the key challenges and risks associated with FinTech in regulatory compliance, focusing on regulatory uncertainty and fragmentation, cybersecurity and data privacy concerns, and technology integration issues.

One of the primary challenges facing FinTech companies and financial institutions is the lack of standardized regulations across jurisdictions (Omarova, 2020). Regulatory frameworks governing FinTech vary widely from country to country, creating compliance complexities for multinational firms. Differences in regulatory requirements related to licensing, data protection, and consumer rights pose challenges in achieving uniform compliance standards globally (Okwandu et al., 2024). National regulations often diverge from international standards, further complicating regulatory compliance for global FinTech operations. Variations in regulatory expectations regarding risk management practices, customer due diligence (CDD), and reporting obligations necessitate tailored compliance strategies for each market. Bridging the gap between national and international regulations requires collaboration between regulatory bodies and industry stakeholders to harmonize standards and facilitate cross-border operations (Krimmer et al., 2021; Simpa et al., 2021).

The proliferation of digital transactions and data-driven FinTech solutions increases the vulnerability of sensitive financial information to cyber threats. Financial institutions and FinTech providers must implement robust cybersecurity measures to safeguard data integrity, confidentiality, and availability (Allen et al., 2021; Adejugbe, 2024). Compliance with data protection regulations, such as the General Data Protection Regulation (GDPR) in Europe, imposes stringent requirements on data handling practices and breach notifications to protect consumer privacy rights (Bakare et al., 2024; Adanma and Ogunbiyi, 2024). Cyber attacks targeting FinTech platforms pose significant operational and reputational risks. Malicious actors exploit vulnerabilities in software systems, phishing scams, ransomware attacks, and Distributed Denial of Service (DDoS) attacks to compromise sensitive financial data and disrupt services. The dynamic nature of cyber threats requires continuous monitoring, threat detection, and incident response protocols to mitigate risks and maintain trust with stakeholders (Ahmad et al., 2020).

Integrating new FinTech solutions with existing legacy systems poses technical challenges related to compatibility and interoperability. Legacy systems, characterized by outdated infrastructure and proprietary software, may lack the flexibility to accommodate modern FinTech innovations. This integration gap hinders seamless data exchange, process automation, and real-time reporting capabilities essential for regulatory compliance (Adanma and Ogunbiyi, 2024). The cost and complexity of integrating FinTech solutions with legacy systems are significant barriers for financial institutions. Upgrading infrastructure, retrofitting security protocols, and training personnel on new technologies require substantial investments of time and resources. Moreover, the disruption caused by system migrations and upgrades can temporarily impact operational continuity and service delivery, necessitating careful planning and risk mitigation strategies (Seyi-Lande and Onaolapo, 2024).

Addressing the challenges and risks associated with FinTech in regulatory compliance requires proactive measures and collaborative efforts, regulatory authorities should collaborate at national and international levels to harmonize standards, streamline compliance requirements, and facilitate cross-border operations. Financial institutions must prioritize cybersecurity investments to fortify defenses against evolving cyber threats, implement robust data encryption protocols, and conduct regular security audits and vulnerability assessments (Pomerleau and Lowery, 2020; Scott et al., 2024). Gradual modernization of legacy systems through phased integration and adoption of scalable FinTech solutions can enhance operational efficiency, reduce compliance costs, and improve agility in responding to regulatory changes. While FinTech presents transformative opportunities for enhancing regulatory compliance, it also introduces significant challenges and risks that must be addressed proactively. Regulatory uncertainty, cybersecurity threats, and technology integration complexities underscore the importance of adopting a holistic approach to risk management and compliance (Shah, V. and Konda, 2022; Okatta et al., 2024). By embracing innovative solutions, fostering regulatory collaboration, and prioritizing cybersecurity measures, financial institutions can navigate the complexities of FinTech-driven regulatory compliance effectively. Ultimately, striking a balance between innovation and regulatory adherence will ensure sustainable growth, consumer trust, and resilience in the evolving landscape of financial services.

## Strategies for Effective Integration of FinTech in Regulatory Compliance

The integration of Financial Technology (FinTech) in regulatory compliance represents a significant opportunity for financial institutions to enhance efficiency, transparency, and risk management capabilities (AlMomani and Alomari, 2021; Olatunde et al., 2024). However, navigating the complexities of regulatory frameworks while leveraging FinTech innovations requires strategic approaches and proactive measures. This explores strategies for effectively integrating FinTech in regulatory compliance, focusing on collaboration between banks and FinTech companies, regulatory sandboxes and innovation hubs, continuous training and education, and adoption of Regulatory Technology (RegTech) solutions.

Collaboration through partnerships and alliances between banks and FinTech companies fosters synergies in innovation and regulatory compliance (Freij, 2020). Banks bring industry expertise, customer trust, and regulatory knowledge, while FinTech firms contribute technological agility, innovation capabilities, and niche solutions. Strategic partnerships enable financial institutions to leverage FinTech's advanced technologies, such as blockchain, AI, and big data analytics, to streamline compliance processes and enhance operational efficiency (Awotunde et al., 2021; Simpa et al., 2024). Joint innovation initiatives facilitate co-development of FinTech solutions tailored to regulatory compliance requirements. Banks provide insights into compliance challenges and regulatory expectations, guiding FinTech companies in developing solutions that align with industry standards and best practices. Shared innovation promotes iterative development, rapid prototyping, and agile deployment of compliance solutions, ensuring timely adaptation to regulatory changes and market dynamics.

Regulatory sandboxes provide controlled environments where FinTech firms can test new technologies and business models under regulatory supervision (Everhart, 2020). These sandboxes allow participants to experiment with innovative solutions without immediate regulatory constraints, facilitating iterative testing, feedback incorporation, and risk assessment. By simulating real-world conditions, regulatory sandboxes enable regulators to evaluate the viability and compliance of new FinTech applications before widespread deployment. Innovation hubs serve as collaborative platforms where regulators, financial institutions, and FinTech innovators engage in dialogue, share knowledge, and co-create solutions (Agyei-Boapeah et al., 2022). These hubs promote regulatory clarity, facilitate compliance consultations, and support ecosystem development through networking opportunities and mentorship programs. By fostering a supportive environment for innovation, regulators can mitigate compliance risks while promoting responsible experimentation and technology-driven advancements in regulatory compliance.

Continuous training programs ensure that compliance professionals stay abreast of technological advancements and regulatory developments in the FinTech landscape. Training initiatives cover topics such as blockchain technology, AI applications in compliance monitoring, cybersecurity best practices, and regulatory updates impacting FinTech operations (Chang et al., 2020; Adejugbe, 2020). By investing in ongoing education, financial institutions empower their workforce to leverage FinTech innovations effectively while adhering to evolving compliance requirements. Cultivating a culture that values both compliance and innovation is essential for successful integration of FinTech in regulatory compliance. Organizations promote cross-functional collaboration between compliance, technology, and business units to align strategic objectives, mitigate compliance risks, and drive innovation initiatives (Adanma and Ogunbiyi, 2024). By fostering a culture of continuous learning, adaptability, and ethical conduct, institutions nurture a workforce capable of leveraging FinTech advancements responsibly and ethically.

Regulatory Technology (RegTech) encompasses technologies and solutions designed to automate and streamline regulatory compliance processes (Seyi-Lande et al., 2024). RegTech solutions leverage AI, machine learning, robotic process automation (RPA), and cloud computing to enhance regulatory reporting, monitoring, and risk management capabilities. The adoption of RegTech enables financial institutions to achieve operational efficiencies, reduce compliance costs, and mitigate regulatory risks in a rapidly evolving regulatory landscape. AI-powered platforms monitor transactions, detect suspicious activities, and generate alerts for compliance violations in real-time (Agrawal, 2022; Simpa et al., 2024). Automated KYC solutions verify customer identities, screen for sanctions, and assess risk profiles using advanced data analytics. Cloud-based RegTech solutions automate data aggregation, validation, and submission of regulatory reports, ensuring accuracy and timeliness in compliance reporting. RegTech tools enhance data encryption, access controls, and privacy management to comply with stringent data protection regulations, such as GDPR. Effective integration of FinTech in regulatory compliance requires collaborative partnerships, regulatory sandboxes, continuous training, and adoption of RegTech solutions (Adejugbe, 2019; Adanma and Ogunbiyi, 2024). By leveraging the strengths of banks and FinTech companies through strategic collaboration, financial institutions can drive innovation, enhance regulatory compliance, and deliver superior customer experiences. Regulatory sandboxes and innovation hubs foster a supportive ecosystem for responsible innovation, enabling experimentation with new technologies under regulatory supervision (Simpa et al., 2024). Continuous training programs empower compliance professionals to navigate technological advancements and regulatory complexities effectively. Finally, adoption of RegTech solutions automates compliance processes, improves operational efficiencies, and mitigates compliance risks in a dynamic regulatory environment. By embracing these strategies, financial institutions can harness the transformative potential of FinTech to navigate regulatory challenges, foster sustainable growth, and maintain trust and confidence in the financial services industry

## Future Trends in FinTech and Regulatory Compliance

The future of Financial Technology (FinTech) holds immense promise for transforming the financial services landscape, driven by advancements in technology and evolving regulatory frameworks (Zeidy, 2022; Okem et al., 2024). This explores emerging trends in FinTech and their implications for regulatory compliance, focusing on emerging technologies like quantum computing and advanced AI, the evolution of regulatory frameworks, and the role of Central Bank Digital Currencies (CBDCs) in compliance and monitoring.

Quantum computing represents a paradigm shift in computational power, capable of solving complex problems exponentially faster than classical computers (Adanma and Ogunbiyi, 2024). In FinTech, quantum computing holds potential applications in areas such as encryption, risk modeling, portfolio optimization, and fraud detection. The ability of quantum algorithms to process vast amounts of data and perform complex calculations could revolutionize financial analysis and decision-making processes. Advancements in AI and machine learning are enhancing predictive analytics, natural language processing (NLP), and automation capabilities in FinTech. AI-driven models enable real-time fraud detection, personalized customer experiences, and algorithmic trading strategies. Machine learning algorithms learn from data patterns to improve accuracy in risk assessment, compliance monitoring, and regulatory reporting (Adanma and Ogunbiyi, 2018). The integration of AI in FinTech not only enhances operational efficiency but also introduces new challenges related to data privacy, algorithmic bias, and regulatory oversight.

Regulatory frameworks are evolving to accommodate technological innovations and mitigate associated risks in FinTech (Omarini, 2020). Adaptive regulations prioritize flexibility and responsiveness to technological advancements, enabling regulators to adapt compliance requirements in real-time. Regulatory sandboxes and pilot programs provide safe environments for testing new FinTech solutions under regulatory supervision, fostering innovation while ensuring consumer protection and market integrity. The globalization of FinTech necessitates harmonized regulatory standards and cross-border cooperation among regulatory authorities. Global coordination aims to address regulatory arbitrage, enhance regulatory clarity, and facilitate seamless cross-border transactions. International organizations such as the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) play pivotal roles in promoting regulatory convergence and setting global best practices in FinTech regulation (Marcacci, 2022; Okem et al., 2024).

Central Bank Digital Currencies (CBDCs) are digital representations of fiat currencies issued and regulated by central banks. CBDCs streamline payment systems, reduce transaction costs, and enhance financial inclusion (Barr et al., 2021). From a compliance perspective, CBDCs enable central banks to monitor transactions in real-time, enforce regulatory requirements (e.g., AML/CFT), and ensure compliance with monetary policies. The transparency and traceability of CBDC transactions enhance regulatory oversight and mitigate risks associated with cash-based economies. CBDCs present opportunities for financial innovation, efficiency gains, and enhanced monetary policy transmission mechanisms. They can facilitate instant cross-border payments, mitigate counterparty risks in financial transactions, and support economic resilience during crises. However, CBDC adoption poses challenges related to cybersecurity, data privacy, interoperability with existing payment systems, and regulatory compliance across jurisdictions. Addressing these challenges requires collaborative efforts among central banks, financial institutions, and regulatory authorities to establish robust governance frameworks and technological infrastructure.

The future of FinTech and regulatory compliance is shaped by emerging technologies, adaptive regulatory frameworks, and the adoption of Central Bank Digital Currencies (CBDCs). Quantum computing and advanced AI promise to revolutionize financial services by enhancing computational capabilities, improving decision-making processes, and automating compliance tasks (Girasa and Scalabrini, 2022). Regulatory frameworks are evolving towards adaptive and responsive regulations that foster innovation while safeguarding financial stability and consumer protection. Global coordination and standardization efforts seek to harmonize regulatory practices across jurisdictions, promoting regulatory clarity and facilitating cross-border FinTech operations. Central Bank Digital Currencies (CBDCs) represent a pivotal development in the financial ecosystem, offering opportunities for efficiency gains, financial inclusion, and enhanced regulatory compliance. However, the widespread adoption of CBDCs necessitates addressing challenges related to cybersecurity, data privacy, and regulatory compliance frameworks (Foster et al., 2021). By embracing technological advancements responsibly and fostering collaborative partnerships, stakeholders in the financial services industry can harness the transformative potential of FinTech to create a more resilient, inclusive, and compliant global financial system.

3. Conclusion The intersection of Financial Technology (FinTech) and regulatory compliance marks a pivotal moment in the evolution of the banking sector, characterized by innovation, challenges, and transformative opportunities. This conclusion reflects on key points discussed, the ongoing transformation of the banking sector, and offers final thoughts and recommendations for stakeholders navigating the dynamic landscape of FinTech and regulatory compliance.

FinTech innovations such as AI, blockchain, and quantum computing are revolutionizing financial services, enhancing operational efficiency, and reshaping customer experiences. The evolving regulatory landscape poses complexities for financial institutions and FinTech firms, requiring adaptive compliance strategies and global coordination to ensure regulatory adherence and consumer protection. Strategic partnerships between banks and FinTech companies, regulatory sandboxes, and continuous education are essential for integrating FinTech solutions effectively while navigating regulatory requirements.

The banking sector continues to undergo profound transformation driven by FinTech innovations and regulatory advancements, increasing adoption of digital payments, robo-advisors, and peer-to-peer lending platforms is expanding access to financial services and improving operational efficiencies. Advanced analytics and AI-driven models enable banks to derive actionable insights from vast datasets, enhancing risk management, customer engagement, and decision-making processes. Regulatory frameworks are evolving to accommodate technological advancements, fostering innovation while ensuring regulatory compliance, market integrity, and financial stability.

As the financial ecosystem evolves, stakeholders in the banking and FinTech sectors are urged to consider the following, foster a culture of innovation that prioritizes ethical considerations, consumer protection, and regulatory compliance. Leverage RegTech solutions to automate compliance processes, enhance transparency, and mitigate risks associated with regulatory non-compliance. Promote collaboration between banks, FinTech firms, regulators, and policymakers to address regulatory challenges, harmonize standards, and drive industry-wide innovation. Strengthen cybersecurity measures to protect sensitive financial data, mitigate cyber threats, and maintain trust in digital financial services. The synergy between FinTech and regulatory compliance represents a transformative force shaping the banking sector's future. By navigating regulatory complexities, embracing technological innovations responsibly, and fostering collaborative partnerships, stakeholders can capitalize on the opportunities presented by FinTech while safeguarding financial stability and enhancing customer trust. The ongoing evolution of the banking sector requires proactive adaptation to emerging trends and regulatory developments, ensuring resilience and sustainable growth in a digital first era.

# The Impact of Strategic Cost Management on the Relationship Between Supply Chain Practices, Top Management Support and Financial Performance Improvement

## Abstract

The present study investigated the role of strategic cost management as a moderating variable on the relationship between supply chain practices, Top Management Support (TMS), and financial performance improvement. Financial performance improvement was considered as a dependent variable, while supply chain practices, strategic cost management, and TMS were taken as the main independent variables. Besides, the financial structure and the firm size were considered as control variables. The research sample included 165 companies that were selected using random sampling from among companies listed on the Tehran Stock Exchange. The data were collected using the Senior Management Survey (SMS) to measure supply chain practices, TMS, and strategic cost management. The results of the structural equation modeling after discriminant tests showed that strategic cost management had a positive and significant effect on the relationship between different subscales of supply chain practices and different measures of financial performance improvement. The results also showed that the relationship between strategic cost management, senior management support, supply chain activities and improving financial performance is non-linear and so that Supply Chain Integration (SCI) is more effective at low and medium levels and at higher levels. The above has a lesser or even negative effect.

## Introduction

Following previous studies in the literature [1]-[5], despite recent developments in the literature on strategic cost management, there are three basic limitations in this field: first, this field of research is largely limited to management executive costing while the knowledge of structural management costing has expanded substantially outside the scope of accounting research. Most accounting researches have addressed executive management costing issues in areas such as cost allocation and costing. Furthermore, little research has been done on structural cost management. Second, the flow of research on strategic cost management has not established a sufficient relationship between the executive management costing dimensions and structural cost management. Thus, the existing body of knowledge has failed to integrate them [6].

Therefore, it is essential to consider the development of structural cost management, but this does not negate the need for addressing executive cost management to prevent incomplete results and artificial efforts. Accordingly, it is necessary to address both fields of strategic cost management at the same time to clarify the interaction between the two fields.

Third, many researchers have claimed that they have extended the benefits of strategic cost management. However, despite empirical research that has addressed the impact of management executive costing on the effectiveness of management costing systems, the empirical evidence does not support the impact of strategic cost management on financial performance. More specifically, empirical evidence from the executive management costing literature supports a weak relationship between costing system design and financial performance, and there are some controversies in this area [7].

A review of the literature on supply chain management points to the impact of supply chain practices on improving financial performance or corporate market performance. For instance, Cohen and Kaimenaki [7] have suggested that Supply Chain Integration (SCI) allows a focal company to access and use resources and capabilities in the supply chain. They have highlighted that SCI can be considered as the integration of internal and external capabilities that directly or indirectly helps a company improve its financial performance. However, the question, what effect does SCI have on improving a firm's financial performance? has remained unanswered.

This study addresses the SCI literature beyond the positive impact of financing chain activities on financial performance improvement by incorporating both the positive and adverse effects of SCI into a single model. Following previous studies (Kim [8]), this study has hypothesized that SCI positively affects financial performance improvement, at least in cases where the level of SCI is not very high. However, it is also assumed that the outcomes of the SCI are also effective in degrading the firm's financial performance. This means that the positive impact of the SCI is persistent up to a certain extent, leading to a negative impact on performance afterward so that its risks and costs outweigh its possible benefits. This being so, it is assumed that instead of a linear relationship, there is a U-shaped nonlinear relationship between the level of supply chain practices and financial performance improvement. This curvilinear and nonlinear relationship between supply chain practices and financial performance improvement may explain why some studies are unable to demonstrate the expected performance gains from the positive effects of SCI on financial performance improvement [8].

In addition, the study illustrate the moderating role of strategic costing management on the one hand and senior management support on the other hand on the relationship between supply chain activities in the field of SCI and improvement in financial performance which can change the associations.

This study also provides implications for strategical and top management who will be benefited of the results to use supply chain activities and complementary assets including strategic cost management and senior management of the procedure of enhancing supply chain activities and improving financial performance.

Therefore, due to the importance of the study and lack of the researches that has been done in Iran related to the field of cost management, this research will improve financial performance and promote indigenous knowledge in this field.

The present study has been conducted using the data of manufacturing companies in Iran, while the special conditions of post-BARJAM and the threats of its violation have intensified the attention to the factors affecting the improvement of financial performance in the field of research. Especially in developing countries such as Iran and China there is lack of the sufficient researches in this field [9] and [10].

The historical review of the research indicates that the research conducted in this regard is mainly in Western developed countries, which have different conditions and atmosphere with the conditions of developing countries such as Iran. In this regard, the difference in cultural conditions in developing countries and its impact on financial performance can be found in studies such as Bagchi et al. [11], Tawil-Souri [12] and finally Kim [8].

According to the results of these studies, the relationship between supply chain activities and improving financial performance and the impact of strategic cost management on this relationship, in countries such as Iran and China due to cultural differences in collectivism, power distance and masculinity [13]. Therefore, this study will provide significant management insights on how supply chain activities are performed to improve the financial performance of companies in Iran.

Strategic cost management may help resolve disputes over the goals and resources of the SCI. Hence, it is hypothesized that strategic cost management can be considered a complementary asset to strengthen the impact of SCI on financial performance improvement. Therefore, the following question can be developed:

− *What effect does strategic cost management as a moderating variable have on the relationship between supply chain practices, Top Management Support (TMS), and financial performance improvement?*

## Theoretical Framework and Hypothesis Development and Background of the Research

## Supply Chain Practices

Customer and supplier integration is a level of integration whereby a company can cooperate with its core suppliers and customers to formulate its inter-organizational strategies, methods, procedures, and behaviors in common, coordinated and controllable processes to respond to customer demands. Intraorganizational fragmentation, on the other hand, is a form of SCI in which a company organizes its organizational strategies, methods, procedures, and behaviors in collaborative, coordinated, and controllable processes to meet customer needs [14].

The assumption of the lasting positive effect of SCI on financial performance improvement can be ruled out. Although the negative effects of SCI are well known, there is little empirical evidence to support these effects. This study examines two possible explanations for the inconsistency between the findings of previous studies: first, contrary to many previous researchers' assumptions, instead of a linear relationship between SCI and financial performance improvement, there is possibly a nonlinear relationship these two variables affected by the benefits and limitations of supply chain practices. Second, the discrepancy in the findings of previous studies on the relationship between SCI and financial performance improvement can be affected by the difference in a complementary asset of the company, which in this study is referred to as strategic cost management [15].

Supply Chain Practices and Financial Performance Improvement

To elucidate the relationship between SCI and financial performance improvement, the Resource-Based View (RBV) and Transaction Cost Economics (TCE) are combined in this study. Accordingly, it is hypothesized that supply chain activity may have both a positive and a negative impact on financial performance. The positive effect of supply chain practices is to help companies to obtain and use the resources and capabilities available in the supply chain, which can improve financial performance. With the supply chain practices exceeding the desired threshold, an increase in SCI activities is expected to lead to a decline in financial performance. Therefore, it is possible to imagine a desirable level to which the cost of coordination with the benefits of SCI is offset, and beyond that financial performance decreases [10]-[16].

According to the theory of TCE, if supply chain practices increase in line with integration, they will lead to consequences such as increased coordination costs, reduced emphasis on organizational biases and regulations, and reduced market pressure [17]. Furthermore, increased coordination costs may offset the savings from supplier integration. Seriousness and organizational bias in the routine and objective models created can disrupt independent thinking and prevent the learning and absorption of foreign knowledge, in turn preventing companies from responding effectively to environmental changes. In addition, supplier integration weakens market pressure because the company may, with its weaknesses, develop “reciprocal norms” with its suppliers, leading to inefficiency of inputs and ultimately to damage to the company's financial performance [18].

In short, the combination of the RBV and TCE shows that there is a positive relationship between supplier integration and financial performance as long as the level of supplier integration is low and medium. Based on this, the first research hypothesis can be developed as follows:

**Hypothesis 1**. There is a non-linear U-shaped relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The RBV assumes that information sharing, goal setting, and collaborative planning, mutual teams, and collaboration are essential elements of intra-organizational integration [19]. Because it breaks down functional barriers and encourages collaboration between staff and management to meet customer requirements. The main advantage of intra-organizational integration is the improvement of the interaction between employees and management.

Managing communication and interaction between all different organizational domains may be difficult in practice. This requires managers with staff-specific training to coordinate complex processes with diverse groups of people. In summary, while the RBV claims that intra-organizational integration is effective in improving financial performance, there may be a favorable threshold for this effect. Thus, following theoretical issues, logical reasoning, and empirical evidence, the second research hypothesis can be developed as follows:

**Hypothesis 2**. There is a non-linear U-shaped relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

Improving the level of SCI to meet customer needs does not necessarily lead to more sufficient information to improve financial performance. Therefore, there must be a threshold at which the level of benefits of developing levels above SCI is offset by the overload of information at a level beyond the need, complexity, and investment in dealing with such high levels of information. Thus, it is expected that corporate financial performance increases only slightly or moderately with an increase in the level of SCI in terms of customers. SCI helps to provide a variety of information and thus enables effective and rapid response to customer demands. However, when the SCI level reaches the desired level, beyond this level the marginal benefits of more information may be negligible, and therefore further increase in the integration will negatively affect the company’s financial performance, which is due to problems in seeking information and cost of resources spent on the integration process. The combination of the RBV and TCE will allow us to predict a nonlinear and U-shaped relationship between SCI and corporate financial performance. Accordingly, the third hypothesis is stated as follows:

**Hypothesis 3**. There is a non-linear U-shaped relationship between supply chain practices in customer integration and corporate financial performance improvement.

## Top Management Support (TMS)

In this study, TMS is assumed as a complementary asset. Examples of complementary assets discussed in the literature include organization and training of human resources, Research and Development (R&D), and production and marketing capabilities. The resources and capabilities available to create complementary assets may be physical, human, or organizational [20]. These complementary assets are created using resources or capabilities that are rare, valuable, irreplaceable, and difficult to copy. Hence, a company with a high level of management support can improve financial performance by developing SCI in terms of suppliers, intra-organizational resources, and customers. Following the theoretical framework of the study, arguments, and empirical evidence, the fourth, fifth, and sixth hypotheses are developed as follows:

**Hypothesis 4**. TMS affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

**Hypothesis 5**. TMS affects the relationship between supply chain practices in terms of intraorganizational integration and corporate financial performance improvement.

**Hypothesis 6**. TMS affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

## Strategic Cost Management

Strategic cost management was developed in the aftermath of the failure of traditional management accounting techniques in providing sufficient information to enable managers to monitor customers and competitors. Strategic cost management provides information to make managers more responsive to external users, foresight and enables long-term attention and strategic focus, and includes customer costing, strategic costing, competitive costing, competitive index costing, integrated performance measurement, and competitive pricing and decision making [21].

Following the literature, strategic cost management is defined as a variable mediating the relationship between SCI and financial performance improvement and is measured based on metrics such as customer benefit analysis, performance index analysis, competitive cost analysis, strategic pricing, value chain analysis, integrated performance measurement, competitor performance appraisal, service costing, and strategic costing [22].

**Hypothesis 7**. Strategic cost management affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

**Hypothesis 8**. Strategic cost management affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

**Hypothesis 9**. Strategic cost management affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

Background of the Research

Lotfi et al. [23] showed flexibility and sustainable supply chain network design by considering renewable energy for the first time. Findings from data analysis indicate that by increasing the scale of prob- lems, the cost function and time solution grow up. Effects of changing conservative coefficient are sur- veyed and indicate that when the amount of conserva- tion increases, the cost function grows up. Effects of changing demand are investigated and when demand is high, activating RE is conomically feasible and we cannot buy and supply energy by the government power network and have to supply energy by RE.

Ghasempoor Anaraki et al. [24] conducted a study entitled "evaluation and selection of supplier in supply chain with fuzzy analytical network process approach". The purpose of this research is proposing a new method for assessment and rating the suppliers. In this study linguistic and fuzzy variables and a form of FANP are used to comprise the uncertain and ambiguous states; these weights signify the importance of each criterion in relation to the purpose, which is supplier selection. Taking into consideration the characteristics of this model, the mutual effects of the decision making elements can be applied to calculation and the decisions can be made in the best form.

Nozari and Ghahremani-Nahr [25] conducted a study entitled "providing a framework for implementing agile supply chain based on big data". The results of the research provide a framework that intelligently identifies the agility needs of the organization and strives to achieve it, thus creating a more competitive advantage for the company and increasing customer satisfaction and expanding the market share of the organization. This framework can be an effective guide to implementing an agile and clean supply chain based on the use of big data. It also provides a clear path to the agility process from data entry to data analysis, evaluation, and optimization for greater agility, which can be useful for organizations, especially in the fast-moving consumer industries.

Khlilzade et al. [26] conducted a study entitled "designing a model for financial streamlining of the supply chain process". The central category was financial agility, which was presented in three dimensions, as well as causal, contextual, intervening conditions, strategies and results, and the final model was presented. Then, using Delphi analysis method, a prototype design questionnaire was presented by correction, approval and financial model agility model of the supply chain process of companies. According to the results of this study, the main categories of the developed model include internal organizational, technological and human factors of financial agility of the supply chain process of companies.

Lotfi et al. [27] conducted a study entitled "a robust optimization model for sustainable and resilient closedloop supply chain network design considering conditional value at risk". The present study proposes solving the model using constraint relaxation and in the worst possible case of using objectives which causes a lower bound and an upper bound to be obtained for the model. The lower and upper bounds get near to each other by increasing the model size. Commercial solvers and the web-based server of NEOS are applied to solve the model.

Ruan [15] based on the analysis of the field of knowledge and the use of content analysis method examined the key elements affecting the strategic cost management in the supply chain. In this study, key factors were analysed based on organizational and extra-organizational axes and for each of the business partners involved in the supply chain. In this research, which used a meta-analytical model, over seventy research were analysed and compared in this field based on variables, research method or geographical area.

Mzoughi et al. [28] have studied the effect of supply chain management operations on organizational performance in companies operating in various industries in Tunisia. The results of this study show that some dimensions of supply chain management operations have a direct and positive effect on performance. For example, the level of information sharing and its quality have a positive effect on organizational performance. Customer relations only have a positive effect on financial performance. On the other hand, supply chain management operations have an indirect effect on performance through competitive advantage.

Vahabpour and Safarzadeh [29] conducted a study entitled "Study of the effect of SCI on company performance using the mediating variables of competitive capabilities and supply chain management." Findings indicate that the level of SCI indirectly affects the company's performance. This indirect effect is done through two paths: 1) through the mediating variability of competitiveness, 2) through mediating variables, the level of focus on supply chain management operations and competitiveness.

Fakhrzad and Lotfi [30] conducted a study entitled "assessing the green model of inventory management by the seller with the allowance of deficiencies in the two-tier supply chain with Epsilon constraint and NSGA-II" solution approaches. By reducing the cost of shortages, the amount of profit, shipping and orders is higher than the base model and the optimal amount of shortage is reduced, thus reducing the cost of inventory shortages. The proposed model is also compared with the traditional inventory management model or by buyers. Accordingly, in most cases, the VMI performed better in profit and the amount of carbon dioxide emissions was reduced.

Koh et al. [31] to evaluate the effect of supply chain management operations on organizational performance related to supply chain management and organizational performance, used different indicators compared to previous research to measure supply chain management operations. The results of this study show that supply chain management operations have a direct and significant positive effect on operational performance, but do not have a direct effect on organizational performance related to supply chain management.

Fathi and Nazari [32] conducted a study entitled "investigating the impact of total quality management on financial performance: the mediating role of organizational learning capacity and innovation". The results show the positive and significant effect of total quality management on organizational learning capability and business innovation of the company, positive and significant effect of organizational learning capability on business innovation and positive and significant effect of organizational learning capability as well as business innovation on company financial performance. Naseri et al. [33] conducted a study entitled "strategic management accounting review on improving corporate financial performance". Financial performance, there is a direct and positive relationship between strategic pricing and improving financial performance, between target costing and improving financial performance.

## 3 | Research Methodology

To explore the effect of strategic cost management, TMS, and supply chain practices on financial performance improvement a survey research design was employed using questionnaires to measure non financial variables as these variables could not be quantified objectively based on quantitative measurement of research variables performance data. A review of the literature and especially studies that addressed Iranian stock exchange companies shows that financial performance data such as balance sheet figures or profit and loss data have been collected over a period of several years. Furthermore, the relationship between variables has been measured using panel data analysis. Since the present study aims to employ a survey design to measure explanatory variables, cross-sectional data are used to quantify the research variables. The research sample included 165 companies that were selected using random sampling from among companies listed on the Tehran Stock Exchange during two fiscal years ending March 2019.

In this study, control variables or corporate characteristics are measured using the performance data of the companies in the fiscal year ending March 20, 2019.Following the literature, the firm size was measured as the number of employees and the financial structure as the ratio of long-term debt to book value of equity [34]. Besides, financial performance improvement as a dependent variable was measured based on changes in interest rates on sales compared to the previous year, changes in rates of return on assets, and changes in rates of return on equity compared to the previous year. These variables were defined using the performance data of the companies in the fiscal year ending March 20, 2019 [35]. Moreover, the dependent variables including supply chain practices, strategic cost management, and TMS were measured using a questionnaire in which items 1 to 9 were scored on a scale ranging from 1 to 9 showing the lowest and highest levels of significance, respectively [36].

Intra-organizational integration was assessed using six measures. Three measured were derived from the model proposed by Fayard et al. [19] and the remaining three were defined based on real-time information integration and cross-integration in strategic planning in line with the development of intraorganizational integration. To measure each of the dimensions of convergence or integration of suppliers and customers, the five measures were used to measure supplier integration. Three measured was extracted from the work of Fayard et al. [19]. The remaining two measures were developed based on real-time monitoring and integration [34]. The model proposed by Fayard et al. [19] was used to measure the five metrics of customer integration. Additionally, TMS as a moderator variable was quantified using six measures fitting the model proposed by Tracy et al. [36]. Finally, strategic cost management as a moderator variable was measured following the previous studies [34] and [35]. The control variables and financial performance were measured objectively and based on performance data and other items using a survey method.

In this study, the direct or indirect relationships between the variables were determined using Eq. (1):

|  |  |
| --- | --- |
| PERi = β0 + β1 SI²i + β2SIi + β3SIi ∗ TMSi + β4SIi ∗ SCMi + β5II 2 + β6 IIi+ β7IIi ∗ TMSi + β8IIi ∗ SCMi + Β 9CI 2i + β10CIi + β11CIi  ∗ TMSi + β12CIi ∗ SCMi + β13SIZEi + β14LEVi + εi. | (1) |

Where PERi is financial performance improvement in company i, SIi is the first supply chain activity of company i in terms of supplier integration, IIi is the second supply chain activity of company i in terms of intra-organizational integration, CIi is the third supply chain activity of company i in terms of customer integration, TMSi shows the TMS for supply chain practices in company i, SCMi is strategic cost management in company i, SIZEi is the size of company i, LEVi is the financial structure of company i, and εi is an unknown term.

## 4 | Results

To assess the impact of supply chain activity, strategic cost management, and TMS on the financial performance of companies listed on the Tehran Stock Exchange, the data were analyzed using structural equation modeling with Smart-PLS software.

## 4.1 | Descriptive Statistics

The qualitative variables in this study were measured using a questionnaire that was administered to the managers of 165 listed companies. An analysis of the respondents’ gender showed that 130 respondents (78.78%) were male and only 35 persons (21.21%) were female. Most of the participants were in the age of over 55 years old accounting for 44.85% of the managers. Besides, the lowest number of the respondents was in the age group of fewer than 35 years old accounting for only 9.09% of the total respondents. A majority of the managers held a bachelor's degree (72 persons, equivalent to 43.64%) and only 15.15% of them had an associate’s degree or lower education. Moreover, most of the managers reported that they had 15 to 20 years of experience (55 people accounting for more than 33%) and only about 7% of them reported managerial experience for less than 5 years. Table 1 shows the descriptive statistics for the respondents’ demographic data:

Table 1. Descriptive statistics of research variables.

|  |  |  |  |
| --- | --- | --- | --- |
| **Factor** | **Number of Items** |  | **Standard Deviation** |
| Supplier integration | 5 | 1 | 24/1 |
| In-house integration | 6 | 7 | 47/1 |
| Customer integration | 5 | 7 | 37/1 |
| Supreme management support | 6 | 7 | 32/1 |
| Strategic cost management | 9 | 6 | 1/58 |
| Change in profit to sell | 1 | 5 | 814 |
| Change in return on assets | 1 | 2 | 580 |
| Change in return on capital | 1 | 4 | 459 |
| Size of company | 1 | 4 | 74/1 |
| Financial structure | 1 | 04 | 0/93 |

## 4.2 | Discriminant Tests

To evaluate the factor load of each of the variables, factor analysis was run and the results are presented in Table 2. An analysis of the factor loads indicated the maximum coverage for all selected variables occurred with the related constructs as shown in Table 2:

**Table 2. Fit indicators the estimated model**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Factor** | **Item** | **Factor load** | **Weight** | **Statistics T** | **Result** |
|  | 19 | 0.85 | 0.13 | 1.65 | confirmed |
|  | 20 | 0.78 | 0.24 | 1.68 | confirmed |
| Supplier integration | 21 | 0.72 | 0.24 | 1.32 | confirmed |
|  | 22 | 0.71 | 0.25 | 1.14 | confirmed |
|  | 23 | 0.73 | 0.27 | 1.16 | confirmed |
|  | 24 | 0.75 | 0.27 | 1.51 | confirmed |
|  | 25 | 0.76 | 0.15 | 0.185 | confirmed |
| In-house integration | 26 | 0.77 | 0.11 | 1.52 | confirmed |
| 27 | 0.78 | 0.14 | 1.85 | confirmed |
|  | 28 | 0.81 | 0.17 | 1.36 | confirmed |
|  | 29 | 0.84 | 0.16 | 1.35 | confirmed |
|  | 30 | 0.77 | 0.11 | 1.63 | confirmed |
|  | 31 | 0.78 | 0.14 | 1.98 | confirmed |
| Customer integration | 32 | 0.79 | 0.21 | 1.35 | confirmed |
|  | 33 | 0.81 | 0.24 | 1.52 | confirmed |
|  | 34 | 0.82 | 0.28 | 1.89 | confirmed |
| Control variables | 35 | 0.83 | 0.29 | 1.88 | confirmed |
| 36 | 0.84 | 0.31 | 1.78 | confirmed |
|  | 4 | 0.80 | 0.12 | 1.02 | confirmed |
|  | 5 | 0.82 | 0.14 | 1.42 | confirmed |
| Supreme management support | 6 | 0.79 | 0.16 | 1.14 | confirmed |
| 7 | 0.75 | 0.21 | 1.32 | confirmed |
|  | 8 | 0.79 | 0.23 | 1.74 | confirmed |
|  | 9 | 0.81 | 0.29 | 1.33 | confirmed |
|  | 10 | 0.82 | 0.28 | 1.85 | confirmed |
|  | 11 | 0.79 | 0.11 | 1.74 | confirmed |
|  | 12 | 0.77 | 0.16 | 1.33 | confirmed |
|  | 13 | 0.83 | 0.18 | 1.52 | confirmed |
| Strategic cost management | 14 | 0.80 | 0.19 | 1.33 | confirmed |
|  | 15 | 0.83 | 0.21 | 1.85 | confirmed |
|  | 16 | 0.79 | 0.22 | 1.42 | confirmed |
|  | 17 | 0.77 | 0.27 | 1.88 | confirmed |
|  | 18 | 0.72 | 0.14 | 1.63 | confirmed |
|  | 1 | 0.77 | 0.22 | 1.88 | confirmed |
| Financial performance | 2 | 0.71 | 0.31 | 1.75 | confirmed |
|  | 3 | 0.76 | 0.12 | 1.42 | confirmed |

As shown in *Table 2*, the t-statistic for all items is less than 2 indicating that their significance level is close to 0. Therefore, at the level of 95% confidence, the significant assumption of using each item in the model fit is confirmed. In the second step, the cause and effect paths designed unilaterally in the model were estimated. These paths express the relationship between objective and subjective indicators for each of the different factors (*Fig. 1*).

A diagram of a network

Description automatically generated with medium confidence

**Fig. 1. The model goodness of fit (GOF) based on the standard coefficients.**

To determine whether a path coefficient is significant, the t-statistic for the path coefficients was calculated as shown in Fig. 1. Convergence validity shows the correlation of a construct with its indicators, implying that the higher the correlation, the higher the fit. The results showed that all constructs in this study have an Average Variance Extracted (AVE) higher than 0.4, so there is a divergent validity between the latent variables of the research model, and the assumption of multicollinearity is rejected. The model goodness of fit (GOF = 0.42) shows the compromise between the quality of the structural model and the measurement model and the estimated model has a good fit.

## 4.3 | The Relationship Between the Variables

Performance improvement as a dependent variable was defined as the change in sales profit, return on investment, and return on equities of the selected listed companies. Supply chain practices, strategic cost management, and TMS are defined as the main independent variables or factors affecting financial performance improvement. The results of regression analysis for measures of financial performance improvement are summarized in Table 3.

**Hypothesis 1**. There is a non-linear U-shaped relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The squared coefficients of the Supplier Integration (SI2) were equal to 0.047, 0.036, and 0.111. As these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Furthermore, the Student’s t values for the supplier integration were equal to 2.328, 5.385, and 2.186 at the significance levels of 0.015, 0.0000, and 0.0308 (p<0.05).

LEV

**Variable Description**

Width of origin

Squares of supplier integration

Supplier integration

Supplier integration and Strategic cost management

Supplier integration and supreme management support

Squares of in- house integration

In-house integration

In-house integration and Strategic cost management

In-house integration and supreme management support

Squares of customer integration

Customer integration

Customers and Strategic cost management

Customers and supreme management support

Cize of company

Financial structure

-0.126

-3.559

SIZE

-0.151

-2.144

CI\*SCM 0.044

4.450

CI\*TMS 0.016

2.141

CI 0.033

4.745

CI2 0.016

2.886

II\*SCM 0.111

2.265

II\*TMS 0.095

2.694

II 0.106

3.063

II2 0.006

1.977

SI\*SCM 0.096

2.444

SI\*TMS 0.088

2.746

SI 0.009

3.689

SI2 0.111

2.186

Β0

0.161

2.227

**Symbol Coefficient**

**Statistics**

**Table 3. The relationship between performance improvement and factors affecting it.**

**Return on Capital**

0.0009

**Return on Assets**

0.0373

0.0000

0.0368

0.000

0.0056

0.0276

0.0094

0.0028 0.0489

0.0160

0.0070

0.0004 0.0308

0.0278 **Probability**

-0.042

-0.059

0.081

0.018

0.051

0.016

0.035

0.041

0.011

0.029

0.030

0.022

0.062

0.036

0.108

**Coefficient**

-4.382

-2.488

2.545

2.967

3.129

2.076

2.073

2.248

2.427

2.579

2.314

2.887

2.484

5.385

-2.587 **Statistics**

0.0001

**Sales Returns**

0.0160

0.0143

0.0048

0.0031 0.0427

0.0420

0.0279

0.0175 0.0121

0.0252

0.0059

0.0167 0.0000

0.0129 **Probability**

-0.033

-0.042

0.061

0.009

0.063

0.008

0.022

0.074

0.037

0.016

0.012

0.036

0.028

0.047

0.031

**Coefficient**

-2.408

5.001

3.452

2.519

4.632

2.349

2.344

2.778

4.6339 5.418

5.312

2.312

2.746

2.328

2.029

**Statistics**

0.0163

0.0000

0.0006

0.0119

0.000

0.0191

0.0193

0.0056

0.0000 0.0000

0.0000

0.0212

0.0069 0.0215

0.0446 **Probability**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Return on Capital** | | |  | **Return on Assets** | | | **Sales Returns** | |  |
| **Variable Description** | **Coefficient** | **Statistics** | **Probability** | **Coefficient** | **Statistics** | **Probability** | **Coefficient** | **Statistics** | **Probability** |
| The coefficient  of determination And adjusted coefficient of determination | 0.7309 |  | 0.6982 | 0.8102 |  | 0.7823 | 0.7612 |  | 0.7242 |
| Fisher statistic and level of significance | 9.028 |  | 0.013 | 11.096 |  | 0.008 | 12.362 |  | 0.001 |

**Hypothesis 2.** There is a non-linear U-shaped relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

The squared coefficients of the Intra-organizational Integration (II2) were equal to 0.016, 0.029, and 0.006. As these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Moreover, the Student’s t values for the intra-organizational integration were equal to 5.418, 2.579, and 1.977 at the significance levels of 0.0000, 0.0121, and 0.0489 (p<0.05). Thus, the alternative hypothesis is confirmed, indicating that there is a U- shaped correlation between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 3.** There is a non-linear U-shaped relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The squared coefficients of the Customer Integration (CI2) were equal to 0.008, 0.016, and 0.016. Since these values were positive and non-zero, it can be suggested that there is a U-shaped correlation between the customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. Moreover, the Student’s t values for the customer integration were equal to 2.349, 2.076, and 2.886 at the significance levels of 0.0191, 0.0427, and 0.0056 (p<0.05). Thus, the alternative hypothesis is confirmed, indicating that there is a U-shaped correlation between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 4.** TMS affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The interactive coefficients of the Supplier Integration and TMS (SI\*TMS) were equal to 0.012, 0.030, and

0.096. Since these values were positive and non-zero, it can be suggested TMS positively affects the relationship between the supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of supplier integration intensifies the effect of these practices on performance improvement. Moreover, the Student’s t values for the supplier integration and TMS were equal to 5.312, 2.314, and 2.444 at the significance levels of 0.0000, 0.0252, and 0.0160 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 5.** TMS affects the relationship between supply chain practices in terms of intra- organizational integration and corporate financial performance improvement.

The interactive coefficients of the Intra-Organizational Integration and TMS (II\* TMS) were equal to 0.022, 0.035, and 0.111. Since these values were positive and non-zero, it can be argued TMS positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of intra-organizational integration intensifies the effect of these practices on performance improvement. Moreover, the Student’s t values for the intra- organizational integration and TMS were equal to 2.344, 2.073, and 2.265 at the significance levels of 0.0193, 0.0420, and 0.0276 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 6.** TMS affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The interactive coefficients of the Customer Integration and TMS (CI\* TMS) were equal to 0.061, 0.081, and 0.044. Since these values were positive and non-zero, it can be argued TMS positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, TMS for supply chain practices in terms of customer integration reinforces the effect of these practices on performance improvement. Moreover, the Student’s t values for the customer integration and TMS were equal to 3.452, 2.545, and 4.450 at the significance levels of 0.0006, 0.0143, and 0.0000 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that TMS positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 7.** Strategic cost management affects the relationship between supply chain practices in terms of supplier integration and corporate financial performance improvement.

The interactive coefficients of the Supplier Integration and Strategic Cost Management (SI\*SCM) were equal to 0.036, 0.022, and 0.088. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of supplier integration reinforces the effect of these practices on performance improvement. Moreover, the Student’s t values for the supplier integration and strategic cost management were equal to 2.312, 2.887, and 2.746 at the significance levels of 0.0212, 0.0059, and 0.0070 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between supplier integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 8.** Strategic cost management affects the relationship between supply chain practices in terms of intra-organizational integration and corporate financial performance improvement.

The interactive coefficients of the Intra-Organizational Integration and Strategic Cost Management (II\*SCM) were equal to 0.074, 0.041, and 0.095. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of intra-organizational integration reinforces the effect of these practices on performance improvement. Moreover, the Student’s t values for the intra-organizational integration and strategic cost management were equal to 2.778, 2.248, and 2.694 at the significance levels of 0.0056, 0.0279, and 0.0094 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between the intra-organizational integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

**Hypothesis 9.** Strategic cost management affects the relationship between supply chain practices in terms of customer integration and corporate financial performance improvement.

The interactive coefficients of the Customer Integration and Strategic Cost Management (CI\*SCM) were equal to 0.009, 0.018, and 0.016. Since these values were positive and non-zero, it can be argued strategic cost management positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies. In other words, strategic cost management as a support for supply chain practices in terms of customer integration reinforces the effect of these practices on performance improvement. Moreover, the student’s t values for the customer integration and strategic cost management were equal to 2.519, 2.967, and 2.141 at the significance levels of 0.0119, 0.0048, and 0.0368 (p<0.05). Thus, the alternative hypothesis is confirmed at a 95% confidence interval, indicating that strategic cost management positively affects the relationship between customer integration and performance improvement with the measures of sales return, investment return, and equity return in the selected listed companies.

5 | Discussion and Conclusion

Despite the availability of a good bulk of research in the field of strategic cost management, studies in this field still have three main limitations: First, most of these studies have not focused much on structural cost management. Second, most of the studies on strategic cost management have been done outside the field of accounting. Most accounting studies on executive cost management have addressed cost allocation (i.e. allocation of overhead and common costs, cost incentive analysis, activity-based costing, etc.) and cost accounting (cost deviation, use of cost information for decision making, etc.). Moreover, relatively little accounting research has addressed strategic cost management and its effects on supply chain activity and TMS and their impact on corporate performance. This study focused on three research areas including strategic cost management, supply chain practices, and financial performance.

The strategic cost management literature has mainly focused on executive cost management and failed to address the relationships between strategic cost management with issues such as supply chain performance and activities.

The present study provided evidence that strategic cost management can enable performance analysis properly due to its impact on supply chain practices and TMS. In addition, previous studies on the development and impact of strategic cost management have not taken into account factors affecting performance and have mainly addressed strategic costs in a descriptive and prescriptive manner and neglected their relationship with corporate performance. This study provided good evidence regarding the impact of these types of costs on corporate financial performance.

The present study combined marketing, financial, and strategic management approaches based on mixed linear regression and cross-sectional data analysis and using the models proposed by Henri et al. [34] and Zhao et al. [10] to evaluate the relationship between supply chain practices, strategic cost management, TMS, and financial performance improvement in companies listed on the Tehran Stock Exchange with an econometric approach. It also examined the relationship between variables using a mixed linear regression method and cross-sectional data analysis with SMART-PLS software.

Strategic cost management has a positive effect on the relationship between supply chain practices and intra-organizational, supplier, and customer integration by improving financial performance in terms of sales returns, return on investment and return on equities. Accordingly, policymakers and senior managers of companies are recommended to take effective measures through supply chain practices to improve the financial performance of sales return, investment return, and equity return. These measures include customer benefit analysis, performance index analysis, competitive cost analysis, strategic pricing, value chain analysis, integrated performance measurement, competitor performance appraisal, service costing, and strategic costing.

The present study showed that a U-shaped relationship between strategic cost management, TMS, supply chain practices, and financial performance improvement so that low and medium levels of SCI are more effective and it has a lesser or even negative effect at higher levels. Accordingly, other researchers are advised to evaluate the optimal level of supply chain practices (in terms of integration) to improve financial performance by using mathematical optimization models such as genetic algorithms.

Following the findings of this study, managers and policymakers of companies are recommended to pay special attention to various aspects of strategic cost management and to issues such as operating efficiency, financing and constraints facing the company, selection of partners, and designing the buyer-supplier relationship between buyer-supplier by considering organizational design and managerial support.

# IMPROVING THE MECHANISMS OF STRATEGIC MANAGEMENT OF INNOVATION PROCESSES IN ENTERPRISES

## Annotation:

This article provides feedback on improving the strategic management mechanisms of innovation processes and the implementation of management strategies.

## Keywords:

Industrial enterprises, innovation management, innovation process, raw materials, corporate structure, strategic management.

## Introduction

To ensure the competitiveness of industrial enterprises in Uzbekistan in the global market, the implementation of modern innovative management strategies, especially the radical improvement of organizational and economic mechanisms of processes from primary raw materials to finished products is an important direction. The organization of innovation processes in enterprises with developed corporate relations and the improvement of its strategic management mechanisms are primarily associated with the modernization of production and the widespread introduction of innovative technologies in them. At the same time, the development of the corporate sector of the economy is of great importance in the context of reforms in the field of private property. Consistent implementation of the policy of denationalization and privatization of property, the gradual sale of state assets, the reduction of state participation in the economy, in turn, will create a business environment. At the same time, corporate structures, like other forms of ownership, are formed, and their contribution to GDP is significantly increased. It is worth noting that the normative and legal documents being developed today on the economic development of priority sectors of the national economy, the laws are aimed at the introduction of innovative management in enterprises, further acceleration of innovation processes in economic entities.

## Main part

Factors that allow the relatively efficient implementation of the production process in the innovative management of enterprises are studied. In addition to the special role of the corporate sector in ensuring the competitiveness of the national economy, there are some problems in the development of innovation processes, the solution of which is important not only for the development of the industry, but also for economic stability. These include:

* ineffective mechanisms for the accumulation and mobilization of large amounts of funds required for the implementation of innovation processes in corporate structures;
* Lack of use of domestic and foreign production and technological ties in the gradual replacement of obsolete equipment and technology of joint-stock companies with modern, new means of production;
* low activity of investment projects in enterprises with multi-stage technological processes of production of innovative products:
* Existing problems in providing production with modern equipment and technologies and the introduction of new types of innovative management methods.

In the current situation, the solution of problems related to innovation processes in corporate structures, the introduction of innovative projects in production and the widespread introduction of innovative technologies require the involvement of large investments for the implementation of investment projects of strategic importance. The main source of funding for such large and strategically important investment projects is the placement of corporate securities in financial markets, and many joint-stock companies do not have the expected results due to the lack of guarantees for private property.

With the rapid development of scientific and technological potential in the world, the use of intellectualization factors in production is growing. Therefore, the introduction of innovations has become an important factor in ensuring economic growth and market competitiveness. This, in turn, requires the effective use of advanced scientific developments and technical advances in the field of innovation in all areas, as well as strengthening the competitiveness of the current economic potential. Therefore, today many countries are investing heavily in the development of research and innovation.

It would be expedient to develop and implement measures in a number of stages and directions in the improvement of strategic management mechanisms of innovation processes, which can be expressed in the form of separate stages. Development and improvement of legal, organizational, economic and financial support to improve the innovative environment in corporate structures in improving the strategic management mechanisms of innovation processes, licensing and patenting of proposals for innovative products and solving existing problems in developing innovative ideas and proposals further expands production capacity.

In general, the key factor in determining the sustainable development of the innovative economy at the present time is the formation and development of the country's innovative environment, the creation and use of new production technologies and their subsequent introduction into the market. and implementation.

Hence, the competitiveness of existing firms, enterprises, organizations and corporations depends on the effective functioning of the country's system of antitrust and competitive environment improvement. At the same time, the competitiveness of the national economy is determined by the level of development of private property, its system of state guarantees and the high level of innovation policy and a strong institutional environment in the country.

The above analysis shows that the effective implementation of the stages of implementation of the innovation strategy of the enterprise has achieved positive results in order to increase the competitiveness of business entities, improve their innovative potential. However, the state of the material and technical base of enterprises and the inability of products to compete in the market indicate that there are some problems in the strategic management of innovation processes.

In the strategic management of innovation processes in enterprises it is necessary to pay attention to the following key issues:

First, a number of fundamental sciences in the country have great potential, but the mechanism of activation of this potential in connection with production has not been created (mutual integration of science-education-production);

secondly, the fact that the real sector enterprises remain at a low level of innovation adoption process leads to a slowdown in the demand for advanced technologies in enterprises;

third, the existence of shortcomings in the creation of a favorable business and business environment has a negative impact on increasing the competitiveness of enterprises;

fourth, significant differences between the development of production and management processes due to the lack of mechanisms to ensure the smooth operation of production modernization processes in enterprises

fifth, the lack of guarantees that a safe and effective system for attracting local and foreign investors and managing their financial resources will not meet international standards and that dividends will be accounted for in a transparent, open, transparent and fair manner.

The data show that the failure of some business managers to anticipate changes in national and global markets, to study consumer demand and taste, to determine in which direction the company can achieve a stable competitive advantage in terms of governance leads to failure in competition. According to scientists conducting research in this area, globalization, integration, investment, innovation and competition will affect the development of the world economy in the XXI century. Therefore, the issues raised in this paragraph have been studied from a scientific-theoretical and practical approach to improving the mechanisms of strategic management of innovation processes.

Based on the above analysis and theoretical knowledge, the development of innovative goals, prospects and long-term innovation strategies of the enterprise, its implementation and monitoring of the results will increase the level of competitiveness of the enterprise. As a result, the innovative environment of the enterprise is formed and improved. Therefore, the above considerations show that an important factor in increasing the competitiveness of enterprises is the strategic management of innovation processes. Because the strategy of innovation processes is a set of interrelated measures to achieve the set goals, aimed at strengthening the potential and strength of the enterprise in relation to competitors. This creates opportunities for the right choice of innovative strategy of the enterprise, the effective organization of mechanisms to increase product competitiveness, attracting domestic and foreign investment in production. As a result, conditions will be created to increase the competitiveness of enterprises.

It should be noted that corporate structures have the opportunity to create a high synergistic effect by improving the mechanisms of strategic management of innovation processes. As a result, risk pooling measures will be developed and the expected losses in production will be reduced. It is obvious that the effective management of innovation processes in corporate structures requires a systematic socio-economic analysis of quantitative and qualitative indicators of corporate structures. Also, based on the results of systematic analysis, innovative development strategies of the enterprise will be developed.

Assessment of the country's sectoral and sectoral capacity in the development of strategies for the formation and development of innovation processes, identification of innovative potential of industry, identification of innovative priorities of the economy leads to significant qualitative changes in production

Thus, the improvement of strategic management mechanisms of innovation processes in corporate structures will not only increase production and management efficiency, but also significantly increase the level of implementation of innovative and investment projects and improve the conditions of innovative activity.

One of the important elements of modernization and increasing the competitiveness of the national economy is an innovative approach to production and services. As a result, the interaction of economic entities based on different forms of ownership is formed under the influence of a competitive environment.

The process of formation of an innovative economy in Uzbekistan is based on the gradual implementation of economic reforms and the consistent, effective renewal of products and services through the application of knowledge, economy and science-based economy. Also, the acceleration of the introduction of innovative approaches to the economy, modernization, technical and technological renewal of production and services will increase the production of competitive products in domestic and foreign markets.

Research shows that the strategic management of innovation processes in the regions should focus on the following key issues:

First, our country has a great potential in a number of fundamental sciences, but there is no mechanism for the implementation of this potential in connection with production;

secondly, the fact that the real sector enterprises remain at a low level of innovation adoption process leads to a slowdown in the demand for advanced technologies in enterprises;

third, the existence of shortcomings in the creation of a favorable business and business environment has a negative impact on increasing the competitiveness of enterprises.

Based on the above analysis and theoretical knowledge, the development, implementation and monitoring of innovative goals, prospects and long-term innovation strategies of the enterprise operating in the regions will increase the level of competitiveness of the enterprise. As a result, the innovative environment of the enterprise is formed and improved.

## Conclusions

Based on the above considerations, in our opinion, special attention should be paid to the strategic management of innovation processes in Uzbekistan:

* Rapid development of the process of applying innovations in production, services and education;
* providing ample opportunities for the import of new technologies, information and communication devices, means of production and modern management methods from foreign countries;
* Ensuring the short-term training of young professionals in developed countries in order to launch the production of goods and services that meet international standards;
* It will be necessary to develop economic, financial, organizational, managerial and legal instruments of state support in the implementation of programs for the development and implementation of the national innovation system.

Such circumstances determine the prospects for the establishment of innovative production in the country, the modernization of the national economy and the efficient use of local raw materials, increasing export opportunities.

# IMPLEMENTATION OF FINANCIAL STRATEGY BUSINESS PLAN ARENA CORNER

**ABSTRACT:**

In today's increasingly tight and high-speed sports *startup* industry, companies need to create and plan financial strategies, especially investment strategies. This meets the funding needs and economic needs to compete in the startupecosystem, the Sports*, Venuestartup.* To capture this financial strategy, the company must have added value in the financial investment planning of PT Arena Corner Indonesia as a company that owns arena *corner* brand products. Good financial strategy to be able to compete with competitors in the market. So, to survive, this company must focus on business activities and processes by concentrating on product development and financial efficiency to maintain the company's sustainability. Therefore, our initial business Financial Strategy Method focuses on calculating the value of an investment by calculating the IRR, NP, V, Return on Investment (ROI), and payback *period* of this business plan. To determine the feasibility of this business, it is necessary for financial strategy feasibility investment appropriate and quality and always follow the development of the times. The Conclusion that the Sports *Venue* Business plans and executes is profitable and feasible to get the right investors*.*

**KEYWORD -***Financial Modelling, Strategic Financial, Business Plan, Arena Corner*

# INTRODUCTION

The development of the world of sports today is very rapid with the rise of *venues* and sports equipment that began to mushroom in various Indonesia locations, one of which is Jakarta. In sports, especially in Jabodetabek, there are currently a variety of sports facilities, both sports conducted in groups and sports activities conducted individually. Based on data from BPS (2018), DKI Jakarta is currently the location of group sports. There are 139 places to rent football fields, 229 futsal courts and 247 badminton courts, 174 tennis courts, 155 basketball courts, and 196 volley *courts*. While sports are conducted individually, there are 230 fitness sports locations, 165 yoga studios, 160 Zumba studios,97 swimming pools, 17 driving *golf,* andten0 bowling locations. (BPS data, 2018). Technology from developing a *smartphone* application still much needs the data we see in the Central Bureau of Statistics (BPS). In 2015, the number of regular exercises had not reached one-third of the total population. Only7.61 percent of Indonesians sport at least once a week. This means that out of 100 Indonesians agedten0 years and above, only about 28 actively participate in sports activities, while 72 others do not exercise regularly (BPS, 2018). And according to the APJII survey (2020), from the total population of Indonesia of264.16 million people in 2018, as many as 171.17 million people or more than 64.8% percent of the population of Indonesia has used the internet, an increase of more than 10 million people compared to 2017 (APJII, 2020).

From the data, today, there are still few who use digital media in the use and booking and reservation of sports venu*es,* so this becomes an opportunity for Arena *Corner* to make a pioneering Star *up Sports venue.* Digital technology in sports has not been so interesting such as Marketplace and startup stubs such as gojek, *halo doc,* Ruang Guru. And so, the prospects are still wide open. Technology from the development of a smartphone application *sports venues* is still much needed. This is seen from the many sports interests that began to increase in DKI Jakarta. *As* one of *the mobile* digital platforms, Arena Corner is trying to enter this segment to bridge the needs of group sportsmen and individuals in meeting the needs of sports venues in DKi Jakarta. The progress of this Startup is strongly supported by working capital needs, where working capital management directly affects the profitability and liquidity position of the company also confirms the important role of working capital (Sutjiadi et al., 2020).

Arena *Corner* development pioneer requires working capital needs and funds from investors as part of the continued development that Arena Corner will implement*, so* Arena Corner must conduct Investment Analysis for investors for this business to get additional working capital. Four methods will be used in this study, the first using the Payback Period (PP) Method, the second using Net Present Value (NPV), the third is Return on Investment (ROI), and the last is Internal Rate Return (IRR) which is used to calculate income interest rates (Gammanpila et al., 2012; Solomon, 2013; Winantara et al., 2014). For Investors, it is very important to know and study the Potential of the Startup (Prihambodo et al., 2020).

Furthermore, the purpose of this feasibility analysis is comprehensively enough to use Present Net Value (NPV), Internal Rate Return (IRR), Return on investment (ROI), and Payback Period (PP)(Marsiwi et al., 2019). Using these four methods can indicate financially or financially unfeasible business feasibility (Kim et al., 2013; Kangotra, 2013). So, from the existing development, researchers try to research the research theme **"Implementation of Arena Corner Business Plan Financial Strategy” so** that it is expected that this analysis can guide investors to assess the feasibility of investment in *Arena Corner.*

## LITERATURE REVIEW

While *the* definition of digital Star up according to Ries (2011), is a group of individuals who create and sell new products or services on erratic market dynamics in search of the right business model so that startups face changing market conditions with a very high level of uncertainty. This is what distinguishes Star *up* from the company. Based on the understanding, according to Brikman (2015), Digital Star *up* is a group of individuals who form the organization as a start-up company that produces products in the field of technology. By utilizing internet technology in an all-digital age, Startups must be ready to enter the free market on the internet that can reach all consumers in expanding market share by expanding the market massively. So, it is not uncommon for Star to disrupt large-scale technology from conventional models into digital forms that can be accessed without space and distance limits. This is the basis of Star *up* has targeted for massive consumer growth at the beginning of its launch (Fisher et al., 2015).

*The payback period* is the most common method used by businesses to measure the length of investment funds reinvested as before. Therefore, the calculation results are expressed in units of time, i.e., years or months. The faster the return period on investment, the smaller the investment risk and the investment project are worth running. On the contrary, the longer the return on investment risk, the greater, and the investment project is less feasible/unfit to run (Harmono, 2016).

*Net Present Value* (NPV) is a net financial assessment in the company after being reduced by other costs. The value-added or lack of money of existing companies can be used as a reference to assess whether or not the company's finances are appropriate.

IRR, or Internal Rate of Return, is an evaluation instrument used to decide whether a capital owner wants to invest or not. The IRR > the required profit level, the project is accepted, but when the IRR < the required profit level, the project is rejected.

*Return on Investment* (ROI) is a ratio measuring the company's success in generating shareholders' profit and loss. Therefore, ROI is considered a representation of shareholder wealth or company value. Let's look at the existing ROI trends. The company, in generating profits for shareholders, experienced a noticeable increase in the value of ROI ratio (Harmono 2016).

## METHOD

In conducting business investment feasibility analysis, PT Arena Corner Indonesia using several methods of calculating feasibility. The value of Net Present *Value* (NPV) is a net financial cash flow. Understanding Net *Present Value* (NPV) in Net Present *Value* (NPV) calculation activities in a company needs to be done by competent corporate financial personnel. This is because miscalculation of existing values can affect the large level of profit revenue in the company. *Net Present Value* (NPV) can be linked to the company's funds summed when the existing funds are no longer mixed with investment funds. This can be attributed to the total net capital earned by the company with added net profit (Syamsuddin, 2011). Therefore, *Net Present Value* (NPV) is defined as a financial analysis used to determine whether or not the efforts made by the company are seen through the present value of net cash flow to be received by the company in question compared to the present value of the investment capital issued by the company. This is the company's financial analysis reviewed according to investment expenditures conducted by the company (Pinson, 2008) (Harmono 2016). The Net *Present Value* (NPV) method is used to see the difference between receipt and the investment value.

IRR is more an indicator of the efficiency of an investment than an NPV, which indicates the value or amount of money. IRR is an effective compounded return rate annually generated from an investment or yield of an investment. A project/investment can be made if the rate of return is greater than the return received if we invest elsewhere (banks, bonds, etc.). So IRR should be compared with other investment alternatives. IRR has a weakness where IRR is commonly used for decision-making for single projects instead of mutually exclusive projects. The NPV criteria are more dominantly used for mutually exclusive projects where projects with larger NPVs will be selected despite having a smaller IRR. From the chart, a project will probably have several discount rates that make the value of NPV = 0 (there are a negative net income in-between years of positive net income), so that the IRR value can be more than one or we are faced with several choices of IRR values. In terms of reinvestment, IRR also has drawbacks, so that Modified *Rate of Return (*MIRR*)* is issued. Although NPV is academically more dominantly chosen, surveys indicate that executives prefer IRR over NPV. This is because managers or owners of capital are easier to compare investments/projects of different sizes in the form of % rate of return (IRR) compared to the amount of money (NPV) (Harmono, 2016).

The *Payback Period* method is used to view the period of return of capital that has been issued. The payback Period method is needed to recoup investment expenditures (initial cash investment) using cash flow. In other words, the *Payback Period* is a ratio between initial *cash investment* and *cash flow which* is a unit of time. This method has a drawback: ignoring the time value of money (time value of money). To overcome one of the disadvantages of the *Payback Period*method, which is not paying attention to the money's time value, try to improve the method by changing the cash inflow to the present value of the investment plan and then just calculated the *Payback Period.* Thus cash flow used is cash flow that has been discounted based on *interest rate*

*/ required rate of return* or *opportunity cost* (Karaini, 2000).

*Return on Investment* (ROI) in Arena *Corner* is a ratio measuring the success of Arena Corner in generating profit and loss in a period of 5years. Thus, Arena Corner ROI is a representation of arena corner wealth as well as arena corner company value. If we look at the existing ROI trends, then companies in generating profits for shareholders experienced a noticeable increase in the value of ROI ratio. (Harmono 2016).

## RESULT

In performing NPV and IRR calculations PT Arena Corner uses three parameters pessimistic, normal, and optimistic, as follows:

Table 1. *Net Present Value*

In *the* table, Net Present Value Optimistic conditions are calculated using traditional accounting in the 10th year appeared NPV results (149,998,595,974) positive and IRR also positive (4 %), so it can be concluded that this business is increasing the user and the number of downloads arena corner application so it is worth to run, this needs to be compared with the calculation of user valuation of arena *corner application*. (Harmono 2016). In the table, *Net Present Value* normal conditions are calculated using accounting in the 5th year visible NPV results (156,654,395,363) positive and IRR also positive (4 %), so it can be concluded that this business is in the medium of increasing the user and the number of downloads arena corner application and worth to run, this needs to be compared with the calculation of the valuation of the arena *corner* application user. (Harmono 2016). In the table, *Net Present Value* optimistic condition appears NPV results from 7.816. 675. 762 positive and IRR is also positive 80%, so it can be concluded that this business is worth running. (Harmono 2016). Looking at all the calculation results above, it can be concluded that the feasibility of this digital startup business is not only seen using traditional accounting calculations but must also be compared with user valuation calculations.

## Payback Period

Table 2.*Payback Period*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OPTIM** | **IS** |  | |  | | **NORM** | **AL** |  | |  | | **PESIMI** | **S** |  | |
| YEAR | NET PROFIT | BALANCE | |  | | YEAR | NET PROFIT | BALANCE | |  | | YEAR | NET PROFIT | BALANCE | |
| 1 | 1.795.661.800 | - | |  | | 1 | (1.581.249.763) | - | |  | | 1 | (5.914.370.075) | (5.914.370.075) | |
| 2 | 3.533.147.050 | 3.533.147.050 | |  | | 2 | (181.455.669) | (181.455.669) | |  | | 2 | (4.947.888.013) | (10.862.258.088) | |
| 3 | 5.275.697.853 | 8.808.844.903 | |  | | 3 | 739.634.863 | 558.179.194 | |  | | 3 | (5.178.440.715) | (16.040.698.803) | |
| 4 | 50.108.660.418 | 58.917.505.321 | |  | | 4 | 45.073.991.128 | 45.632.170.322 | |  | | 4 | 38.496.607.992 | 22.455.909.189 | |
| 5 | 105.881.220.811 | 164.798.726.132 | |  | | 5 | 100.289.084.592 | 145.921.254.914 | |  | | 5 | 92.972.963.143 | 115.428.872.332 | |
| PAYBACK PERIOD 2,4 | | |  | | PAYBACK PERIOD 3,2 | | | |  | | PAYBACK PERIOD 3,3 | | | |

Based on the calculation in Table 2 of the investment Assessment, the *Payback Period* is the optimistic condition of the PT application business investment project. Arena Corner Indonesia 5 years explains that a period of 2 years four months is favorable for investors. (Harmono 2016). Based on the calculation in Table 2 of Investment Assessment, the *Payback Period* is the pessimistic condition of the PT application business investment project. Arena Corner Indonesia 5 years, in the calculation of traditional accounting then this business for 3.3 years for payback, explains that the period of 3 years three months is a favorable condition for investors (Harmono 2016). Based on the calculation in Table 2 of Investment Assessment, the *Payback Period* is a normal condition of PT application business investment project. Arena Corner Indonesia 5 years, in accounting calculations, this business is worth running with 3.2 years for the payback period. This explains that a period of 3 years three months is a favorable condition for investors. (Harmono 2016).

## Return of Investment

Table 6.*Return of Investment*(ROI)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **OPTIMIS** | |  | **NORMAL** | |  | **PESIMIS** | |
| Net Margin | 26.470.305.203 | Net Margin | 25.072.271.148 | Net Margin | 23.243.240.786 |
| Total Investment  ROI | 6.269.510.014  24% | Total Investment  ROI | 6.269.510.014  25% | Total Investment  ROI | 6.269.510.014  27% |

In *the table Return of Investment* (ROI), optimistic conditions appear that the positive average percentage of 24 percent over five years of investment explains that the business is quite attractive for investors to make investments with calculations based on financial analysis. In *the Table return of Investment* (ROI), normal conditions appear that the positive average percentage of 25% percent during the five year investment period, this explains that the business is attractive enough for investors to make investments with calculations based on financial analysis, In the table Return of Investment (ROI) pessimistic conditions appear that the positive average percentage of 27 percent over five years of investment, this explains that the business is quite attractive for investors to make investments with calculations based on financial analysis (Harmono 2016).

## CONCLUSION

The Final Conclusion that the Sports *Venue* Business is planned and executed using Present Net Value (NPV) on the optimized three parameters, normal and pessimistic, are still in the positive category and worth carrying out, In the analysis of Internal Rate Return (IRR) method also in 3 parameters Optmis, normal and pessimistic also showed a positive value, Return on Investment (ROI) also showed a positive value with an average of above 20%. At the same time, the Payback Period (PP) of this business also showed a positive value with a payback of 2 years four months to be optimistic up to 3 years three months at a pessimistic condition. Overall, this analysis provides good information to investors to be able to provide their investments to Arena Corner. In addition, for further research, it is necessary to examine other fundamental factors that impact investor interest in investing in Arena Corner.

# Exploring Critical Success Factors of Competence-Based Synergy in Strategic Alliances: The Renault–Nissan–Mitsubishi Strategic Alliance

## Abstract:

This paper aims to unbundle the antecedents of competence-based synergy in the strategic alliance formation process by employing the ARCTIC framework. The current research provides a new empirical application of the ARCTIC framework to reveal the success factors of reciprocal synergies of the Renault–Nissan–Mitsubishi strategic alliance in the automotive industry. By taking a resource-based view on the sources of competitive advantage, the current paper contributes to theoretical and practical issues of global strategic alliances as part of the existing literature on strategic management, international business, and corporate finance. By bridging qualitative and quantitative research methods, the paper provides validity to the ARCTIC framework with an application of the real option valuation. A conceptual model of research helps practitioners and scholars to explore critical success factors of alliance formation and to predict a competence-based synergy of strategic alliances. Future research may explore the institutional context of strategic alliances, specifically, exploring the impact of the French and Japanese governments on the Renault–Nissan–Mitsubishi alliance’s synergies.

**Keywords**: strategic alliance; core competence; the ARCTIC framework; synergy; real options

## Introduction

This paper aims to operationalize and test the ARCTIC framework to assess the prerequisites of competence-based synergy in the strategic alliance’s formation process and to employ real options application to value such types of synergies. (Chirjevskis and Joffer 2007) provided the ARCTIC framework (A—Advantage, R—Relevance, C—Complexity of Competence to absorb, T—Time of Integration, I—Implementation Plan, C—Cultural Fit) to explore compatibility, complementarities, and transferability of core competencies of the collaborative partners and to predict competence-based synergy in M&A deals and strategic alliances. The ARCTIC framework was already tested empirically, employing several case studies of M&As (Cirjevskis ˇ 2020a, 2020b, 2020c, 2021a), however, it has not been sufficiently tested through studies of strategic alliances. The current research explored the prerequisites of a competence-based synergy in strategic alliance and identified three steps for investigating whether core competence transfer in a strategic alliance process would be an important source of synergies.

The motivation of the current research is as follows. Previously published research papers on the ARCTIC framework (Cirjevskis ˇ 2020a) were expertise by stating that the author has shown the empirical evidence supporting the applicability of the ARCTIC framework based on the author’s perception of the firm’s competencies. Hence, it would be more persuasive with evidence of post-merger deals performances. Furthermore, it was argued that, based on the types of M&A (horizontal or vertical integration) and other forms of collaborative strategies (strategic alliances, cooperative arrangements, etc.), the applicability of the ARCTIC model can be different.

The current study and, specifically, the ARCTIC framework, contribute to the gaps in the literature in two ways. First, the resource-based view (RBV) and value-rarity- imitability-organization (VRIO) method encouraged users to evaluate resources relative to competitors ([Knott](#_bookmark57) [2015](#_bookmark57)) but not to business partners. RBV still demonstrates “reasonably lacking an understanding of how firms’ resources and capabilities truly play a role on M&A” ([Ferreira et al.](#_bookmark35) [2016](#_bookmark35)), or other types of competitive strategies such as strategic alliances and cooperative arrangement ([McGee et al.](#_bookmark71) [1995](#_bookmark71); [Child et al.](#_bookmark18) [2019](#_bookmark18)). That is because the RBV has “a tendency to elicit static and inward-looking descriptions that are insufficiently geared to future-focused decisions” ([Lockett et al.](#_bookmark63) [2009](#_bookmark63); [Knott](#_bookmark57) [2015](#_bookmark57), p. 1816).

Prior RBV studies paid relatively little attention to the subject of synergy and did not directly consider the assessment of potential synergy effects in a collaborative type of strategy ([Błaszczyk](#_bookmark14) [2018](#_bookmark14)). In this vein, the ARCTIC framework contributes to the first gap extending the VRIO model and adding practical tools for the analyses of complementarity, compatibilities, and transferability of idiosyncratic (VRIO) resources of business partners in search of reciprocal competence-based synergies.

Second, the “strategic fit” concept suggests that the recombination of heterogeneous (VRIO) resources and their relatedness between collaborative partners creates a synergy potential—a key determinant of value creation ([Gomes et al.](#_bookmark38) [2013](#_bookmark38)). However, failure to find a consistent relationship between synergy potentials of strategic fit and collaborative performance has led researchers to recognize that “organizational fit” between companies’ in the post-deal (integration) phase might be the main determinant of overall business partners’ performance ([Weber and Fried](#_bookmark93) [2011](#_bookmark93)).

In this vein, the ARCTIC framework contributes to the second gap by integrating the assessment of “strategic fit” with the “organizational fit” of collaborative strategies in a single analytical tool to assess the prerequisites of collaborative synergies ([Feldman and](#_bookmark34) [Hernandez](#_bookmark34) [2021](#_bookmark34)). Therefore, the study contributes to the “strategy as practice” interest of the Strategic Management Society (SMS) with a fresh piece of empirical research on the synergism of “strategic fit” and “organizational fit,” together with the ARCTIC framework. To develop and test the ARCTIC framework to explore the prerequisites of managerial synergy in strategic alliances, the chosen object of the current research is one of the longest partnerships in the automotive industry since 1999, namely, Renault–Nissan–Mitsubishi. Even though the first Renault and Nissan alliance experienced several challenges at the beginning, such as the skepticism of the industry experts, cultural differences, and the global financial crisis of 2008, more than twenty years after its formation, the alliance ranked among the top-three largest car manufacturers worldwide and became a leader in electric car vehicles. Renault’s Zoe was the best-selling electric car in Europe in 2020, beating the Tesla Model 3 to second place ([Statista](#_bookmark89) [2021](#_bookmark89)).

The motivation to research the Renault–Nissan–Mitsubishi alliance was as follows. Before the Renault–Nissan alliance was established, the concept of a strategic alliance was relatively uncommon in the automotive industry ([Kreutzer and Pfeffer](#_bookmark59) [2019](#_bookmark59)). It should be noted that the success of the Renault–Nissan–Mitsubishi alliance insisted that other global automotive players make provisions on forming alliances to reach their ambitious goals, such as the GM–Fiat alliance ([Kreutzer and Pfeffer](#_bookmark59) [2019](#_bookmark59)) and VW–Ford alliance ([Klayman](#_bookmark56) [and Schwartz](#_bookmark56) [2019](#_bookmark56)).

Moreover, several strategic attempts by carmakers to ally demonstrated well-documented failures. Among others, culture clashes of Daimler–Chrysler when Stuttgart engineers were reluctant to work with their US colleagues and their resultant divorce in 2007. The presence of the demanding partner, when Peugeot and Fiat’s negotiation on an alliance in 2009 was foundered, “in part, because of the reluctance of the Peugeot family to cede control” ([Reed](#_bookmark80) [2012](#_bookmark80), p. 1). The partnership of Volkswagen and Suzuki that targeted India and aimed to produce small cars together also came unstuck in 2011.

Therefore, to unpack the “black box” of antecedences of long-term success in terms of competence-based synergies generated in past and looming challenges in the future of the Renault–Nissan–Mitsubishi alliance, the author asked a research question: how to explore the prerequisites of competence-based synergies in strategic alliances in the automotive industry and value these synergies employing real options?

To answer the research question, the paper is organized as follows. In the beginning, it explores the significance of the core competence concept for strategic alliance success and sources of synergies. Then, the author selected the inductive case study of one of the most successful strategic alliances in the automotive industry, namely, the Renault–Nissan– Mitsubishi partnership, to test the newly developed ARCTIC framework for strategic alliances (A—Advantage, R—Relatedness, C—Communication, T—Trust, I—Integration Plan, C—Cultural Fit) empirically. Next, the paper contributes to interdisciplinary research by bridging core competence theory and real options theory in a holistic synthesized view. At the end of the paper, the author discusses theoretical and empirical findings, limitations, and future work.

## Literature Review

*Resources, Capabilities, and Core Competencies*

The theoretical foundation of the current paper is ([Penrose](#_bookmark77) [1959](#_bookmark77)), intellectual contribu- tion to a resource-based view on the competitive advantage of a corporation. Penrose’s theory of firm growth viewed the corporation as the bundle of capabilities and resources that were administrated by the management of a firm. ([Penrose](#_bookmark77) [1959](#_bookmark77)) argued that a firm’s resources are efficient in current uses, whereas unused resources become available for further growth. Later, ([Penrose](#_bookmark77) [1959](#_bookmark77))’s “resources approach” to the growth of the firm gave way to the modern resource-based view (RBV) on sources of competitive advantages in the 1980s and 1990s ([Kor and Mahoney](#_bookmark58) [2000](#_bookmark58)). Prahalad and Hamel defined core compe- tence as a central value-creating capability of an organization ([Prahalad and Hamel](#_bookmark78) [1990](#_bookmark78)). ([Markides and Williamson](#_bookmark69) [1996](#_bookmark69)) defined the core competencies of a company as catalysts for the efficient exploitation of strategic assets.

One more seminal paper on core competencies should be mentioned. This is ([Barney](#_bookmark10) [1996](#_bookmark10))’s VRIO framework for the analysis of resources, capabilities, and core competencies. According to Barney, each competence can be a source of sustained competitive advantage only if it creates value (V), is unique and rare (R), is hard to imitate or substitute (I), and the focal company has reporting structures, formal and informal management control systems, hiring and retention policies, and compensation policies, allowing the company to exploit and organize (O) this competence. ([Barney](#_bookmark10) [1996](#_bookmark10)) states that core competencies should be analyzed in terms of their ability to produce valuable and unique synergies and bring a competitive advantage to the company.

According to ([Barney](#_bookmark10) [1996](#_bookmark10)), organizational issues (O) such as a firm’s reporting structure, management controls, and incentives enable a firm to realize the full potential of its competencies. However, the core competencies transfer in the strategic partnership in the search of synergy is a much more complex process than the firms’ reporting structures and managerial control systems. Moreover, according to ([Sanchez](#_bookmark84) [2008](#_bookmark84)), RBVs failed to provide a consistent basis for explaining which firm resources are currently strategically valuable ([Sanchez](#_bookmark84) [2008](#_bookmark84)).

[Priem and Butler](#_bookmark79) ([2001](#_bookmark79)) argued that the main problem here lies in the RBV’s indefinite notion of value. The current paper argues that the resources of a strategic alliance’s partners are valuable if they can provide a new integrated customer value proposition, underpin new core competencies of a newly integrated company, and provide a competence-based synergy that can be measured by real options application. Moreover, Sanchez argues that the RBV is unable to explain how a firm’s resources and ways of using resources differentially contribute to the firm’s ability to create strategic value ([Sanchez](#_bookmark84) [2008](#_bookmark84)).

Recently, ([Wong and Ngai](#_bookmark94) [2021](#_bookmark94)) have developed a conceptual model to illustrate the impact of business competence on sustainable firm performance. Their multiple-case study research has found that “numerous articles have focused on the antecedents or enablers of business competence, which consists of organizational competence, economic competence, and environmental competence” ([Wong and Ngai](#_bookmark94) [2021](#_bookmark94), p. 441). However, very few articles focused on how competencies of different business partners can generate competence-based synergies which pursue a collaborative type of strategic development. In this vein, the current paper argues that it is not enough to outline the core competencies of strategic alliance partners. Their core competencies should be investigated through the lens of a research question: do they work together?

[Lin and Darnall](#_bookmark61) ([2015](#_bookmark61)) argue that the competency-oriented alliances are motivated by complementary resources, organizational learning, and knowledge creation that affect alliance performance in terms of technology development, knowledge creation, and a host of other factors among which there were no competence-based synergies. Thus, the current paper is asking next how to explore the prerequisites of competence-based synergies in strategic alliances.

*Exploring the Prerequisites of Competence-Based Synergy of Collaborative Strategies*

A strategic alliance is a purposive relationship between independent firms involving them in the sharing and co-development of resources and competencies to achieve mutually relevant benefits ([Kale and Singh](#_bookmark52) [2009](#_bookmark52)). Specifically, firms establishing strategic alliances obtain useful external resources and competencies to maximize market opportunities and minimize the impact of threats ([Mamédio et al.](#_bookmark68) [2019](#_bookmark68)). Thus, the creation of strategic alliances can be viewed as hybrid and plural sourcing of core competencies shaping competitive advantages of collaborative firms ([Serrano et al.](#_bookmark88) [2018](#_bookmark88)). However, the process of transforming external resources and competencies into a competitive advantage is, in fact, a complex one which is confirmed by the high rates of failure of established alliances ([Helfat et al.](#_bookmark43) [2007](#_bookmark43)).

The strategic alliance as a new business collaboration is justifiable only if it builds long-term market value-added by building a synergistically combined partnership. The strategic fit between collaborating companies exists when one or more activities comprising their respective value chains present opportunities to generate managerial synergy. ([Meyer](#_bookmark72) [and Altenborg](#_bookmark72) [2008](#_bookmark72)) argue that strategic fit is an indicator of the synergy potential of a transaction. Taylor argued the most significant factors affecting alliance success are the openness of the alliance partners, human resource practices, and partners’ learning capability and adaptability during implementation ([Taylor](#_bookmark90) [2005](#_bookmark90)).

Recent research by [Hao et al.](#_bookmark42) ([2020](#_bookmark42)) has shown that a strategic alliance as a business partnership relates to different types of synergistic effects: explicit and tacit. While explicit synergy emerges when business partners share complement assets or technologies ([Zaheer](#_bookmark97) [et al.](#_bookmark97) [2013](#_bookmark97)), a tacit synergy can be pursued when business partners’ knowledge bases spur joint learning and inspiring innovation that could not be predicted upfront ([Baum et al.](#_bookmark12) [2010](#_bookmark12)). In the last, business partners’ core competencies can be integrated into new products development, and thus reframing their thinking modes, adding market value ([Hernandez and](#_bookmark45) [Shaver](#_bookmark45) [2019](#_bookmark45)). For instance, ([Hao et al.](#_bookmark42) [2020](#_bookmark42)) argued that when automobile manufacturers ally “to adopt each other’s core parts,” they pursue an explicit synergy, whereas by synthesizing automobile technologies and rechargeable batteries, the tacit synergy “can reframe their way of thinking of how an automobile can be powered” ([Hao et al.](#_bookmark42) [2020](#_bookmark42), p. 434).

To determine whether an alliance can create more synergies, ([Kittilaksanawong and](#_bookmark55) [Palecki](#_bookmark55) [2015](#_bookmark55)) used the following criteria’s model: “new technology, affordability, flexi- bility/responsiveness, and localization/adaptation”. However, human factors such as leadership, trust, communication, and cultural compatibility were missed in the model. For instance, ([Rodrıguez-Sanchez et al.](#_bookmark82) [2018](#_bookmark82)) argue that human resource management (HRM) issue is a key factor in collaborative strategies’ success and synergies. A lack of HR manage- ment explains why 50% of strategic partnership processes do not create the expected value for stakeholders in the first 18 months following the agreement ([Rodrıguez-Sanchez et al.](#_bookmark82) [2018](#_bookmark82)). ([Marks and Mirvis](#_bookmark70) [2011](#_bookmark70)) also found that one of the causes of the failure of collabora- tive strategies related to HRM is the integration problem due to cultural incompatibility.

Among other antecedents of failure, there is a lack of leadership during the process ([Rodrıguez-Sanchez et al.](#_bookmark82) [2018](#_bookmark82)) and mutual trust ([Taylor](#_bookmark90) [2005](#_bookmark90); [Cullen et al.](#_bookmark28) [2000](#_bookmark28)), and

communication deficiencies that lead to problems of motivation, abandonment, or absen- teeism ([Drori et al.](#_bookmark30) [2011](#_bookmark30)). Entering the alliance with a lack of trust will almost inevitably lead to failure ([Taylor](#_bookmark90) [2005](#_bookmark90)). Trust affects inter-partner cooperation allowing more energy to be directed towards long-term goals of mutual benefit ([Cullen et al.](#_bookmark28) [2000](#_bookmark28)). Thus, the generation of a certain atmosphere of trust should take place to provide core competency sharing during the effective alliance formation. Moreover, Kanungo argues that the success of an alliance is largely based on sharing the goals, trust, open and interactive communi- cation, and teamwork ([Kanungo](#_bookmark53) [2015](#_bookmark53)). ([Agrawal et al.](#_bookmark8) [2010](#_bookmark8)) also highlighted the role of communication as a motivational solution in strategic alliances.

What is more, trust plays an important or even dominant role in maintaining commu- nication in successful alliances ([Kanungo](#_bookmark53) [2015](#_bookmark53)). ([Cullen et al.](#_bookmark28) [2000](#_bookmark28)) argued that mutual trust and commitment are critical success factors of strategic alliance management. Al- liance partners should pay more attention to operational integration issues as an alliance evolves to achieve successful cooperative relationships ([Taylor](#_bookmark90) [2005](#_bookmark90), p. 469). Moreover, ([Kanungo](#_bookmark53) [2015](#_bookmark53)) argues that strategic alliances’ crucial attributes to thrive are “sharing competence, trust, complimenting the resources, communicating expressly, and building collective working teams” ([Kanungo](#_bookmark53) [2015](#_bookmark53), p. 120). Finally, ([Fainshmidt and Frazier](#_bookmark32) [2017](#_bookmark32)) recently found that climate for trust has a direct relationship with a competitive advantage of the firms.

Thus, synergies in strategic alliances are a function of strategic compatibility, com- plementarities, and transferability of core competencies that are fostered by the internal advantages (A) and external relevance (R) of core competencies of partnership compa- nies and are underpinned by open and interactive communication (C), mutual trust and commitment (T), an integration plan of core competencies (I), and cultural compliance of business partners (C). Therefore, the literature review has distinguished six critical success factors (the ARCTIC framework) in generating competence-based (reciprocal) synergy in strategic alliance management.

*The Competence-Based Synergy Testing in Strategic Alliances with the ARCTIC Research Framework: An Approach and an Application*

To create a managerial synergy in strategic alliances, the core competencies of collabo- rating companies should satisfy six critical success factors of the ARCTIC framework. Of course, each criterion, given in question form, is to be explained at length:

A—Internal Advantage—if core competencies of business partners are mutually complementing each other and can be jointly developed further, sustaining competitive advantage ([Hitt et al.](#_bookmark46) [2009](#_bookmark46); [Bauer and Matzler](#_bookmark11) [2014](#_bookmark11)) and providing synergy, then the answer is “Yes”. If competencies are based on complex technologies and sophisticated know-how, it would be difficult for the other partners to absorb and exploit. The absorption capacity is a variable closely linked to cooperation agreements and the transferability of core competencies between partners ([Guisado-González et al.](#_bookmark39) [2018](#_bookmark39)). The answer to the internal advantages is “No” if core competencies are complex and inappropriate for fast absorption by the other partners ([Hitt et al.](#_bookmark46) [2009](#_bookmark46); [Bauer and Matzler](#_bookmark11) [2014](#_bookmark11)); this would hamper competence-based synergy. Moreover, the answer is also “No” if core competencies are not difficult to copy by competitors. There is no rationale behind the alliance.

R—External Relevance—it is not enough if core competencies of business partners are unique and rare, such as technological advancement, R&D activities, quality assurance, etc.; they should be valuable to current and future customers ([Barney](#_bookmark10) [1996](#_bookmark10); [Bauer and Matzler](#_bookmark11) [2014](#_bookmark11)). Moreover, if the joint core competencies of collaborative partners are providing a new customer value proposition, extend geographic coverage and distribution network, enhance the economy of scale, and increase purchasing bargaining power, then the answer is “Yes”.

C—Open and interactive communication. If internal and external communication, as well as the communication language, have been adopted by collaborating companies and have been planned and communicated to all employees, the answer is “Yes”. In turn, ineffective communication is one of the causes of hostilities and spite that might destroy an alliance’s synergies. “Any ineffective communication may jeopardize alliances where the defining characteristics of communication have been misinterpreted” ([Kanungo](#_bookmark53) [2015](#_bookmark53), p. 122). Thus, if there are communication deficiencies in a strategic alliance and the communication plan between deal teams and leaders has struggled or failed, the answer is “No”. This is the third critical success factor of the competence-based synergy potential in strategic alliances.

Trust and commitment. Trust is essential to the successful operation of the partner companies, as it is a significant element in a social and economic exchange where coop- eration, as well as commitment and communications, are important ([Savolainen](#_bookmark85) [2008](#_bookmark85); [Jacquemod](#_bookmark51) [2020](#_bookmark51)). Trust conveys positive expectations about a partner’s intentions and behaviors ([Connelly et al.](#_bookmark27) [2012](#_bookmark27); [Jacquemod](#_bookmark51) [2020](#_bookmark51)). ([Jacquemod](#_bookmark51) [2020](#_bookmark51)) argues that trust is a crucial factor in the cooperative process as the quality of dyadic relationships echoes throughout the entire organization. If leaders of partnership companies develop effective interpersonal relationships, which are based on mutual reciprocity, respect, and loyalty, the answer is “Yes”. Trust must cascade through the whole organization, otherwise alliance work becomes ineffective. Consequently, if there is a lack of generation of a certain atmo- sphere of trust to provide core competency sharing during the effective alliance formation, the answer is “No”.

I—An integration plan for core competencies. Scholars argue ([Hitt et al.](#_bookmark46) [2009](#_bookmark46); [Bauer](#_bookmark11) [and Matzler](#_bookmark11) [2014](#_bookmark11)) that an effective and efficient integration plan of collaborative partners is a must for sustaining long-term success. If the partners have a focused plan that everyone understands and believes in, then the answer is “Yes”. The answer is “No” if there is no integration plan.

C—Cultural compatibility of business partners. Organizational and national culture misfit of foreign partners can create an enormous number of problems and destroy the value of one of the partners ([Chirjevskis and Joffer](#_bookmark19) [2007](#_bookmark19); [Cˇ irjevskis](#_bookmark23) [2020b](#_bookmark23), [2021a](#_bookmark25)). The professional

culture alignment (e.g., engineers to engineers) is also needed. In this sense, cultural alignment is important even in non-international strategic alliances and mergers and acquisitions. If there is cultural incompatibility, then the answer is “No”. If management and personnel support the shared values of an alliance and support a new organizational culture ([Cartwright and Schoenberg](#_bookmark17) [2006](#_bookmark17); [Bijlsma-Frankema](#_bookmark13) [2001](#_bookmark13); [Lodorfos and Boateng](#_bookmark64) [2006](#_bookmark64); [Nguyen and Kleiner](#_bookmark76) [2003](#_bookmark76)), then the answer is “Yes”.

To summarize, the competence-based synergies in a strategic alliance are fostered by the internal advantages of core competencies (A) and their external relevance (R), the open and effective communication (C) of deal teams and leaders of partnership companies, the mutual trust and commitment of collaborating partners (T), the plan of core competencies integration (I), and organizational cultural fit (C).

To justify the evidence of the importance of mutual trust and effective communication in the process of the transferability of core competencies (C, T, I, C factors) as well as to provide new empirical insights of the ARCTIC framework application and to reveal the success factors of competence-based synergies of the Renault–Nissan–Mitsubishi strategic alliance, the following research has been carried out as outlined below.

Moreover, to value the competence-based synergies in the strategic alliances pursuing global growth, the current research employed real options theory (ROT) to quantitatively value those synergies. Within this approach, the author introduces the hybrid model of real options valuation of the competence-based synergies that enhances the role of real options reasoning in the strategic alliance’ context, contributes to interdisciplinary research, and offers a research agenda for future research.

*Real Options Application to Valuing Competence-Based Synergies in Strategic Alliances: Hybrid Approach*

The bridging of real options theory and strategic management theory to value a reciprocal synergy arising from cooperative deals has emerged recently ([Loukianova et al.](#_bookmark65) [2017](#_bookmark65); [Bruner](#_bookmark15) [2004](#_bookmark15)) and developed in this paper. Scholars ([Dunis and Klein](#_bookmark31) [2005](#_bookmark31), p. 8) have argued that collaborative deal’s synergies can be considered as a value of a real option. The partners have a right but not an obligation to merge or to ally. Therefore, the call option on the collaborative deal can be executed by partners if the option is “in the money”. Having adopted ([Dunis and Klein](#_bookmark31) [2005](#_bookmark31)) arguments, the following input variables of real options have been employed to value a competence-based synergy.

The stock price (So) equivalent for the real option is the summarized market capitalization of partnership companies or their market value before the alliance formation. Data of market capitalization are usually available on <https://www.reuters.com/>, <https://www.google.com/finance> (assessed on 17 August 2021), the YChart portal ([YChart](#_bookmark95) [2021a](#_bookmark95), [2021b](#_bookmark96)) and other available sources. The strike price (E) is the sum of the hypothetical future market value of the partners without an alliance. The hypothetical future market value of the partnership companies can be predicted with different EV-based multiple valuations and/or with discounted free cash flow forecasts.

The volatility (σ) of a stock price is available on the V-Lab Volatility Analysis ([V-](#_bookmark92) [Lab](#_bookmark92) [2021](#_bookmark92)) or can be obtained by direct observation. Duration (T) of obtaining synergy is

managerial anticipation of when competence-based synergies would be fully realized in terms of the number of years following completion of the alliance formation. Regarding the risk-free rate (rf), it is a long-term government bond yield ([Dunis and Klein](#_bookmark31) [2005](#_bookmark31)) in the country of leading partners of collaborative strategy.

Therefore, the option of the potential of strategic alliance benefits to the shareholders is a real call option on the market value of the allied companies with the expected future stand-alone market value defined as the strike price. In this vein, to model the real option as an American call option with a stochastic exercise price is a reasonable tool to measure a competence-based synergy of strategic alliances.

The call option premium as competence-based synergies results can be calculated using an Excel spreadsheet in the American or European type of option. The research has evidenced that the binomial method makes the calculations visible and strategically flexible, so the results can be easily understood by and communicated with practitioners, whereas the Monto Carlo Simulation gives higher accuracy of results; however, they are not so convenient in terms of intuitive reasoning in valuing real options as the Lattice-based

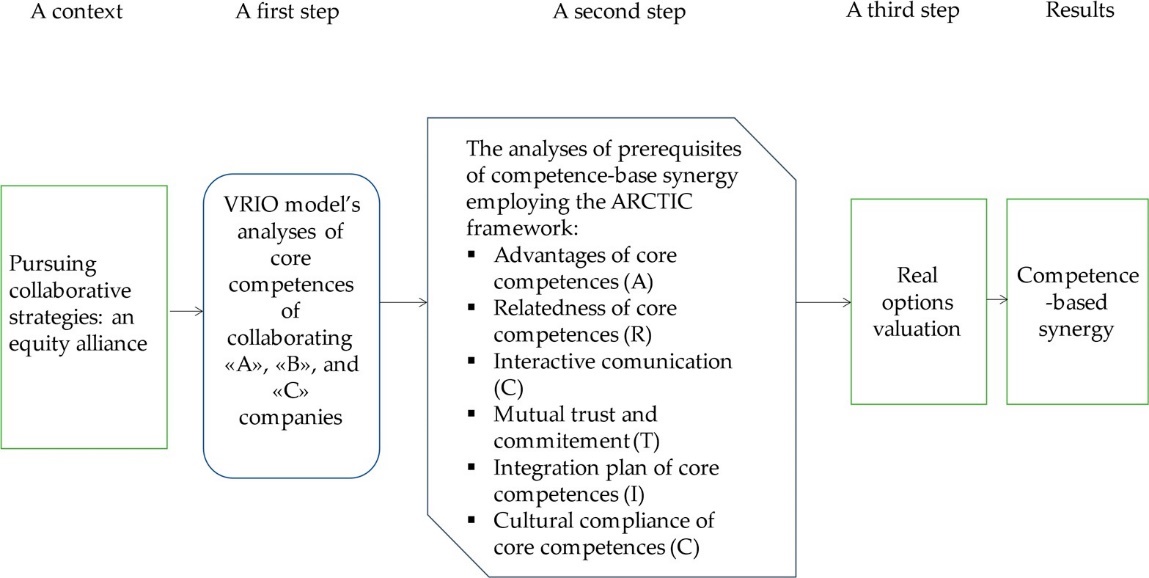
Option Pricing Models ([Cˇ irjevskis](#_bookmark26) [2021b](#_bookmark26)).

To conclude the theoretical part of this paper, the competence-based synergy in strate- gic alliances can be measured with real option application, namely, with the Binomial Option Pricing Model using the real option binominal lattice (American option) to ob- tain the visualization of synergetic market value-added variations and the Monto Carlo Simulation to obtain higher-level accuracy of real options valuation.

## Method

This case study relies on the primary data and extensive archival search of secondary data for the operationalization of the ARCTIC framework in the strategic alliance context. For primary data collection, the in-person interview and online survey questionnaires were sent to the experts of companies of the automotive industry that are active in the busi- ness. The survey’s questions were related to respondents’ experience in alliance strategies and synergy creation processes. The secondary data analysis added enough information to value competence-based synergies quantitatively using real options valuation. The conceptual model of research is presented in Figure [1](#_bookmark0).

The author asked the research question: how to explore the prerequisites of competence- based synergies in strategic alliances and value these synergies employing real options? The research question is answered by analyzing an inductive case study that helps an outsider understand critical success factors of competence-based synergy in the strategic alliance formation and post-formation processes and the real options valuation technique measuring quantitatively competence-based synergies.



There are three stages of the current research to answer the research question. The first stage of the current research involves the ARCTIC framework’s application process. The author has justified the critical success factors of competence-based synergy and codified them in the ARCTIC framework by noting in the form of responses “Yes” or “No” regarding their compatibility, complementarities, and transferability of the appropriate core competencies of one strategic partner to other alliance partners.

Practically, the application of the ARCTIC framework within the first stage of research consists of two steps. In the first step, the core competencies of both partnership companies are identified using the VRIO framework. Using the VRIO framework, the resources and capabilities of collaborating companies can be evaluated in terms of their value (V), uniqueness and rareness (R), imitability (I), and organization (O). Therefore, the VRIO framework allows identifying the core competencies of partnering companies as a source of their sustained competitive advantages.

In the second step, the competence complementarity and transferability analyses were done by employing the ARCTIC framework. An ARCTIC framework (A—Advantage, R— Relevance, C—Communication, T—Trust, I—Integration Plan, C—Cultural Fit) was used to evaluate if core competencies can be transferred in the strategic alliance management and generate synergy. To some extent, the ARCTIC framework is similar to the VRIO framework, where “A” of the ARCTIC framework corresponds to “R and I” of the VRIO model, “R” corresponds to “V” and “C, T, I, and C” corresponds to “O”. The first two factors are concerned with “strategic fit” of business partners resources and help to explore the potential effectiveness of core competence in the new organization.

The other four factors (C, T, I, and C) are more concerned with “organizational fit” and explore the transferability of core competencies and with the mutual integration process. By using the ARCTIC framework, core competencies of an “A” partnership company can be analyzed by a “B” partnership company in terms of their complementarity, compatibility (A and R), and transferability (C, T, I, and C) by giving the answers “Yes” or “No.” Then, in the same manner, the “A” company analyzes the core competencies of the collaborating “B” company. To obtain a competence-based synergy, core competencies must satisfy all six of the ARCTIC framework criteria.

The second stage is primary research. To justify six critical success factors of the ARCTIC framework in the context of the strategic alliance though the opinions of practitioners involved in strategic alliances of the automotive industry, the primary research was done. First, the interview with the Global Manager Human Resources (HR) of the Renault group was carried out. The objective of this interview was to gain a practitioner’s opinion on the critical success factors regarding the competence-based synergy in the Renault– Nissan–Mitsubishi group’s current performance. The interview included eight open-ended questions divided into three themes: the strategic alliances in the automotive sector, the critical success factors of the Renault–Nissan–Mitsubishi alliance, and strategic sources of competence-based synergies of the strategic alliances. Then, online survey questionnaires were sent to experts in the automotive industry that are active in the business ([Cˇ irjevskis](#_bookmark21) [and Fialeix](#_bookmark21) [2021](#_bookmark21)).

Cross-sectional survey questionnaires were the main data collection technique. The questionnaire was developed based upon success factors obtained from the literature review and success factors gauged by the interviewed executive in the earlier stage. The questionnaire has been made with Google Forms. The survey’s questions were related to respondents’ experience in strategic alliance formation and synergy creation processes. The online questionnaires were sent to the Renault network thanks to the help of the Global Manager HR—Product Engineering Department in the Renault Group; in addition, the questionnaires have also been sent to other automotive companies using the internet. The questionnaires were sent online randomly to 900 strategical employees of the European automotive industry thanks to social networks (mainly LinkedIn). The questionnaire was online for 15 days from the 7th until the 22nd of April of the 2020 year, and 102 employees of different automotive producers responded ([Cˇ irjevskis and Fialeix](#_bookmark21) [2021](#_bookmark21)).

In this vein, the current paper applies a case study research methodology to explore a single phenomenon (competence-based synergies) in a natural setting (Renault–Nissan– Mitsubishi strategic alliance) using a variety of methods (qualitative and/or quantitative) to obtain in-depth knowledge (about the appropriateness of the ARCTIC framework to assess prerequisites of competence-based synergies). The method used to collect data in this case study includes interviews with top management representatives, experts’ surveys, and documentary analysis. ([Eisenhardt](#_bookmark33) [1989](#_bookmark33), p. 534) advises that it is usually best to “combine data collection methods such as archive searching, interviews, questionnaires, and observation. The evidence may be qualitative (e.g., words), quantitative (e.g., numbers) or both”.

According to ([Scapens](#_bookmark86) [1990](#_bookmark86)), the method used is the illustrative case study, where research attempts to illustrate a new and possibly innovative practice (an application of the ARCTIC framework to predict competence-based synergies adopted of a particular strategic alliance). Therefore, since the research aims not only to explore certain phenomena but also to understand them within a particular strategic context, statistical analysis is not needed to reach the aim of current research. In deciding how accurate the author wants his research tone and balancing practical considerations against statistical power and generalizability, the author adopted ([Roscoe](#_bookmark83) [1975](#_bookmark83))’s suggestion that sample sizes larger than 30 and less than 500 are appropriate for most research. ([Sekaran and Bougie](#_bookmark87) [2016](#_bookmark87)) agree that sample sizes larger than 30 and less than 500 are appropriate for most research in social science.

However, because the statistical analysis (neither common method bias nor no- response bias) was not planned in the current research, the author has to discuss the generalizability and validity of this research. When it comes to the validity of qualitative case study research, validity refers to the extent to which the qualitative research results accurately represented the collected data (internal validity), and can be generalized or transferred to other contexts or settings (external validity) ([Sekaran and Bougie](#_bookmark87) [2016](#_bookmark87)).

The third stage is quantitative research, specifically, a valuation of competence-based synergies in strategic alliances with a real option application to obtain a numerical assess- ment of synergetic effects with a particular focus on the joining in 2016 of the Mitsubishi Motors corporation into the Renault–Nissan alliance. The addition of Mitsubishi to the alliance is an intriguing case in the context of competence-based synergy. With the appli- cation of the ARCTIC framework, it becomes evident that the joining of Mitsubishi was important in terms of economy of scale (A), geographic diversification (R), and access to plug-in-hybrid-electric vehicles (PHEVs) technologies (A and R). On the other hand, it could have provoked a challenge in terms of the cultural clash when two partners were Japanese firms but only one partner was French (last C).

Then, the competence-based synergies of including Mitsubishi into the Renault– Nissan strategic alliance are measured by employing real options application: the Binominal Option pricing model (BOPM) and Monte Carlo simulation (MCS). While the binomial lattices approach is the most convenient, flexible, and intuitive in valuing real options, the Monto Carlo simulation provides highly accurate and quick ROV results (Cirjevskis ˇ 2021b). 4. Empirical Testing of the ARCTIC Framework: Renault–Nissan–Mitsubishi Strategic Alliance. Data and Interpretation The Renault company is a French car manufacturer who had a good presence in Europe and Latin America; however, Asia, which was just beginning to reveal its significant growth potential, remained its weak point in the 1990s. Regarding Nissan, the company experienced its greatest expansion in the 1970s when the entire Japanese auto industry was expanding and became the number two Japanese automobile, behind Toyota. However, in its race with Toyota, in the 1990s, the company Nissan fell behind in the development of its new products, and the identity of its products looked unclear. At the end of the 1990s, Nissan was close to bankruptcy. In this vein, the two manufacturers, aware of the current challenges in the race for globalization, sought to diversify their core competencies by joining forces. After several months of negotiations, the two companies came together. In 1999 a company incorporated under Dutch law, Renault– Nissan BV, was created to work out a common strategy and develop synergies; it is equally owned by Renault and Nissan. Carlos Ghosn, CEO of Nissan, undertook the recovery of the company, with the plan “NRP”, the Nissan Revival Plan. By practicing a drastic cost reduction policy, by cutting 28,000 jobs, and by taking advantage of synergies with its new shareholder, Nissan was once again becoming a globally competitive company. Moreover, after the first alliance between Renault and Nissan, the group developed further competencies by buying a stake in another brands such as Mitsubishi Motors in 2016. The Renault–Nissan alliance overtook its rivals Volkswagen and Toyota and became the largest carmaker in the world in 2017 (Campbell 2017). To evaluate how the competencybased synergies had been generated in the Renault and Nissan alliance formation, the core competencies were explored through the lens of VRIO and the ARCTIC frameworks.

*4.1. The First Stage Is to Identify the Core Competencies of Renault and Nissan: Compatibilities and Complementarity* To identify the core competencies of both companies, an application of the VRIO framework was used, which stands for four questions that should be answered as to whether resources and capabilities are: valuable; rare; costly or/and timely to imitate; efficiently and effectively organized. According to the core competencies analyses of companies, they have compatible core competencies and complement each other. Despite its financial difficulties, the Nissan company had retained all of its technological competencies. In addition, Nissan still held significant commercial positions in markets where Renault was practically absent: Asia, the United States, where Nissan had been the first Japanese manufacturer to open a factory, Mexico, the Middle East, and South Africa. On the other hand, Nissan needed to find a way to open to Europe, which is an ultra-competitive market, to overcome the financial crisis it was going through.

Thereby, both corporations have synergized complementarity in geographical presence, especially in the most important 21st-century Asian market. The alliance has gained supply bargaining power and joined an investment in R&D enhancing electric cars production. Thus, the complementarity and compatibility of core competencies of Renault’s and Nissan’s groups generated striking reciprocal competence-based synergies. The addition of Mitsubishi Motors has increased the size of the alliance. (Nissan Motor Co., Ltd., Yokohama, Japan) acquired a 34 percent equity stake in Mitsubishi Motors on 20 October 2016, and together with Renault, Nissan and Mitsubishi Motors ascended to the top four car groups globally in 2016.

By including Mitsubishi in the alliance, the Renault–Nissan alliance afterward gained core competencies in plug-in-hybrid-electric vehicles (PHEVs). Recently, Mitsubishi Motors announced that the Outlander PHEV has closed out 2020 as Europe’s best-selling plug-in hybrid of sport utility vehicles (SUV) (Mitsubishi Motors 2021). Moreover, in 2016, Mitsubishi was added to the alliance’s competence in car brands and on small crossovers and hybrid vehicles and, in 2019, the alliance included 10 car brands (Kreutzer and Pfeffer 2019).

Thus, the addition of Mitsubishi was important for gaining access to technologies and for the additional economy of scale. Even though with the addition of Mitsubishi Motors almost no new market access was gained (Kreutzer and Pfeffer 2019), as shown in Table 1, Mitsubishi had core competence in the geographic presence in Australia, Indonesia, Philippine, and Thailand markets. As it was announced by Carlos Ghosn, the planned areas of collaboration of the 2016 Renault–Nissan–Mitsubishi alliance were purchasing, plant utilization, technology, and marketing that there would be “massive” synergies for Mitsubishi and substantial synergies for Nissan (Choudhury 2016). The joint synergy of Nissan and Mitsubishi was planned as 187.47 M euro in 2017, and 465.77 M euro in 2018.

*4.2. The Second Stage Is to Assess the Prerequisites of Competence-Based Synergy in the Strategic Alliance Functioning Process through the ARCTIC Framework*

Step two is to assess the prerequisites of competence-based synergy in the strategic alliance functioning process Having assessed the potential of the competence-based synergy of the merger of the Renault–Nissan strategic alliance by the ARCTIC framework application, it became evident that compatibilities and complementarity of core competencies of Renault and Nissan helped to develop their further growth and to generate competence-based synergies. After the alliance formation, the group benefits from the core competencies of each other as shown in Table 1. The ARCTIC framework is clearly illustrating both Renault, Nissan, and Mitsubishi’s several numbers of core competencies that possess compatibility and complementarity. They are complementary in terms of geographies (R), competencies in manufacturing expertise, and technologies (A). Moreover, the competence-based synergy potential can be found in global purchasing power, reducing the cost of goods sold, R&D and technologies sharing, global marketing efforts, and distribution networks of vehicles and after-sales services. When it comes to transferability of core competencies, France and Japan are different on several Hofstede dimensions (e.g., long-term orientation, masculinity, individualism), J. Risk Financial Manag. 2021, 14, 385 12 of 22 different leadership styles (a consensus versus a meritocracy), and different norms and values (a focus on a profit versus a focus on the growth of market share) (Kreutzer and Pfeffer 2019) as given in Table 2.

On the one hand, partners convinced themselves that cultural barriers could be overcome, and both partners were aspiring automotive companies ambitious to achieve global growth, although French and Japanese culture has different values and norms (Kreutzer and Pfeffer 2019). On the other hand, France and Japan are good examples of highcontext cultures (Katz 2005). In the high-context cultures of France and Japan, building a strong network of dependable relationships is a way to “fill the gaps” and become aware of what is going on (Katz 2005). Moreover, in the high-context culture, people emphasize longterm relationships and loyalty that enhance knowledge management, shape absorption capacities, and facilitate core competency transfer (Ga´c and Górzy ´nski 2009).

Because Renault did not directly hold any Mitsubishi shares, it can be argued that Nissan gained some power relative to Renault in the alliance. The two Japanese partners may be closer to each other than to their French partner in terms of culturally influenced values (Huang 2018). This could impair the development of a common organizational culture, and the government interests are proving to be growing problems for the group which has never been so close to the end of its alliance as today. That is why the answers on the cultural convergence (last C) are “Yes” and “No”, meaning success in the past but that it might be a challenge in the future.

During the second stage of the research, to justify the VRIO and ARCTIC frameworks’ results, the Renault Global Manager HR was interviewed via Skype for 50 min from 10:30 a.m. till 11:20 a.m. on April 20, 2020. The objective of this interview was to obtain a managerial opinion on the market regarding the alliances and synergies, the Renault Nissan group’s current situation, and its strategic goals (Cirjevskis and Fialeix ˇ 2021). During the alliance, the HR manager was the distribution manager and therefore could describe the key factors to consider when one company allies with another company. After analyzing this interview result, which greatly helped this research, the first competency that stood out was the strategic complementarity of the two companies in terms of their core competencies.

By joining forces, both companies were able to significantly expand their market share while benefiting from the core competencies of the other company. In addition, this alliance was made in an egalitarian manner while protecting the history and identity of each of the companies. Furthermore, after the first alliance between Renault and Nissan performing well, Renault acquired a majority stake in Samsung Motors in 2001 (which now stands at 80.1%) (Renault Group 2012), and thus established a significant presence in the South Korean market; Nissan bought Mitsubishi in 2016. Today the group has 12 brands and still has big ambitions.

When it comes to transferability of core competencies in an alliance, the Global Manager HR at Renault Group argued that the most important success factors for obtaining managerial synergy in an alliance are mutual trust (T), integration plan (I), and ability to overcome cultural obstacles (last C). Moreover, the survey results (n = 102) justified strategic factors of managerial synergies as follows. Having employed social networks (mainly LinkedIn), the questionnaire was sent to 900 strategic employees of different automotive companies. The questionnaire was online for 15 days from the 7th till the 22nd of April of 2020 and received 102 answers (Cirjevskis and Fialeix ˇ 2021). The survey made it possible to operationalize certain critical success factors on the transferability of core competencies in alliances provided by the executive and to justify the ARCTIC framework factors, particularly, regarding transferability (C, T, I, and C factors) in the ARCTIC framework. As mentioned before, internal communication (C) is essential, however, external communication is also indispensable. Cultural differences (last C) can be an obstacle to the development of an alliance. As part of the Renault–Nissan Alliance, a charter was developed to promote cohesion and understanding. Planification of the integration (I) was also quite crucial. For example, in 2017, the Renault–Nissan–Mitsubishi alliance announced the six-year plan called “Alliance 2022” that set a new target to double annual synergies to €10 billion and plans to develop twelve new “100% electric” vehicle models by 2022 (Kreutzer and Pfeffer 2019). Finally, the survey confirmed that, for the employees’ mutual respect, trust (T) and communication (C) are the most important factors. The factor of the integration plan (I) seems also among the critical success factors. A right estimation of time and resources needed to be achieved for the synergy, frequent communication with the leaders, development of clear roles, policy and guidelines, clear directive for each employee, and realistic objectives of the collaborative group have been also more frequently mentioned among other success criteria. Today, the Renault–Nissan–Mitsubishi alliance is the group in the world that sells the third most after the Toyota group and Volkswagen group (Kreutzer and Pfeffer 2019). Nevertheless, despite the great results and the profitability of the alliance, today, the group is facing some strategic and managerial conflicts that are negative for the group and could drive to separation if no solution is found. These issues are further discussed in the Conclusion. 4.3. Third Stage of the Research Is Real Options Application Nissan Motor Co., Ltd. acquired a 34 percent equity stake in Mitsubishi Motors by 237 billion yen ($2.29 billion) on 20 October 2016 (Choudhury 2016). To assess the competencebased synergies with a real option, first, the Monte Carlo simulation was applied to obtain the theoretical value of options (synergies). Parameters of the Monto Carlo simulation to value the European call option and thereby to value a competence-based synergy are given in Tables 3 and 4.

MCS is easily applied to European-style real options and provides a highly accurate result. The synergetic competence-based result equals $5.76 billion that was generated by using a Monte Carlo simulation. However, it is relatively hard to apply it to American options (Cirjevskis ˇ 2021b). Therefore, the next step is an application of BOPM valuation.

Initially, a lattice of the underlying is constructed, and afterward—real options valuation lattice. As there are six time steps in the lattice, each time step between sequential nodes will represent four months. Starting with the underlying value at the time of alliance formation (St), the lattice can be developed. In the first time step, S0 is multiplied by the up factor and down factor, thus creating two sequential nodes—S0u and S0d. The value of each of these two nodes represents the values that the underlying may take in one time step in the risk-neutral probability approach. Hull suggests the following Equation (1) to calculate the value of the underlying at a j-th node at time δt (Hull 2005, p. 351):

S0i, j = S0ujdi−j (1)

where S0 = value of the underlying at time zero, u = up factor, d = down factor, j = number of up steps, and i = total number of time steps from time zero.

The lattice of the underlying value essentially shows how the underlying can evolve in the next two years. Identification of value of competence-based synergies shall start from the terminal nodes and then the tree is “rolled back”. Therefore, once the lattice of underlying is developed for such period, which is equal to the duration of the (longest) real option, as of the sequence presented, a real option valuation lattice can be created (Bailey et al. 2003). Carrying out such a process from the sixth time step backward (to the left), the value of the starting node is determined.

The value of the starting node shall thus be extended to Net Present Value (eNPV) or the value of the core competence-based synergies in the current research. At the terminal nodes, the management of the alliance excepts to obtain all core competencies-based synergies, meaning that after two years real options have reached their maturity. Referring to Table 5, wherein the characteristics of real options are tabulated, a real options valuation lattice can be provided as shown in Figure 2.

Via backward induction, real options valuation lattice is “rolled back” one time step at a time. Accordingly, calculations begin at time at step five and are made backward from the starting node. For instance, the intermediate value at the node “*P*” can be calculated according to ([Mun](#_bookmark75) [2002](#_bookmark75), p. 157) Equation (2).

*IVP* = [(p)up + (1 *−* p)down]e*−*rfδt (2)

where p = risk-neutral probability; up = value of up node (i.e., the value of node “*V*”); down = value of down node (i.e., the value of node “W”); e = mathematical constant of exponential function; rf = two-year risk-free rate; δt = stepping time. At the starting node (i.e., node “A”), the competence-based synergy of the alliance formation is determined.

For descriptive appeal, both lattices have been merged into one lattice as shown in Figure [2](#_bookmark6). The developed lattice of the underlying and real option lattice are presented in Figure [2](#_bookmark6), thereby having the following legend: each node is characterized by three rows; in the top row of each node there is an arbitrarily assigned denotation (from A till AB), so nodes can be distinguished afterward; the middle row represents the value of the underlying (in $ USD bn) at that particular node; the bottom row indicates the real option value.

Now, the result of the Monte Carlo simulation can be compared to the results of the binomial option pricing model. According to BOPM and Monte Carlo results, Nissan and Mitsubishi would have added a market value of about $6.0 bn. Therefore, the expected market value (eNPV) of Nissan Motors and Mitsubishi Motors could have been the cumu- lated future market value of collaborative partners after the announcement (K) of $42.39 bn plus $6 bn of core competence-based synergy; thus, the future market value of collaborative partners could have equaled $48.39 bn in October 2018.

In fact, on October 17, 2018, Mitsubishi Motors’ capitalization was $9.73 bn ([YChart](#_bookmark96) [2021b](#_bookmark96)) and Nissan’s capitalization was $35.45 bn ([YChart](#_bookmark95) [2021a](#_bookmark95)); thus, a total market capitalization was $45.18 bn which is $3.21 bn less than predicted. Even though the connection of the theoretical value with actual value largely depends on the timing of the prices taken and is entirely difficult to justify precisely in this study, the overall comment is as follows.

Having compared the estimated and real market capitalization of Nissan and Mit- subishi, it should be mentioned that the result has evidenced that Nissan Motors did not fully realize forecast competence-based synergy. Nissan Motors’ market capitalization was reduced from USD 38.77 bn in October 2016 ([YChart](#_bookmark95) [2021a](#_bookmark95)) to $35.45 bn on 17 October 2018 ([YChart](#_bookmark95) [2021a](#_bookmark95)); whereas Mitsubishi Motors had doubled their market value from USD 4.667 bn ([YChart](#_bookmark96) [2021b](#_bookmark96)) on 17 October 2016, to USD 9.73 on 17 October 2018 ([YChart](#_bookmark96) [2021b](#_bookmark96)), and, thus, was enjoying a competence-based synergy of strategic alliance.

To conclude, the ARCTIC framework clearly illustrates that Renault, Nissan, and Mitsubishi all had several core competencies in terms of compatibility, com- plementarity, and transferability. Regarding complementarity, there are complementary geographies (R), complementary competencies in manufacturing expertise (A), and com- plementary competencies in technologies (A). Thereby, the competence-based synergy potential can be found in global purchasing power, R&D and technology sharing, global marketing, and global distribution of vehicles and spare parts ([Kreutzer and Pfeffer](#_bookmark59) [2019](#_bookmark59)).

However, regarding the transferability of core competencies, the cultural divergence (last C) and the government interests are proving to be growing problems for the group, which, today, has never been so close to the end of the alliance. On 19 November 2018, almost about two years after the addition of the Mitsubishi Motors, “... Chairman of the Board and Representative Director, Carlos Ghosn, had been arrested by Tokyo District Public Prosecutors Office on the charge of filing annual securities reports containing fake statement, in breach of the Financial Instruments and Exchange Act ...” ([Mitsubishi Motors](#_bookmark73) [2018](#_bookmark73), p. 1). This “black swan” made a further forecast of the alliance synergism quite questionable. Yet, despite this event, the theoretical and managerial contribution of the paper is discussed in the next section.

## Discussion

This research is bridging the gap between real options theory, resource-based view in the strategic management discipline, and global strategy practice in search of critical success factors of reciprocal synergy in strategic alliances and their quantitative measurement. Furthermore, the paper contributes to a rich literature on the importance of “fit”, shaping the collaborative strategies performance, including strategic fit ([Larsson and Finkelstein](#_bookmark62) [1999](#_bookmark62)) and organizational fit ([Datta](#_bookmark29) [1991](#_bookmark29)) by providing an integrated ARCTIC framework to assess the prerequisite managerial strategies.

The factors of the ARCTIC framework perfectly fit into the ([Larsson and Finkelstein](#_bookmark62) [1999](#_bookmark62)). For example, ([Larsson and Finkelstein](#_bookmark62) [1999](#_bookmark62)) found that the success of a merger or acquisition (M&A) is gauged by (1) the similarities and complementarities between the two businesses in terms of their production and marketing (A and R); (2) organization integration by firm interaction, coordinative efforts, and employees’ resistance (C, T, and I); (3) management style similarities (last C). ([Larsson and Finkelstein](#_bookmark62) [1999](#_bookmark62)) argued that future works on the success of collaborated strategies can move scholars’ efforts forward by testing more detailed models of M&A performance ([Larsson and Finkelstein](#_bookmark62) [1999](#_bookmark62), p. 18).

In this vein, the ARCTIC framework is contributing to this request by providing a useful model for the practitioners regarding how they can achieve greater synergistic benefits from a strategic alliance. Moreover, the ARCTIC framework can help academic researchers who study M&A to test an application of the ARCTIC framework in the context of non-equity alliances and/or cooperative arrangements. Thus, future research can provide new insights that can theoretically advance the ARCTIC framework for strategic management and international business fields.

What is more, ([Datta](#_bookmark29) [1991](#_bookmark29)) found that an important element of “organizational fit” in M&A deals is the extent of compatibility in the styles of the acquiring and acquired firm management. ([Datta](#_bookmark29) [1991](#_bookmark29)) argued that the reason for poor acquisition performance results in executives should seek differences in management style (last C) as well as in differences in reward and evaluation system. Moreover, Datta had asked: “Why did some acquisitions with high differences in management styles perform better than others?” ([Datta](#_bookmark29) [1991](#_bookmark29), p. 294) and argued that an interesting area for future research relates to how the process can be best managed in cases where organizational incompatibility poses challenges ([Datta](#_bookmark29) [1991](#_bookmark29)).

Having illustrated advanced international alliance practice in the global automotive industry, the current paper contributes to this request and enriches scholars’ understanding of why some international alliances with a different managerial culture are doing business better than other strategic alliances. In this sense, the paper not only contributes to the existing frameworks on the synergism of collaborative deals ([Bauer and Matzler](#_bookmark11) [2014](#_bookmark11); [Larsson and](#_bookmark62) [Finkelstein](#_bookmark62) [1999](#_bookmark62); [Datta](#_bookmark29) [1991](#_bookmark29)) but also extends them to the strategic alliance context.

Recently, ([Hannah et al.](#_bookmark41) [2021](#_bookmark41)) argued that mathematical models for developing strat- egy are often poorly understood in the strategic management and organizational commu- nity ([Hannah et al.](#_bookmark41) [2021](#_bookmark41), p. 329). “... Strategy scholars are now building theory using an option-pricing model that is solved numerically ..., while powerful closed-form approaches exist in the finance literature that has yet to be adopted in the strategy... A new approach may allow new research questions to be asked, and existing questions to be addressed in greater depth” ([Hannah et al.](#_bookmark41) [2021](#_bookmark41), p. 353).

Having used a real option to value competence-based synergy in real case studies, the paper contributes to the real options theory in strategic management. This is the major theoretical contribution. The current paper has addressed this gap by contributing an understanding of option pricing models to value a competence-based synergy of collabora- tive strategy and making them more accessible and compelling to the broad strategy and finance scholarly community ([Hannah et al.](#_bookmark41) [2021](#_bookmark41)).

When it comes to the managerial implication of the paper, the proposed approach to value competence-based synergy (Figure [1](#_bookmark0)) can be used by the partners of strategic alliances within two first alliance formation stages, namely, selection and design stages ([Kale and Singh](#_bookmark52) [2009](#_bookmark52)). The application of the ARCTIC framework would help to audit the availability of the important key drivers of single alliance success such as partners complementarity, compatibility, and commitment ([Kale and Singh](#_bookmark52) [2009](#_bookmark52)), as well as to assess the ability to provide a competence-based synergy and to explore new development opportunities ([Hoffman](#_bookmark47) [2007](#_bookmark47)).

To summarize theoretical and managerial contributions, the relationship among re- search variables is given in Figure [3](#_bookmark7). Figure [3](#_bookmark7) illustrates the likely relationships among the main constructs presented in the paper and devotes them to the future research of competence-based synergies in the different forms of business collaboration.

## Conclusions, Research Limitation, and Future Work

The author has answered the research question of how to explore the prerequisites of competence-based synergies in strategic alliances and value these synergies with real options as well as justified the internal and external validity of the proposed conceptual model of the research by exploring the case study of the Renault–Nissan–Mitsubishi strategic partnership in the automotive industry.

To be the best in the automotive industry today, players need to ally with the right partners at the right time. The advantages of alliances are competence-based synergies fostered by the advanced technologies and geographic presence of collaborative partners and, at the same time, promoting their brands and preserving their cultural identity.

However, the cultural dimension should be a special concern of the collaborative partners. When you ally with foreign business partners, each party must make efforts to understand the cultural differences of each other. Thus, even if this alliance has mainly generated strengths for the group, there are nevertheless some weaknesses. Although initially the agreement was good, the recent scandals related to the Carlos Ghosn affair generated conflicts of interest between the two companies.

Nissan, which sells the most vehicles, has the unofficial place of second in the group. The CEOs of the alliance have always been French. On the other hand, suspicions of Nissan’s plots towards Renault have sprung up. Some Renault leaders point out that Nissan leaders and certain Japanese politicians wanted to harm Carlos Ghosn and Renault to allow Nissan to take the lead in the group (Cˇ irjevskis and Fialeix 2021). Another thing that generates tensions is equity in the shares. Renault owns 43.4% of Nissan’s capital while Nissan only has 15%, without voting rights on the board of directors. All these conflicts are generating uncertainty for the group despite good results over the last 20 years.

Regarding the limitations of the current research, the application of real options valuation possesses several limitations. For example, (Lambrecht 2017) argued that “... real options valuation due to its complexity is not a particularly flexible valuation framework

... ” (Lambrecht 2017, p. 168). In this vein, the BOPM model provides a more favorable condition to be applied in projects where the execution time could be at any time (Guo and Zhang 2020).

Concerning the future work, (Fainshmidt and Frazier 2017) argued that an organi- zational climate for trust facilitates adaptability and coordination among organization members, and thus enhances the firm’s sensing, seizing, and reconfiguring capabilities (Fainshmidt and Frazier 2017) that in turn affect competitive advantage. Therefore, future research can further explore the role of all factors of the ARCTIC framework as a driver of dynamic capabilities that underpins competence-based synergy in strategic alliances. Future research can also explore the institutional context of strategic alliances, specifically, by analyzing influencing roles of the French and Japanese governments that are impacting the Renault–Nissan–Mitsubishi alliance’s synergies or might be dis-synergies.

# Effect of Dividend Policy on the Value of Firms (Empirical Study of Quoted Firms in Nigeria Stock Exchange)

## ABSTRACT

The study empirically investigated the effect of dividend policy on the value of firms as reflected on shareholder’s wealth maximization. The data employed in the study was computed as weighted average of five year summary extracted from the audited financial reports of firms selected at random from Nigeria stock exchange; in performing the analysis, rigorous econometric tools such as unit root stationary test, multiple OLS regression, granger causality test, impulse response innovation and variance decomposition test were all employed with the aid of econometric statistical packages version 8. The result of the study revealed that the dividend per share is significant and inversely related to share value of the firm while earning per share is both positive and significant to share value of firms; this result is like that of Baker, H.K. 1989. Based on this, the study concluded that earning per share is the predominant variable to influence the share value of firms. It is therefore recommended that finance managers should play an important role in the debt-equity mix in the balance sheet in order to magnify the earning per share as will be reflected in the wealth of shareholders.

Keywords: earnings per share, dividend per share, internal rate of return, market value per share, impulse response, variance decomposition.

## INTRODUCTION

Dividend policy is defined as a deliberate action of managers to distribute portion of earnings to shareholders in proportion of their holdings in the firm called dividend; the distribution of earnings to shareholders can be in form of cash dividend, bonus or script dividend, repurchased stock etc. the expected relationship between dividend paid out ratio and retention ratio is inversely related such that increase in retention ratio will bring about reduction in payout ratio of the firm, yet the duo work together for shareholder’s wealth maximization, it is practically impossible to formulate one without affecting the other.

Dividend decisions are extremely important to the company’s valuation which practically translates to capital gain in share prices; shareholder’s wealth maximization is a paramount objective of a finance manager; which serves as return on investment outlay as reflected in the value of the firm. Return consists of two components: dividends and bullish stock (capital gain), despite the inverse relationship between dividend and earnings ratio, dividend and retained earnings have similar purpose towards maximizing shareholders interest (wealth); the unshared profit (retained earnings) is used to finance viable projects for expansion while dividend increases the bargaining power of stakeholders.

However, finance managers often strive to increase the fundamentals of their company; the fundamentals of companies as opined by the fundamentalist are earnings, earnings per share, dividend yield, dividend payout ratio, and dividend cover among others. Good fundamentals of firms are reflected in share price movement in the stock market which ultimately translates to shareholders wealth maximization.

## STATEMENT OF PROBLEM

Over the years, there have been conflicting goals regarding stakeholders’ wealth maximization and market valuation of the firm; many scholars believed that stakeholder’s interest and market value of the firm are reflected in the company’s earnings per share and capital gain in share price respectively. Scholars have also argued that company’s fundamentals do not impact positively on the value of the firm; the major proponent of this argument is Modgiliani and Miller’s model which postulate that earnings are the predominant factor that affect the market value of a firm.

However, conflicting interest of shareholders regarding dividend policy cannot be over-emphasized; every rational shareholder will consistently require that higher dividend be paid regardless of the investment decisions of the firm. Finance managers are in a dilemma in harmonizing the both decisions (dividend and investment) since both decisions are very crucial to the worth of companies as shown in the growth of stakeholders’ worth. This research work seems to breach the gap by portraying the significant effect of dividend policy on share valuation.

## SIGNIFICANT OF THE STUDY

The research work will bring about the relative significance of the company’s valuations and dividend decisions as reflected in shareholder’s wealth. The company’s valuation is reflected in price movement in the capital market; the pay-out ratio is in consideration of the project financing policy of the firm. Though, fundamentals of companies such as earnings per share, dividend per share, dividend pay-out ratio and dividend cover among others; impact positively or negatively on the value of the firm as perceived by every rational investor in the stock market.

## STATEMENT OF HYPOTHESIS

H01: Significant relationship does not exist between earnings-per share and market price of a firm. H02: Significant relationship does not exist between dividend per share and share value of a firm. H03: there is no significant relationship between the internal rate of return and share value of a firm.

## THEORECTICAL REVIEW

There are several theories relating to dividend policies and the value of the firm, such theories among others include: professor walter’s Model (Relevant theory), Gordon’s Model, Bird in Hand theory, debt-equity substitution theory, MM theory (Irrelevant theory).

## Debt-Equity substitution theory

This theory describes the relationship between debt-equity, after tax earnings and share prices of quoted companies; managers adjust the debt and equity structure in the balance sheet in order to increase the earnings per share. The resulting effect of debt- equity in a firm’s balance sheet shows the reasons companies often adopt dividends payments and others do not. When distributing earnings to stakeholders in form of dividend, management typically choose between cash dividend or share repurchases; the theory explains the reasons why some firms repurchased agreement lead to a reduction in earnings, such companies prefer cash dividend over share repurchases.

Mathematical representation of debt-equity theory KD > 1 - TC -1

EQ 1 - TD

Where:

KD = total long term debt Eq = total equity

Tc = tax rate on capital gain Td = the tax rate on dividends

## Walter’s Model

Relevant theory argued that dividend policy is significant to the share price of a firm. The relevant theory shows clearly the significant relationship between the firm’s internal rate of return (r) and its cost of capital (k) in computing the dividend yield as reflected in shareholders’ wealth maximization.

Mathematical formula of Walter’s theory to compute the current price per share is as follows P0 = D1 + (r) (E – D1)/Kc

Kc

Where,

P0 = share value per share D1 = Dividend per share

r = internal rate of return on the firm’s investment Ke = Cost of equity

E = Earnings per share

## Gordon’s Model

The theory also known as relevant theory believes that consistent dividend’s payment affect the value of the firm; the theory highlight the significant between dividend pay-out ratio, internal rate of return, cost of fund and the current value of the share price.

Mathematical formula of the model P0 = E (1 – Rt)

Kf - g Where,

P0 = Market price per share E = Earnings per share

Rt = Retention ratio (1-payout ratio) r = Rate of return

kf = Cost of fund

g = Growth rate (g)

## M&M THEORY

Modigliani and Miller (M&M), postulates the irrelevancy of dividend in determining the share value of a firm as it does not impact on the shareholder’s wealth. They argued that the worth of a firm is reflected by total earnings born out of the investment decisions of the firm.

Mathematical formula of M&M theory r= D1 + (P1 + P0)

P0

Were,

D1 = Current Dividend per share P1 = Market price per share

P0 = Current market price per share

## CONCEPTUAL FRAMEWORK

Functions of finance managers is to strike balance between dividend payout ratio and retained earnings; this is very difficult because of the conflicting interest of shareholders – heterogeneous expectation- some shareholders prefer consistent payment of dividend whereas others will prefer capital gains arising from increased share prices (Aivazian et al, 2002)

The finance manager will choose the type of dividend payment methods to adopt when making decisions regarding cash dividends or through stock repurchased. Various factors may be taken into consideration; where shareholders must pay tax on dividends, firms may elect to retain earnings or to perform a stock repurchased in both cases increasing the value of shares outstanding,(Kothari, 2011).

Scholars have believed that dividend is relevant to the value of firms, the school of thought on this proposition are Myron J. Gordon and James E. Walter against the back drop of Modigliani and Miller (irrelevant theory). Different econometric tools are now formulated to assist firms analyze and come out with the best dividend policy. There has not been a compromise between the school of thought on the significant nexus between dividend and share price of firms.

There are various of forms of dividend payment; cash dividends seen as the payment of divided in cash usually via funds transfer or dividend warrant; such dividends are in form of return on investment and are usually taxable to the recipient in the year they are paid (Sullivan, 2003), script dividends are those paid out in the form of bonus stock of the issuing corporation, there are usually issued in pro-rata basis,( D’Souza, 1999).

## EMPIRICAL REVIEW

(Baskin, 1989) examine the relationship between share price and dividend yield of firms; five different explanatory variables were used against the dependent variable – share price. However, the result of the analysis indicates significant relationship between changes in share price and yield of quoted companies.

(Nazir et al., 2010) the period for the study ranges from 2003 to 2008, 73 quoted firms in Karachi stock exchange (KSE) was used for the study. The method used was fixed effect and random effect models on panel data; the result shows that stock movement has significant and inverse relationship with yield and pay-out.

(Suleman et al., 2011) examine the relationship between dividend policy and stock movement in Pakistan. The variables were extracted from Karachi Stock Exchange (KSE) on the relevant sectors for the period of 2005 - 2009. Ordinary least regression analysis was used for the study, Contrary to (Baskin, 1989)’s results, the analysis performed, show that market value has positive, direct and significant relationship with dividend yield of quoted firms.

(Hussainey et al., 2011) examined the correlation between share price movement and dividend policy in UK. One hundred and three English quoted companies were used for the study and the time of the study ranges between 1998 - 2007. The analysis done was similar to that of (Baskin, 1989). Ordinary least square regression analysis was used to determine the relationship between market value with growth yield and payout ratio. It also included more three explanatory variables in their model. The result found an inverse but significant relationship between stock price movement and dividend payout ratio. Also, another empirical result shows an inverse but significant relationship existed between share price movement and dividend yield. The results show that dividend payout ratio remain the most important criteria of the share price movement.

## METHODOLOGY

Various methods were used to determine the relationship between share price, earnings, rate of return and dividend policy of the firm; prominent among the methods used are: unit root test, Johansson co-integration test, ordinary least square, granger causality test, impulse response and variance decomposition.

However, sample size of 12 quoted firms in the Nigeria stock exchange (NSE) was selected from various sectors in the economy to test the validity of claim in the hypothesis. Data was extracted from audited annual financial reports of companies and necessary computations were done.

## MODEL SPECIFICATION

The model shall be specified in three different forms; starting from the functional form to the econometric form.

**Functional** form of the model;

The functional form explains direct functions of the dependent variable on the explanatory variables: Mvs = f ( Eps,Dps,Irr) eq (1)

Where, Mvs is the market value/share, Eps the earnings/share, Dps is dividend/share and Irr is internal rate of return of the company.

The **Mathematical** **Model** measures the exact relationships between the dependent and independent variables; a constant factor is added to the explanatory variable;

Mvs = α0 + α1Eps + α2Dps + α3Irr eq (2)

Where, α1, α2, α3 are the parameters to be estimated; α0 represent intercept in the model while α1, α2, α3 are the slope or coefficients to be estimated.

The **Econometric** **Model** measure inexact relationship between the variables in the model; a stochastic error disturbance term is introduce into the model to account for other variables that are not included in the model that might affect the performance of the dependent variables.

Mvs = α0 + α1Eps + α2Dps + α3Irr + δ eq (3)

Where, δ is the stochastic error disturbance term introduced into the model.

## VARIABLES DESCRIPTION

The variables description explain the significant of the variable to the study, various variables was used in creating the above model such as: market value per share, earnings per share, dividend per share and internal rate of return and among others.

**Earnings** **per** **Share**: this is the sum total of the company profit after tax less preference dividend if any divided by the total shares outstanding as at the time of computation. The earnings per share are an integral part of a firm’s fundamental used by investors to value the firm.

**Dividend** **per** **Share**: it is defined as the total amounts declare as dividend divided by the total shares outstanding. For the purpose of this research work, the total amounts declare as dividend was computed as 40% of profit after tax for the year.

**Internal** **rate** **of** **return**: the firm sets an internal rate of return that is used to bench mark the return perceived from the market. The firm decisions tend to favor proposed investments that have returns greater than the firm’s fixed rate of return. The return of the firm was calculated as profit after tax divided by the shareholders equity.

**Share** **price**: also known as the market value of a company was computed as the 5 years average prices from the capital market.

## APARORI EXPECTATION

We expect that the variables (except earnings per share) will be inversely and significant related to the dependent variable. Dividend per share and others should have stronger predictive ability on the dependent variable.

α >α1<α2>α3

## DATA PRESENTATION AND ANALYSIS OF RESULT

The data below shows the weighted average of five years summary result extracted from the audited annual financial reports of various quoted firms selected at random from different sectors in the economy.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S/n | Companies | Market value per  share | Earnings per  share | Dividend per  share | Internal rate of  return |
| 1 | DANGOTE CEM. | 160 | 8.6 | 3.5 | 0.37 |
| 2. | DANGOTE SUGAR | 6.25 | 0.9 | 0.6 | 0.23 |
| 3. | UNILEVER PLC | 45.5 | 1.2 | 1.0 | 0.24 |
| 4. | FCMB PLC | 1.84 | 0.52 | 0.4 | 0.13 |
| 5. | FBHN PLC | 4.83 | 1.68 | 3.3 | 0.20 |
| 6. | FORTE OIL plc | 236 | 6.8 | 0.37 | 0.32 |
| 7. | GSK NIGERIA | 36 | 2.11 | 1.0 | 0.42 |
| 8. | MOBIL PLC | 132.41 | 12.2 | 6.4 | 0.64 |
| 9. | NASCON PLC | 7.00 | 0.8 | 0.6 | 0.2 |
| 10. | UBA PLC | 3.78 | 0.15 | 0.2 | 0.15 |
| 11. | ZENITH PLC | 15.25 | 2.9 | 1.75 | 0.28 |
| 12. | GTB PLC | 18.59 | 2.5 | 0.8 | 0.25 |

Source: Audited annual financial reports & author’s computation.

## UNIT ROOT TEST

The above method shows the stationary behaviors of the data and subsequently leads the way for a long run analysis.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables | ADF STA | T-STA | Ranking | Remark |
| MVS | -6.271923 | -3.212696 | 1(1) | Stationary |
| EPS | -5.647853 | -3.212696 | 1(1) | Stationary |
| DPS | -4.771964 | -3.259808 | 1(1) | Stationary |
| IRR | -3.315393 | -3.212696 | 1(1) | Stationary |

Source: Econometric View; Version 8

The result of the unit root test shows that the data was nonstationary at level but became stationary at first differencing at 0.05% level of significant indicating the presence of co-integration among the variables.

## MULTIPLE OLS REGRESSION ANALYSIS

Ordinary least square method also called the short run test; examine the significant relationship between the coefficients in the variables.

Dependent Variable: MVS Method: Least Squares

Date: 12/10/15 Time: 18:42 Sample: 1 12

Included observations: 12

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. | |
|  |  |  |  |  | |
|  |  |  |  |  | |
| C | 34.84074 | 26.57377 | 1.311095 | 0.2262 | |
| EPS | 32.02913 | 5.278237 | 6.068149 | 0.0003 | |
| DPS | -29.98807 | 8.428388 | -3.557984 | 0.0074 | |
| IRR | -130.0210 | 135.4540 | -0.959890 | 0.3652 | |
|  |  |  |  |  | |
|  |  |  |  |  | |
| R-squared | 0.883922 | Mean dependent var | | 55.62083 | |
| Adjusted R-squared | 0.840393 | S.D. dependent var | | 77.32914 | |
| S.E. of regression | 30.89360 | Akaike info criterion | | 9.960177 | |
| Sum squared resid | 7635.317 | Schwarz criterion | | 10.12181 | |
| Log likelihood | -55.76106 | Hannan-Quinn criter. | | 9.900334 | |
| F-statistic | 20.30649 | Durbin-Watson stat | | 1.763200 | |
| Prob(F-statistic) | 0.000426 |  | | |  |
|  |  |  | | |  |

The result of the analysis indicates that our model is a good fit with the R-squared adjusted value given as 84% which implies that there is a strong predictive ability of the explanatory variables on the dependent variable; that is changes in the dependent variable is accounted by variations in the explanatory variables. To determine the statistically significant of the variables, the T-Statistics is used, by interpretation, the constant is positive but insignificant; earnings per share is both positive and significant which implies that 1% change will bring about 32% changes in share prices while both dividend per share and internal rate of return are negative (except DPS showing significant relationship with MVS) meaning, 1% change in DPS will bring about 29.9% decrease in share prices in the stock market. The Durbin- Watson statistics shows the present of serial correlation in the model.

## GRANGER CAUSALITY TEST

The granger causality test examines the cause effect relationship between the variables. Pairwise Granger Causality Tests

Date: 12/10/15 Time: 19:14 Sample: 1 12

Lags: 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: | | Obs | F-Statistic | Prob. |
|  | |  |  |  |
|  | |  |  |  |
| eps does not Granger Cause mvs | | 10 | 0.43513 | 0.6695 |
| mvs does not Granger Cause eps | | | 3.98604 | 0.0922 |
|  | |  |  |  |
|  | |  |  |  |
| dps does not Granger Cause mvs | | 10 | 0.49092 | 0.6388 |
| mvs does not Granger Cause dps | | | 5.37208 | 0.0568 |
|  | |  |  |  |
|  | |  |  |  |
| irr does not Granger Cause mvs | | 10 | 1.23264 | 0.3671 |
| mvs does not Granger Cause irr | | | 5.84041 | 0.0492 |
|  | |  |  |  |
|  | |  |  |  |
| dps does not Granger Cause eps | | 10 | 2.41001 | 0.1850 |
| eps does not Granger Cause dps | | | 9.11485 | 0.0215 |
|  | |  |  |  |
|  | |  |  |  |
| irr does not Granger Cause eps | | 10 | 7.21656 | 0.0336 |
| eps does not Granger Cause irr | | | 4.74176 | 0.0700 |
|  | |  |  |  |
|  | |  |  |  |
| irr does not Granger Cause dps | | 10 | 2.38082 | 0.1878 |
| dps does not Granger Cause irr | | | 1.22562 | 0.3689 |
|  |  | |  |  |
|  |  | |  |  |

From the result, it was noticed that share prices granger cause dividend per share and internal rate of return, which implies that changes in the stock prices of the firm will have adverse effect on the dividend and internal rate of return of the firm. We also saw a causal flow from internal rate of return to earnings per share and that of earnings per share granger causing dividend per share, showing a significant relationship between the both.

## IMPULSE RESPONSE TO ONE S.D

Impulse response analysis is practically used by policies makers to make decisions that will be projected into the future.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Response of DPS: |  |  |  |  |
| Period | MVS | EPS | DPS | IRR |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 | 0.000000 | 0.000000 | 1.718322 | 0.000000 |
|  | (0.00000) | (0.00000) | (0.36635) | (0.00000) |
| 2 | 0.131365 | -0.418076 | -0.402875 | 0.317751 |
|  | (0.55474) | (0.35853) | (0.57643) | (0.38849) |
| 3 | 0.563164 | 0.060423 | 0.007597 | 0.532437 |
|  | (0.51552) | (0.37461) | (0.50522) | (0.38999) |
| 4 | 0.499170 | -0.335710 | 0.523501 | -0.216677 |
|  | (0.48690) | (0.30706) | (0.45905) | (0.33471) |
| 5 | -0.379350 | 0.207661 | -0.291008 | -0.139236 |
|  | (0.39868) | (0.24387) | (0.42524) | (0.28476) |
| 6 | -0.137735 | 0.044691 | 0.005335 | -0.041543 |
|  | (0.36792) | (0.20993) | (0.33810) | (0.20260) |
| 7 | -0.014681 | -0.004650 | -0.041411 | 0.048690 |
|  | (0.26342) | (0.13744) | (0.19850) | (0.16955) |
| 8 | 0.078820 | -0.023104 | 0.026100 | 0.047753 |
|  | (0.22601) | (0.11047) | (0.14262) | (0.12993) |
| 9 | 0.045445 | -0.021950 | 0.031003 | -0.007766 |
|  | (0.16912) | (0.07994) | (0.09260) | (0.07472) |
| 10 | -0.021656 | 0.011255 | -0.010254 | -0.017223 |
|  | (0.10507) | (0.04489) | (0.05604) | (0.07031) |

Source: Eview,8

The table above, shows the various projection of data into the future, from the result, accepting the fourth year for short run analysis, MVS impulse response to own shock is 49.9% while the impulse response to shocks emanating from other explanatory variables are -33.5%, 52.3% and -21.6% respectively. However, on the long run analysis, using the ninth year result, it was noticed that the impulse response own shock was negative, while the negative response to shock from EPS became positive leaving others negative. These indicate that the variables are randomly volatile and inconsistent for future decisions.

## VARIANCE DECOMPOSITION

The variables are decomposed into the future, the future error of impulse response is expected to be corrected to allow for more realistic decision making.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variance Decomposition of  MVS: |  |  |  |  |  |
| Period | S.E. | DPS | IRR | EPS | MVS |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| 1 | 1.718322 | 10.56476 | 59.07032 | 5.753309 | 24.61161 |
| 2 | 1.846063 | 21.63078 | 23.47837 | 18.74781 | 36.14305 |
| 3 | 2.003073 | 24.64947 | 21.05715 | 19.44261 | 34.85076 |
| 4 | 2.166835 | 25.46364 | 21.26811 | 19.13372 | 34.13452 |
| 5 | 2.232997 | 25.78607 | 20.86688 | 18.92419 | 34.42287 |
| 6 | 2.238079 | 25.76424 | 20.91895 | 18.89677 | 34.42004 |
| 7 | 2.239044 | 25.74483 | 20.88230 | 18.89776 | 34.47511 |
| 8 | 2.241211 | 25.74460 | 20.88230 | 18.89803 | 34.47507 |
| 9 | 2.242007 | 25.74258 | 20.88603 | 18.89633 | 34.47506 |
| 10 | 2.242230 | 25.74261 | 20.88350 | 18.89528 | 34.47861 |

Source:E-view

From the result, we noticed that the variables decomposed show consistent result significantly erasing the future error committed by impulse response analysis, however, the variance decomposition of MVS to own shock is 2.24% (using the ninth year for estimation) while other shocks emanating from other variables were equally distributed in showing consistent pattern. Therefore, it is expected that future reliance of these variables for decision making will be realistic.

## CONCLUSION AND RECOMMENDATION

Dividend is that portion of the after tax profit that is distributed to shareholders on a pro-rata basis (Agarwal, 1991); there are various factors that affect the payment of dividend such as: liquidity, government policy, investment decisions, taxation among others. Different schools of thought have contributed to identify the relevance of dividend policy in determining the value of a firm.

The empirical result in our analysis revealed that dividends per share have an inverse relationship with the share price in the stock market; this result is in agreement with the empirical analysis done by so many scholars in the field of finance; though, earnings per share have shown a predominant feature in enhancing the value of a firm. The ordinary, least square result shows both a positive and significant relationship between earnings per share and stock market prices while the internal rate of return is both inverse and insignificant to the stock price movement in the stock market.

It is therefore recommended that financial managers should always implement decisions that will adjust the equity- debt structure in the balance sheet in order to enhance the earnings per share, as every rational investor tends to use the earnings per share as rationale in valuing the company, which will be reflected in the share price of the firm. Consistency in dividend payment cannot be over-emphasis as a key factor used by investors and shareholders to determine the value of the company.

# Impact of economic policy uncertainty on dividend decision: A moderating role of board financial expertise

## Abstract

Increased competition in the world of emerging financial markets has highlighted the need for more strategic and far-sighted decisions. Living in a constrained economy investor has always been sensitive about the dividend patterns offered by the firm. Current study focuses on the moderating role of board financial expertise (BFE) on dividend decision of the firm during economic policy uncer- tainty (EPU), by taking data for 517 nonfinancial listed firms from year 2007–2015. Study presents its empirical model in two forms based on dividend initiation (Di) by nondividend payer firms and dividend termination (Dt) by already dividend paying firms during EPU. Logit model was employed to access the effect of explanatory variables on the probability of terminating the dividend by dividend payers and probability of initiating the dividend by nondividend payers during EPU. The results indicate that firms terminate dividend at the time of uncertainty, but when BFE was introduced as a moderator, previously non- payer firms initiate dividend and previously payer firms sustain dividends pay- ments at the time of EPU that remains robust with the inclusion of additional CEO level and corporate governance variables. Study further confirms during the EPU, dividend decisions in turn significantly affect firm value as supported by expectancy theory. Results suggest that BFE can be an important signal for keen market participants in deciding future dimensions of a firm.

## KE YWOR DS

board financial expertise, dividend policy, economic policy uncertainty, emerging financial market

## INTRODUCTION

Dividend policy behavior is at the core of finance theories and is still the most debatable and prominent issue in the corporate finance liter- ature for both developed and developing markets. Numerous researchers have devised theories and studies to uncover the issues pertinent to dividend policy dynamics, but Black (1976) refers to the dividend as a puzzle. Brealey and Myers (2003) argue that the divi- dend is among the top 10 unresolved problems of finance. Lintner (1956) proposes the dividend partial adjustment model and suggests that current year profits and previous year dividends are the only two contributing factors for a firm's dividend.

A plethora of literature identifies debt financing, earning mea- sures, free cash flows, firm growth, investment opportunities, firm size, large shareholders, firm risk level, and so forth, as potential con- tributors for determining a firm's dividend policy for both developed and developing markets (Bhattacharya, 1979; Ho, 2003; Kale and Noe, 1990; Charalambous et al., 2000; Al-Malkawi, 2007; Anil and Kapoor, 2008; Juma'h and Pacheco, 2008; Ahmed and Javid, 2008; Ramli, 2010; Mehrani et al., 2011; Al-Shabibi and Ramesh, 2011; Hashemi and Zadeh, 2012; Appannan and Sim, 2011). In addition to these factors, researchers have also identified board size, board com- position, board independence, board gender, ownership concentra- tion, outside directors, audit type, CEO power, institutional ownership, investor protection, and shareholder rights as the key determinants of dividend policy under the umbrella of corporate gov- ernance (Adjaoud and Ben-Amar, 2010; Abor & Fiador, 2013; Setia- Atmaja, 2010; Erol and Tirtiroglu, 2011; Al-Shabibi and Ramesh, 2011; La Porta et al., 2000).

Economic policy uncertainty (EPU hereafter) and dividend deci- sion have never been simpatico in literature. As soon as uncertainty emerges, firm's decision of dividend disappears. Initially, it was observed that firms which were already paying dividends, terminated it and those not paying any dividends previously, withdrew any initia- tion decision (Huang et al., 2015). Problem pertaining to this shift is long term, where lack of stability and sustainability of dividends in the time of EPU disappoints people in the market about firm and stake- holders get bad vibes about the future of that company (Attig et al., 2018). Hence, creating a bad image for the firm that will stay for longer than that EPU (Nagar et al., 2019). According to expectancy theory (Vroom, 1964), people behave in a specific way because they get motivated to select one specific behavior over the others due to the built expectations from that selected outcome. Explaining theoret- ical implications here, if investors will get news of dividend termina- tion or no initiation from a firm in the market, they will refrain in the future even from investing into that firm.

It is imperative to explore the interesting phenomenon of how financial expertise on board (Henceforth BFE) and financial knowledge of the members of the board transforms decision regarding dividends in the time of policy uncertainties. EPU may appear as cause of financial distress in countries related to performance of firms in that economy along financial decision taken by the country in general (Degiannakis & Filis, 2019). Therefore, it is required to take strength of its argument from the provided facts and explores if EPU can affect the most critical decision of the firm (Baker et al., 2016) named as “dividend decision.” The current study, therefore, constructs models that are based on dividend initiation (di) and dividend termination (dt) dummy. Introducing BFE as a moderating variable between EPU and dividend decision opens new gates into theoretical literature on dividend puzzles.

EPU stresses a raise in already existing puzzling nature of equity premium and creates uncertainty (Lei et al., 2015). Uncertainty can be classified into two types, firm-specific source of uncertainty and non- firm-specific uncertainty. EPU is one form of non-firm-specific uncertainty occurring due to policy-related or regulation-related shocks and other factors outside control of a firm (external factors). Examples of such external factors include some terrorist attack or a black-market open player, making EPU unavoidable to hedge.

## CONTEXT AND BACKGROUND

There is a need to explore and investigate predicted model by using an objective approach. Dividend decision has been disintegrated into dividend initiation (Henceforth *Di*) and dividend termination (Henceforth *Dt*). Profiling for concerned years EPU data for China pro- vides empirical evidence on the raised research question. Hence, one thing hard to predict is either EPU will lead to *Di* or *Dt* of already running dividend. Critical role is played by investigating this relationship for BFE. The suggestion of BFE as a missing variable is novel evidence, presented in the current work, that facilitates explanation about firm's ideology for dividend design specifically in the period of uncertainty so that investors are well versed to aim expectations. It can be clearly seen from the results that firms with more weightage of BFE focus on dividend patterns to be more sustainable, attracting more investors, and repute themselves as the safe investment firm. Results are strongly in line with expectancy theory, suggesting that even in the time of uncertainty, few firms with high BFE will initiate dividend in expectation for high firm value in the market but firms terminating dividend in times of EPU will give low expectations to the investor. It is suggested that firms expecting to earn more of a good will and a powerful image creation into the stock market will think about this long-term investment, and, with the support of the top management, the practice will be announcing dividends even when exposed to EPU.

## PLAN OF STUDY

Current study aims at exploring the impact of economic policy uncertainty on dividend decision. As a huge gap was found regarding dividend paying behavior in the situations of uncertainty. Current study plans to explore how firms in China will behave at the time of EPU. Additionally, study also aims at empirically exploring moderating role of board financial expertise on the relationship between economic policy uncertainty and dividend decision.

## RATIONALE OF STUDY

Huge literature on dividend policy exists but not sufficient knowledge available on influence of uncertainty due to government policies or practices or regulations on the dividend payout policy. Arguably, rea- son behind this can be daunting challenge of EPU measurement (Gulen & Ion, 2016). Current research, however, adds into dividend payout policy and EPU literature by using Baker et al. (2016) index to measure EPU and introducing board financial (BFE) expertise as a moderating variable. Surprisingly BFE has never been tested in the past for its role play between EPU and dividend payout decision.

## SIGNIFICANCE

Study is an effort to analyze effect of EPU on dividend decision (*dt*/*di*) with moderating role of board financial expertise. Study is motivated due to four major reasons. *Firstly*, EPU might change perception of a top management regarding a business environment with stability (Brav et al., 2005). As narrated by the literature, policy uncertainty cumulatively influences real market economy of a country, ultimately impacting growth of a firm and its future earnings prospects. Baker et al. (2016), demonstrated that EPU leads to weaker economy and recovery might takes long time. Hence, management needs to decrease spending, investments, and hiring, as a manager forecasts a rise in hypothesized cost of available external financing it leads firm to select a more conservative form of dividend paying policy to fulfil criteria of “saving for the rainy days.”

*Secondly*, EPU might raise investor's risk perception because a surge in managers perceived risk can lead to dividend sustainability in two ways. First, rising investor risk perception can lead toward high firm's cost of capital (Huang et al., 2015). Second, EPU can cause increased risk perception of manager as risk of cash flow related to policy uncertainty increases (Berkman et al., 2011). Therefore, firms regulate respective dividend policies to get aligned with expected earnings of future (Benito & Young, 2003).

*Thirdly*, a plethora of literature is available on EPU providing researchers to investigate its effect on policies of firms (Drobetz et al., 2018). In compliance with Barrero et al., (2017), EPU is related to uncertainty in long run. Thus, it is important to analyze impact of EPU on dividend policy of the firm.

*Fourthly*, regardless of uncertainties due to firm-specific indica- tors, technology innovation, and uncertainties of environment (Parnell et al., 2015), EPU is the result of government regulations, practices, and policies outside the control of manager like attack by terrorists and commodity shocks, making EPU hard to defend. Nevertheless, EPU relates to uncertainties that are event driven like financial and political crisis; it comprises of policy uncertainty rather than the time- frame zone for event-driven uncertainty (Baker et al., 2016). Hence, it is important to measure mechanism of EPU effecting dividend deci- sion as EPU has always been varying with time (Baker et al., 2016), leading to increase in risk perception of an investors and, therefore, effects investor demand for dividend.

Current study provides following contributions to existing litera- ture: (1) study analyses role of BFE on dividend decision during uncer- tainty period adding both into BFE and policy uncertainty literature,

(2) novel idea of introducing dividend policy literature along BFE dur- ing EPU, and (3) to link BFE role on dividend sustainability during EPU to enhance firm value. Hence, results suggest that BFE can be an important signal for keen market participants in deciding future deci- sion dimensions of a firm.

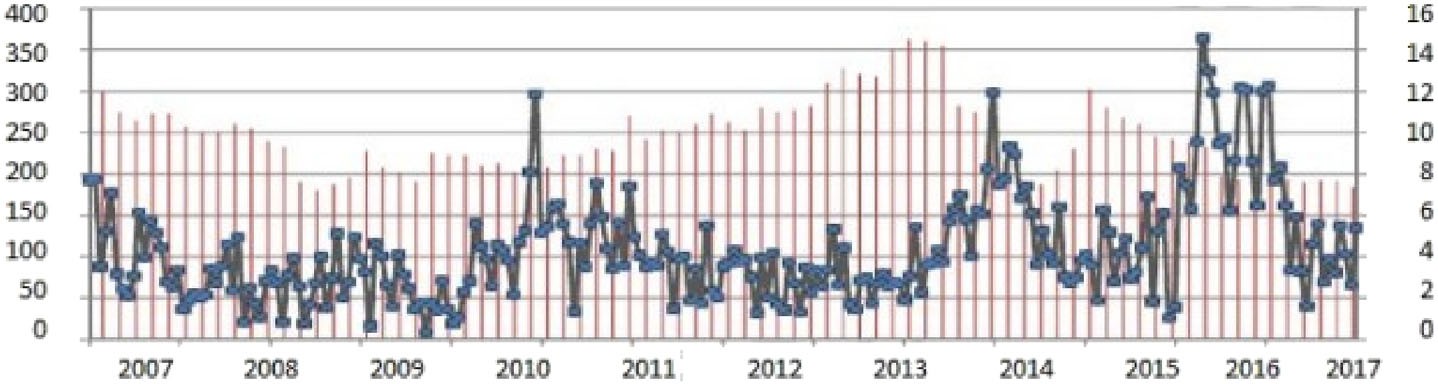
Rest of the paper is structured as follow. Section 2 discusses the literature review. Section 3 discusses the empirical strategy and modeling. Section 4 discusses the data description and research meth- odology. Section 5 includes the empirical findings and finally brief conclusion.

## LITERATURE REVIEW

The purpose of this study is to investigate moderating role of BFE on dividend decision during EPU. Financial expertise is an important fac- tor associated with board efficacy (Agrawal & Chadha, 2005; Karamanou & Vafeas, 2005). BFE helps in audit control implementa- tion in a firm; it also improves monitoring role performance and providing advice to prevent shareholder interest as well (Qiao et al., 2018). Recent strand of emerging literature in developed coun- tries provided the evidence that other than improving financial reporting quality of a firm, BFE can help in better corporate policies application like hedging, taxation, dividend, borrowing, and compensa- tion improving performance (Dionne & Triki, 2005; Guner et al., 2008; Sarwar et al., 2018).

As the previous literature has not discussed an important moder- ating variable that is a board's financial expertise, current study fills this gap. Also, study by Tran (2020) discusses dividends policy that cannot be generalized nonbanking firms. Current study uses a more balanced set of data. Current research was an extension of study con- ducted by Sarwar et al (2020) to explore the difference in the pres- ence of a more financially expert board and their way of looking into the dividend matters at the time of EPU.

It has been reported that, China, although, has corporate gover- nance policy but policies regarding composition of board and its finan- cial expertise have not been clearly defined. Regardless of the fact that, having financial expertise on board delineates board efficiency, this core competency goal has been ignored. Hence, it remains a gray- shaded area that how board financial expertise will affect relationship between EPU and dividend decision. Also, study pertains to manage- rial implications regarding devising board financial expertise policies for betterment of market. As argued by Sarwar et al., (2020) for improving corporate governance of a firm, it is critical to have at least one financial expert on board who can better off with market syn- chronized decision-making to benefit the firm. That paper also argued, even at the time of economic policy uncertainty, a financial expert can exactly shape a decision to remain efficient in earning as well as to sustain market position in front of existing as well as prospective investors. Hence, current study will endeavor in exploring the actual role of having a financially expert panel on relationship between EPU and dividend sustainability.

Romance of puzzling phenomenon of dividend has long cap- tured the attention of researchers, academicians, and practitioners. Finance theory has always framed dividend policy dynamics as a positive prospect for shareholder (Black, 1976). Research contin- ued in the area with no conclusions and leaving dividend phenom- enon as an enigma. Dividend paradigm gains its importance from the phenomenon of expectancy theory (Vroom, 1964). Investor proclaims its attachment with a firm relying on this expectation of earnings. Most important antecedent of dividend is future and its unpredictability. Future uncertainty has real repercussions for behavior of market agents (Bernanke, 1983; Bloom, 2009; Bloom et al., 2007). State policymakers might add second layer of uncer- tainty including fiscal, monetary policy, or regulations termed as economic policy uncertainty (EPU) (Figure 1). The ambiguity of an economic policy makes it very difficult to diversify. Hence, uncer- tainty relevant to economic policy of governments may impact financial markets in general and firm's decisions specifically. Litera- ture has long been inconclusive over the fact that changes in firms operating environment may hit decision made by the firm (Andreou et al., 2017).

IG U RE 1

Behavior of EPU during 2007–2017 in China

Emerging literature has been arguing that policy change is one occu- pying factor that can shape any decision made by the top management (Wang et al., 2014). Besides extant literature in this field and plenty of knowledge, a soft spot remained. Nobody discussed the question that how changes in an economic policy or the uncertainty in EPU can dress the dividend decision of the firm. Previously, literature reported that if firms in a country are experiencing uncertainty in the environment, they are inclined to announce dividend and prefer to stay silent on any major decision that might lead to a fatal situation (Brav et al., 2008). It has been described in the studies (Floyd et al., 2015) that dividend payer firms might terminate dividends and wait for the uncertainty to move out of the zone. Here, one important aspect which never got attention of researcher in the past was this reaction of EPU toward dividend policy. Turning point for above mentioned situation came from the fact that peo- ple who are making this above-mentioned decision (to initiate or to termi- nate dividend) might transform shape of the relationship. Technically, thought provo king aspect of the study is to extend the effect of BFE lit- erature. Current study argues that while reporting the relationship between EPU and dividend, BFE can make a difference. Implying that, a change in BFE can change the *Di* and *Dt* decisions.

Above conceptual frame work can be supported by evidence coming from Vroom (1964). He presumed that individual will act or behave in a specific way since they tend to get motivated toward selection of a specific behavior over some other behaviors because of what they expect as a result of selected behavior. Uncertainty is the mean through with political and economic factors affect markets (Huang et al., 2015).

At times of political instability uncertainties coming along, changes in governments and their policies increase keenness of the investor into risk affairs in financial markets leading to effect on divi- dend payout decision of the firms. *Firstly*, because higher risk is associ- ated with higher equity premium being demanded, Pecking order theory (Myers & Majluf, 1984), and making firm to announce lesser dividends in such time. *Secondly*, manager in such times seeks to retain cash for bad times and avoid any external financing cost as well mak- ing shareholder unhappy as he thinks he is not being taken care of. Hence, at times of policy uncertainty, fund managers are more likely to terminate dividends and less likely to initiate dividends (Wang et al., 2014), keeping all other things constant. Although, it is well understood by those managers that shareholder senses the uncer- tainty becoming more sensitive toward protection of their investment as explained by agency theory (Eisenhardt, 1989).

At that time, they will grab for only those firms offering dividends, that is, initiating more and terminating less. As shareholder believes in the story moral that it is better to have one in hand than two in bush. Revealing that, when EPU increases, there is very low chance that any nonpayer firm will get to initiate dividends and evena tax payer might go into no dividend zone.

H1. *EPU has a negative relationship with Di*.

H2. *EPU has a positive relationship with Dt*.

BFE has been shown to have a strong relationship with dividend payout decision (Qiao et al., 2018; Sarwar et al., 2018). Literature argued in the past that dividend payout decision is effected by agency problem forcing shareholder to think that his best interest is not being met. Issue that has always been a part and parcel of this relationship is that a manger always wants to retain what investor wants to achieve as dividend (Rozeff, 1982). Reason behind is, manager prefers to retain that cash in firm to reduce external financing cost to be borne by firm and thus declining dividend payment. Hence, ignoring rule of shareholder wealth maximization resulting into an annoyed shareholder who might take his investment out of the firm. Now, cur- rent study proposes that if a firm is having financial experts in the board, they combat the agency conflict by reducing risky investments by the manager and more handsome dividends even at the time of EPU. This argument supports our hypothesis that:

H3. *Having a board with more financial expertise moderates the rela- tionship between EPU and dividend payout*.

Current study explores effect of economic policy uncertainty on dividend policy with a moderating role of BFE in emerging market of China. Policies in China are more of an indicator for specifying an ideal, exclusive, and better-performing market setting to measure role of EPU on dividend policy. Context of choosing Chinese firms data comes from two major reason. *Firstly*, China stands second largest economy that is still acting as transition economy, moving away from a centrally planned economy toward more of a market-based econ- omy. While moving in this transition phase, Chinese government faces economic policy problems unceasingly (Chen et al., 2017). *Secondly*, China with its emerging market trend is a lever for central government to encourage economic growth through smoothing transition of econ- omy. Post financial crisis 2008 and euro-debt crisis, huge rise in eco- nomic policy uncertainty was seen in China (Yin et al., 2017). Hence, with the policy uncertainty hype, China security regulatory commission (CSRC) developed many new regulations like SOE share reforms, IPO periodic closure, semi-mandatory dividend policy, and reopening reforms, to facilitate share-holders interest and to handle market that was unstable due to that wave of uncertainty in economy. Hence, it stands critical to consider and measure effect of EPU on dividend decision with moderating role of BFE of Chinese firms to generalize the outcomes for emerging and developed economies both.

## EMPIRICAL STRATEGY AND MODELLING

## BFE, EPU, and dividend payout

To econometrically analyze the impact of BFE on dividend sustainabil- ity during EPU, we use two models that are based on dividend initia- tion (di) and dividend termination (dt) dummy. We employ the following logit models (Equations (1) and (2)) to access the effect of explanatory variables on the probability of terminating the dividend by dividend payers, and probability of initiating the dividend by nondividend payers during period of uncertainty.

*dt* = *β*1*EPU* \* *FE* + *β*2*dta* + *β*3*rete* + *β*4*roa* + *β*5*mv* + *β*6*cash* + *β*7*std* + *εt*,

(1)

*di* = *β*1*EPU* \* *FE* + *β*2*dta* + *β*3*rete* + *β*4*roa* + *β*5 *mv* + *β*6*cash* + *β*7 *std* + *εt*.

(2)

Suppose, *Y* is a dividend decision binary response variable as (Yc

{*dt*, *di*}), *Q* represents the BFE during period of EPU, and *M* is a vector variable which contains characteristics of firms, industry-level fixed effect, and a constant. The Logit regression model for dividend termi- nation decision takes the following form that assumes the likelihood of terminating dividend:

P (*dt* = 1) = Exp(αQ+ Mβ) . (3)

1 + Exp(αQ+ Mβ)

Similarly, likelihood of initiating dividend decision takes the fol- lowing form:

P (*di* = 1) = Exp(αQ+ Mβ) . (4)

1 + Exp(αQ+ Mβ)

In Equation (3), Exp (.) is exponential absolute wherein coefficient estimates are α and β. Chances of firms to terminate dividend is the ratio of probability of firms to terminate dividend (P [*Dt* =1]) to the probability of dividend paying firms (1 − P (*Dt* = 1)). Analogously in Equation (4), chances of firms to initiate dividend are the ratio of

probability of firms to initiate dividend (P [*Di* = 1]) to the probability of nondividend paying firms (1 − P (*Di* = 1)). In present study, we control for the firm characteristics that affect dividend payout that includes

asset growth (dta), return on assets (ROA), retained earnings (RE), cash holdings (Cash), market value (MV), and firm risk (standard deviation of monthly stock return).

## BFE, EPU, and dividend payout under different control governance variables

To check the robustness of our results, we further estimate the role of BFE on dividend sustainability during EPU with the inclusion of additional control variables. We include the corporate governance and CEO-related control variables in motivation to previous literature that examines dividend decisions are effected by corporate governance and CEO characteristics (Abor & Fiador, 2013; Xiao et al., 2019). We further examine the corporate governance significance by augmenting our main regression equation with additional control variables (board size, board independence, CEO-duality) and by retaining explanatory variables in our main regression equation.

## Firm value and dividend sustainability during uncertainty period

The study further estimates the relationship between dividend initia- tion (Di) and dividend termination (Dt) decision on firm value (Tobin Q) during the period of uncertainty (EPU). Firms are sticky in making dividend payments as they are typically grudging to reduce dividend; in particular, they are reluctant to avoid even when firms have nega- tive earnings. The role of BFE and dividend payments is to reduce agency conflict (Sarwar et al., 2018); therefore significant association is predicted between dividend payment during period of uncertainty and firm value, as the dividend payment enhances firms' value (Gordon, 1963; Xiao et al., 2019), and the reduction of dividend pay- ment reduces firm value (Nippel, 2008).

## RESEARCH METHODOLOGY

## Data

The ongoing study focuses on nonfinancial listed firms from an emerg- ing economy of China. Sample consists of 517 Chinese firms listed on Shenzhen and Shanghai Stock Exchanges. The study period is from year 2007 to 2015. We merge firm-level data with EPU index advanced by Baker et al. (2016). Availability of director's profile limits our sample data to 517 nonfinancial listed firms. We collected Chi- nese firm-level data from China Stock Market & Accounting Research (CSMAR) database. To overcome the outliers influence, we winsorize firm-level variables at first and 99th percentiles.

## Variables

Study's empirical tests have number of variables that are introduced under this subsection. Variables detail is summarized in Appendix. Dependent variable of this study is dividend initiation and dividend termination decision variable. Existing studies on dividend have docu- mented a general time trend, wherein dividend has declined over a time in recent decades (Fama & French, 2001). Omitted time trend may lead to measurement error, if the time trend is not properly addressed in level of dividend policy as it may contain time-trend. Our data sample covers 3539 firm-year observations from year 2007 to 2015. These facts may lead to issues while estimating dynamic changes in dividend payout policy in response to EPU. While consid- ering these concerns, current study emphasizes on the changes in div- idend policy rather than changes in EPU itself. Therefore, instead of dividend payout, our main variable of interest is dynamic changes in dividend payout policy: Di (dividend initiation dummy variable) and Dt (dividend termination dummy variable). More precisely, di is define as follow. We first categorize study sample as dividend payers and nondividend payers. We define di for firms that have not paid divi- dend in any of the past 3 years and categorized as past nonpayers. If the dividend past nonpayers start paying dividend in current year, assign a value of 1 to di (dividend initiation dummy), else 0. Similarly, define dt for firms that have paid dividend in all of the past 3 years and categorized as past payers. If the past dividend payers stop paying dividend in current year, assign a value of 1 to dt (dividend termina- tion dummy), else 0. Study's main explanatory variables are EPU (eco- nomic policy uncertainty) and EPU\*BFE (economic policy uncertainty\* board financial expertise). We also control for number of control vari- ables by following extant literature by (Fama & French, 2001; Chay & Suh, 2009), to examine the impact of BFE on firms' dividend sustain- ability during period of EPU. Study's primary regression control for firm characteristics includes asset growth, firm size, retained earnings, return on assets, cash holdings, and stock return volatility. Study fur- ther analyzes the moderating role of BFE during period of uncertainty on dividend sustainability by using board additional control variables as board size, board independence, and CEO duality and also how the dividend sustainability affects firm value during period of uncertainty.

Study measures board financial expertise (BFE) by considering extent of financial expertise a corporate board holds. According to SOX of 2002 and section 407, financial expert is defined as one hav- ing experience and expertise in finance or accounting or supervisory skills along financial responsibilities. Different scholars used SOX defi- nition to elaborate financial expertise (DeFond et al., 2005; Krishnan and Visvanathan, 2008). Current study identifies financial expert as one with degree in economics, accounts, and finance or having work experience as an accountant, chief financial officer, financial advisor, auditor, finance manager, or a financial analyst in a financial or non- financial company. For Chinese companies, data for financial expertise on corporate board are collected from CSMAR database, along educa- tional background and the work experience.

## EMPIRICAL FINDINGS

Table 1 reports key statistics of study variables. Panel A summarizes the number of firm-year observations, mean, standard deviation,

## TA BL E 1 Statistical analysis of study data

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Panel A: Univariate analysis | | | | | | | | | | | | | | | | | | | | | |
|  | No of Obs | | | | Mean | | | Median | | | | Std.dev | | | Minimum | | | | Maximum | | |
| Dt | 2665 | | | | 0.013 | | | 0 | | | | 0.12 | | | 0 | | | | 1 | | |
| Di | 873 | | | | 0.69 | | | 1 | | | | 0.46 | | | 0 | | | | 1 | | |
| EPU | 3538 | | | | 157.3 | | | 136.57 | | | | 83.78 | | | 73.12 | | | | 304.22 | | |
| BFE | 3538 | | | | 0.35 | | | 0.36 | | | | 0.26 | | | 0 | | | | 1 | | |
| Dta | 3538 | | | | 0.04 | | | 0.02 | | | | 0.51 | | | −0.68 | | | | 0.46 | | |
| Roa | 3538 | | | | 4.42 | | | 3.3 | | | | 6.72 | | | −9.96 | | | | 48.96 | | |
| Re | 3538 | | | | 0.16 | | | 0.23 | | | | 0.74 | | | −6.9 | | | | 9.83 | | |
| Mv | 3538 | | | | 22.72 | | | 22.64 | | | | 1.29 | | | 12.36 | | | | 29.56 | | |
| Cash | 3538 | | | | 1.4 | | | 0.82 | | | | 2.09 | | | −0.5 | | | | 40.72 | | |
| Panel B: Correlation matrix  Dt | | | | | Di | | EPU\*FE | | | Dta | Re | | | Roa | | MV | | Cash | | | Sd | | |
| Dt | | 1.000 |  | | | | | | | | | | | | | | | | | | |
| Di | |  | 1.000 | | | |  |  | | |  | | |  | |  | |  | | |  |
| EPU\*BFE | | −0.101 | 0.150 | | | | 1.000 |  | | |  | | |  | |  | |  | | |  |
| Dta | | −0.117 | 0.089 | | | | −0.025 | 1.000 | | |  | | |  | |  | |  | | |  |
| RE | | −0.145 | 0.154 | | | | −0.016 | 0.050 | | | 1.000 | | |  | |  | |  | | |  |
| ROA | | −0.081 | 0.069 | | | | −0.012 | 0.008 | | | −0.014 | | | 1.000 | |  | |  | | |  |
| MV | | −0.073 | 0.040 | | | | −0.035 | −0.030 | | | 0.087 | | | 0.110 | | 1.000 | |  | | |  |
| Cash | | −0.015 | 0.143 | | | | −0.003 | 0.031 | | | 0.010 | | | 0.107 | | 0.124 | | 1.000 | | |  |
| Sd | | 0.046 | −0.065 | | | | −0.013 | −0.001 | | | −0.019 | | | 0.025 | | −0.104 | | −0.019 | | | 1.000 |

## TA BL E 2 Economic policy uncertainty and dividend pay-out decisions

|  |  |  |
| --- | --- | --- |
|  | Dividend decisions |  |
| Variables | Dt | Di |
| EPU | 0.008\*\*\*  (0.002) | −0.004\*\* (0.001) |
| Dta | −3.64\*\*\* (0.64) | 2.289\*  (1.26) |
| Rete | −0.630\*\*\* (0.135) | 0.639\*\*  (0.297) |
| Roa | −0.149\*\*\* | 0.019 |
|  | (0.037) | (0.019) |
| Mv | −0.082 | 0.06 |
|  | (0.124) | (0.156) |
| Cash | −0.009  (0.126) | 0.360\*\*\*  (0.124) |
| Sd | 1.351\*\*  (0.657) | −4.455\*\* (1.792) |
| No of obs | 2386 | 868 |
| Pseudo R2 | 0.078 | 0.065 |

*Note:* This table presents logit regression results of the dividend termination decision and dividend initiation decision for Chinese firms over the period from year 2007 to 2015. Here, dt is the dividend termination dummy, di is the dividend initiation dummy, EPU is economic policy uncertainty index, dta is the growth rate of assets, rete is retained earnings-to-total equity ratio, roa is return on assets, mv is firm size, cash is cash holdings, and std is stock return volatility. Detailed variable definitions are given in Appendix. S.deviation is given in parentheses. \*\*\*,

\*\*, and \* next to coefficients indicate that coefficients are significantly different from zero at the 1, 5, and 10% confidence levels, respectively.

minimum, and maximum value for each variable. First two rows con- firm the rarity of dramatic changes in dividend policy and reports firms follow sticky pattern of dividend payments. Such as, dt mean is 0.013, which shows out of past-payers sample, 2665 firm-year observations, and only 1.3% firm has terminated divined. For the past nonpayer's sample, 873 firm-year observation, di mean is 0.69 means, 69% has initiated divined.

Panel B reports correlation matrix for study main variables. Dt is negatively related to EPU\*FE, and Di is positively related to EPU\*FE.

As the Pearson correlation between EPU\*FE and is −0.101 and

between EPU\*FE and di is 0.150. Panel B reports preliminary view of relationship between EPU and dividend policy, and, in next section, a relationship is address in the context of multivariate regression context.

## Economic policy uncertainty and dividend pay-out decisions

We employ the logit regression model for investigating dividend termination and dividend initiation decision during EPU, and results are reported in Table 2. Study first examines the impact of EPU on dividend termination decision, and result shows that EPU is significantly positively related with dividend termination decision, while it has negative relation with dividend initiation decision. The value of coefficient of EPU is 0.008 (significant at 1% level), and it indicates that

past dividend payers are terminating dividend payouts by approximately 72% (= [exp [0.008\*83.78] − 1]\*100%) in response of one standard deviation increase in EPU. Our results indicate that past

dividend payers are more likely to terminate dividend during period of high economic policy uncertainty. The result shows that EPU has statistically significant negative impact on dividend initiation with a coefficient of 0.004 (highly significant at 1% level). Our result indicates that a past nonpayer decreases the dividend initiation by

approximately 26% (= [exp ([−0.004]\*83.78) − 1]\*100%) in response

of one standard deviation increase in EPU. Thus finding indicates that past nondividend payers are less likely to initiate dividend during period of policy uncertainty.

In addition to analyzing the impact of EPU on dividend pay- out policy decisions, we also control for other firm characteristics that are commonly used in extant literature, for example, (Fama & French, 2001). Result shows firms that are mature (measured as rete), profitable (measured as ROA), high asset growth (measured as dta), and cash holdings (measured as cash) are more likely to initiate during period of high EPU and less like to terminate dividend. Firm-level uncertainty (measured as std of monthly stock return) is positively and significantly related to dividend termination decision and negatively related to dividend initiation.

**TABL E 3 Role of board financial expertise on dividend payout decisions during period of economic policy uncertainty**

|  |  |  |
| --- | --- | --- |
|  | Dividend decisions |  |
| Variables | Dt | Di |
| BFE\*EPU | −0.094\*\*\* (0.019) | 0.010\*\*\* (0.003) |
| Dta | −5.179\*\*\* (0.861) | 2.90\*\* (1.340) |
| Rete | −0.553\*\*\* (0.144) | 0.735\*\* (0.332) |
| Roa | −0.147\*\*\* (0.38) | 0.021 (0.020) |
| Mv | −0.256\* (0.147) | 0.318\*\* (0.125) |
| Cash | −0.072 (0.164) | 0.318\*\* (0.125) |
| Sd | 1.277\*\* (0.65) | −3.84\*\* (1.80) |
| No of obs | 2386 | 868 |
| Pseudo R2 | 0.032 | 0.056 |

**TA BL E 4 Board financial expertise, dividend payout decisions during period of economic policy uncertainty with additional control variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model 1 |  |  | Model 2 |  |  | Model 3 |  |
| Variables | Dt | Di |  | Dt | Di |  | Dt | Di |
| BFE\*EPU | −0.100\*\*\* (0.020) | 0.017\*\*\* (0.003) |  | −0.094\*\*\* (0.02) | 0.018\*\*\* (0.003) |  | −0.010\*\*\* (0.021) | 0.017\*\*\* (0.003) |
| Dta | −5.14\*\*\* (0.960) | 2.640\*\* (1.285) |  | −5.203\*\*\* (0.855) | 2.89\*\* (1.285) |  | −5.170\*\*\* (0.963) | 2.64\*\* (1.285) |
| Rete | −0.698\*\*\* (0.164) | 0.627\* (0.337) |  | −0.545\*\*\* (0.145) | 0.702\* (0.337) |  | −0.692\*\*\* (0.165) | 0.618\* (0.337) |
| Roa | −0.148\*\*\* (0.040) | 0.023 (0.020) |  | −0.150\*\*\* (0.037) | 0.023 (0.020) |  | −0.150 (0.040) | 0.023 (0.020) |
| Mv | −0.130 (0.155) | 0.223 (0.172) |  | −0.261\* (0.150) | 0.220 (0.172) |  | −0.131 (0.157) | 0.226 (0.172) |
| Cash | −0.053 (0.150) | 0.312\*\* (0.127) |  | −0.079 (0.170) | 0.314\*\* (0.127) |  | −0.054 (0.158) | 0.310\*\* (0.127) |
| Sd | 0.510 (0.747) | −4.197\*\* (1.85) |  | 1.282\*\* (0.653) | −4.02\*\* (1.85) |  | 0.519 (0.755) | −4.25\*\* (1.85) |
| Bs | −0.284\*\*\* (0.064) | 0.153\*\*\* (0.039) |  |  |  |  | −0.277\*\*\* (0.065) | 0.146\*\*\* (0.41) |
| Bi | −0.065\*\* (0.022) | 0.051\*\* (0.017) |  |  |  |  | −0.066\*\* (0.023) | 0.050\*\* (0.017) |
| Ceo-duality |  |  |  | 0.634 (0.470) | 0.619\*\* (0.317) |  | 0.347 (0.484) | 0.2012\*\* (0.535) |
| No of obs | 2386 | 599 |  | 2386 | 599 |  | 2386 | 599 |
| Pseudo R2 | 0.032 | 0.012 |  | 0.054 | 0.052 |  | 0.125 | 0.054 |

*Note:* S.deviation is given in parentheses. \*\*\*, \*\*, and \* next to coefficients indicate that coefficients are significantly different from zero at the 1, 5, and 10% confidence levels, respectively.

## Moderating role of board financial expertise on dividend sustainability during period of EPU

To investigate the role of BFE on dividend sustainability during period of EPU, we employ the logit regression model for investigating how BFE affects dividend termination and dividend initiation decision during EPU, and results are reported in Table 3. Result shows the moderating role of BFE on firm dividend sustainability during period of EPU that confirms the role of BFE on dividend sustainability during period of EPU, as EPU\*FE is significantly negatively related with dividend termination decision while it has positive relation with dividend initiation decision. That confirms past dividend payers having more financial expertise on board terminating dividend payouts by approximately 0.02% (= [exp (−0.09\*83.78) − 1]\*100%) in response of one standard deviation increase. Thus our results indicate that past dividend payers with more financial expertise on board are less likely to terminate dividend during period of uncertainty. Moreover, Table 3 reports positive relationship between Di and EPU\*FE. The coefficient is 0.010 at 1% level of significance. It indicates that past nondividend payers are initiating dividend payouts by approximately 85% (= [exp (0.01\*83.78) − 1]\*100%) in response of one standard deviation

increase. Our results indicate that past nondividend payers with more BFE are more likely to initiate dividend during period of uncertainty. Thus finding indicates that past nondividend payers having BFE are more likely to initiate dividend during period of pol- icy uncertainty.

Further Table 4 reports the moderating role of BFE on dividend sustainability during EPU with the inclusion of additional control variables that confirms the robustness of study main findings (Xiao et al., 2019).

## Firm value and dividend sustainability during uncertainty period

Table 5 reports regression estimates for the relationship between divi- dend initiation (Di) and dividend termination (Dt) decision on firm value (Tobin Q) during period of EPU. Overall, results provide support on the role of dividend payout on firm value during uncertainty period.

This work compliments the study of Huang et al. (2015), reported, firms cut dividend payments during period of uncertainty because of increased cost of external financing or financing constraints. In present study, we confirm that firms with financial expertise on board initiate dividend payments during uncertainty period that in turn enhances firm value, and Dt decision in turn reduces firm value.

## CONCLUSION

In this paper, empirical investigation of moderating role of board financial expertise on dividend sustainability during the period of economic policy uncertainty is done. Through use of 517 nonfinancial Chinese firms from the year 2007 to 2015, study stands evident that presence of more financial expertise on board during period of EPU helps firms to sustain dividend. That confirms, past dividend payers/nonpayers with more financial expertise on board are less/more likely to terminate/initiate dividend during period of EPU. Some additional corporate governance and CEO-level variables also vigorously affecting the moderating role of board financial expertise on dividend sustainability during uncertainty. Further, during the period of EPU, Di/Dt decision in turn significantly affects firm value.

This is the first study that investigates the moderating role of board financial expertise on firms' dividend sustainability during period of EPU. Therefore, this study also provides important implication for policymakers. To mitigate the negative (positive) effect of EPU on dividend initiation (dividend termination), policymakers need to maintain the level of board financial expertise that understands the firms financial conditions, that in- turn affect firm policies. Further, this study provides new insights into dividend policy literature by documenting the moderating effect of board financial expertise on dividend sustainability during EPU that is in addition to the study of Sarwar et al. (2018) that confirms the presence of financial expertise on board effects the firm dividend policy. The future studies should also compare the result of emerging firms with the firms of developed markets to evaluate the influence of role of board financial expertise on dividend sustainability during period of EPU. Researchers can also limit the financial expertise to CEOs, with an audit committee only, and investi- gate the influence of their financial expertise on the variation in firm financial activities during period of uncertainty.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.