Reshaping Global Trade Finance and Supply Chains through Digital Supply Chain Finance Platforms

Abstract

This study examines the transformative impact of digital supply chain finance (SCF) platforms on buyer-supplier relationships, specifically focusing on their role in enhancing supply chain certainty and resilience. Adopting a multiple-case study design, the research investigates eight prominent digital SCF platforms through 34 in-depth interviews with practitioners and managers. The findings reveal how digital platforms facilitate supplier and buyer empowerment by fostering transparency, mitigating risk, and recalibrating traditional principal-agent dynamics. A systematic comparison between digital and conventional SCF platforms further underscores the distinctive capabilities of digital solutions in addressing contemporary supply chain vulnerabilities. The study advances the theoretical understanding of digital SCF by elucidating how technological affordances and innovative financing models contribute to the stability and adaptability of global supply chains. In doing so, it also provides practical implications for firms and policymakers seeking to leverage digital technologies to enhance supply chain robustness in an increasingly complex and uncertain trade environment.

Keywords: Digital Supply Chain Finance, Supply Chain Resilience, Digital Collaboration, Digital Platform, Trade Finance, Principal – Agent Dynamics.

1. Introduction

The landscape of global trade finance has undergone a significant transformation with the emergence of digital supply chain finance platforms, catalyzed by the advancements of the 4.0 industrial revolution (Song et al., 2021; Reza-Gharehbagh et al., 2022). These platforms have revolutionized traditional trade finance processes and addressed the pressing need for enhanced efficiency and transparency in global trade (Nguyen et al., 2021). In today's complex global commerce environment, digital supply chain finance platforms play a pivotal role in meeting the multifaceted needs of both buyers and suppliers (Durach et al., 2021; Pessot et al., 2023). By leveraging cutting-edge technologies such as blockchain, these platforms offer more than streamlined trade finance processes; they serve as catalysts for transformative change, providing participants unprecedented access to working capital, optimizing cash flows, and mitigating risks throughout the supply chain (Reza-Gharehbagh et al., 2022; Chen et al., 2022).

The key motivations driving this research are multifaceted. Firstly, digital supply chain finance (SCF) platforms integrate established financing practices—such as dynamic discounting and invoice financing—with advanced technologies to transform their scalability, accessibility, and transparency. While mechanisms like early payment discounting have a long history, digital SCF platforms amplify their impact by offering real-time insights, automated workflows, and broader access to financing (Reza-Gharehbagh et al., 2022; Nguyen et al., 2023). This shift represents a paradigm change not through the novelty of financial mechanisms but by optimizing established methods to foster greater liquidity, financial stability, and efficiency, particularly for suppliers. By leveraging technologies such as blockchain, artificial intelligence, and real-time data analytics, these platforms enable operational efficiencies and financial empowerment previously unattainable in traditional frameworks (Ning & Yuan, 2023). Recent studies underscore their role

in expanding access to financing and fostering supplier integration into global trade networks (Nguyen et al., 2023).

Secondly, buyers benefit significantly from digital SCF platforms, which enhance cash flow management, optimize working capital, and improve financial visibility. These digitally enabled advantages empower buyers to navigate the complexities of global trade with greater precision while strengthening buyer-supplier relationships through enhanced trust and collaboration (Shukla et al., 2023; Chen et al., 2022). For instance, automated payment tracking and predictive cash flow analytics allow buyers to manage liquidity better and reduce operational risks. Although this study primarily reflects platform-level insights, these perspectives are drawn from diverse interactions across supply chain ecosystems, providing aggregated trends and systemic buyer benefits (Shukla et al., 2023; Wandfluh et al., 2016). The adoption of digital SCF platforms thereby enhances supply chain resilience, creating a more robust and interconnected financial ecosystem aligned with modern, digital-first operational demands.

The current platforms available in the market offer various features and functionalities to enhance supply chain finance. For instance, certain platforms provide dynamic discounting and supply chain finance solutions that improve working capital management. Other platforms offer comprehensive treasury and finance solutions, including SCF capabilities, while some integrate SCF solutions with procurement and supply chain management tools. Additional platforms focus on flexible funding options and global reach; some provide an online platform for early payment solutions. Some platforms offer supply chain payments and marketplaces, simplifying B2B payments with SCF options and providing invoice finance and supply chain finance solutions, particularly for specific markets.

Evaluating the performance of these platforms, it is evident that they have significantly enhanced the efficiency and transparency of trade finance processes. They have empowered suppliers by providing access to early payments and flexible financing options, improving liquidity and financial stability. Buyers benefit from optimized cash flow management and extended payment terms, facilitating better financial planning and risk mitigation. However, a significant gap remains in understanding the nuanced dynamics of their adoption and impacts. Existing studies have illuminated the functionalities of these platforms, yet a comprehensive investigation into their implications and profound effects on digital trade finance is imperative (Reza-Gharehbagh et al., 2022; Nguyen et al., 2023). Moreover, recent research underscores the need to explore how these platforms contribute to the empowerment of both suppliers and buyers through innovative financing options and how buyers benefit from their adoption, ultimately leading to a more resilient supply chain (Banerjee et al., 2021; Pessot et al., 2023). Consequently, a deeper examination of the extent to which these approaches contribute to the certainty and resilience of the supply chain within these platforms is necessary to provide actionable insights for stakeholders in the evolving global trade finance ecosystem (Nguyen et al., 2021; Nguyen et al., 2023).

Therefore, this study aims to critically investigate the performance and impact of current digital SCF platforms. By examining their contributions to supplier and buyer empowerment and evaluating how these innovations enhance supply chain certainty and resilience, this research will address the existing gaps in the literature and provide valuable insights for the global trade finance community. This research aims to address the following research question:

Research Question: *How do digital supply chain finance platforms enhance the empowerment of suppliers and buyers through innovative financing approaches, and to what extent do these approaches contribute to the certainty and resilience of the supply chain?*

This study employs a multiple-case research design (Yin, 2017) grounded in agency theory (Noreen, 1988; Reim et al., 2018) to investigate the dynamics within the supply chain finance domain, focusing on eight prominent digital platforms. The selected platforms serve as distinct cases, allowing for a nuanced exploration of their unique features, challenges, and contributions to the empowerment of suppliers and benefits to buyers (Ketokivi and Choi, 2014). Through in-depth interviews with senior managers, suppliers, and buyers, the study aims to understand how these platforms shape principal-agent relationships and influence behaviors and outcomes. This approach comprehensively analyses the mechanisms at play within digital supply chain finance platforms.

The paper is structured into six parts to explore the dynamics within digital supply chain finance platforms comprehensively. Section 2 delves into the theoretical background, centering on adopting agency theory, which serves as the theoretical foundation for this research. Following this, Section 3 outlines the research methodology employed, elucidating the approach to investigate the phenomenon under study. Section 4 focuses on a detailed examination of the findings gleaned from eight prominent digital supply chain finance platforms, providing insights into their unique features and implications. Section 5 builds upon these findings, offering a comprehensive analysis of the impacts observed. The ensuing section, Section 6, underscores this research's theoretical and practical contributions, emphasizing its significance for resilient and certainty-driven supply chain finance practices. Additionally, this section critically evaluates the study's limitations and proposes avenues for future research.

2. Theoretical background

Supply chain finance has emerged as a pivotal component in modern business operations, revolutionizing the management of financial transactions within supply chains (Nguyen et al., 2023; Banerjee et al., 2021). At its core, SCF optimizes working capital and facilitates trade finance among three primary stakeholders: suppliers, buyers, and intermediaries (Salgueirinho de Andrade Guerra, 2022). Suppliers, as entities providing goods or services, often grapple with cash flow management and working capital constraints. Their need for timely payment and access to liquidity is crucial for sustaining operations and growth. On the other hand, buyers procure goods or services from suppliers and aim to balance profitability with financial risks. They seek to extend payment terms to preserve cash flow while maintaining positive supplier relationships (Nguyen et al., 2023; Chen et al., 2022; Tanveer et al., 2024). Intermediaries, including banks and SCF platforms, facilitate financial transactions between buyers and suppliers. These entities provide financing solutions, risk management tools, and technological infrastructure to streamline processes and enhance efficiency. By leveraging their expertise and resources, intermediaries bridge the gap between buyers and suppliers, ensuring timely payment and mitigating financial risks associated with supply chain transactions (Kong et al., 2024; Pellegrino et al., 2024; Ning & Yuan, 2023; Tanveer et al., 2024). In essence, SCF serves as a financial lubricant, enabling the smooth flow of funds within the supply chain ecosystem and promoting stakeholder collaboration.

2.1. Agency theoretical perspective of supply chain finance

Supply chain finance (SCF) operates within a complex web of relationships involving buyers, suppliers, and intermediaries, which can be analyzed through the lens of agency theory (Maestrini, et al., 2018; Shevchenko et al., 2020; Shukla et al., 2023). Within this framework, the principal-

agent relationship is a pivotal aspect, often characterized by asymmetrical power dynamics favoring buyers over suppliers (Wandfluh et al., 2016; Dekkers et al., 2020). Buyers typically dictate the terms of trade, exerting significant influence and resulting in limited autonomy and negotiating power for suppliers (Bhatia et al., 2024). Consequently, transparency and communication between buyers and suppliers may suffer, as suppliers may hesitate to voice concerns or challenge buyer demands due to their subordinate position (Han & Fang, 2024; Shi et al., 2024). Additionally, traditional supply chain finance relies heavily on manual processes for transaction management, heightening the risk of errors and delays. The limited visibility into transaction data and supply chain performance exacerbates these risks, making it challenging for participants to identify and address potential issues proactively (Awaysheh et al., 2021; Wang & Cai, 2024).

Moreover, governance mechanisms within SCF are often informal or non-existent, leading to inconsistency and inefficiency in decision-making processes (Chakuu et al., 2019). While traditional contractual agreements may regulate interactions between buyers and suppliers, they often lack transparency and accountability, particularly in complex supply chain ecosystems (Moretto et al., 2019; Gelsomino et al., 2023). Information sharing and transparency, critical elements of effective SCF, are frequently lacking in traditional models. Limited visibility into financial transactions and supply chain processes hampers decision-making and sporadic or inconsistent communication between buyers and suppliers further complicates information exchange (Wu et al., 2014; Gelsomino et al., 2016; Ishaq et al., 2024). Manual information-sharing processes exacerbate these challenges, leading to delays and inaccuracies in data transmission.

Furthermore, power dynamics within SCF significantly influence relationships between buyers and suppliers. With buyers typically wielding greater bargaining power, there is often an unequal

distribution of benefits and decision-making authority (Wetzel & Hofmann, 2019; Lekkakos& Serrano, 2016). Suppliers may feel constrained by their dependence on buyers and lack the autonomy to negotiate favorable terms or explore alternative financing options. Performance measurement and evaluation in traditional SCF models are constrained by limited visibility into supply chain performance and financial metrics (Moretto et al., 2019; Chen et al., 2022). Ad-hoc or inconsistent performance measurement, relying on manual reporting and analysis processes, results in delays and inaccuracies, hindering stakeholders' ability to assess and improve supply chain performance effectively (Beka Be Nguema et al., 2022). Overall, the traditional SCF landscape is marked by inefficiencies, risks, and power imbalances that undermine the effectiveness and sustainability of supply chain finance operations (Lam & Zhan, 2021; Tseng et al., 2021; Ishaq et al., 2024).

Agency theory provides a robust theoretical basis for this research by elucidating the principal-agent dynamics within SCF, focusing on the impacts of SCF on each party and the convergence of solutions for different parties in the supply chain (Wang & Cai, 2024; Bhatia et al., 2024). Agency theory underscores the principal-agent relationship, highlighting how information asymmetry and power imbalances can affect buyers' and suppliers' interactions. Digital SCF platforms mitigate these issues for buyers by providing real-time visibility into financial transactions and supply chain performance. This enhanced transparency allows buyers to optimize cash flow management and make more informed financial decisions (Maestrini et al., 2018; Shevchenko et al., 2020). For suppliers, agency theory explains the challenges of limited negotiating power and dependency on buyers. Digital SCF platforms empower suppliers by democratizing access to financing options such as dynamic discounting and invoice financing. These innovative solutions enhance liquidity, reduce financial risk, and provide suppliers with

greater flexibility in managing their operations. Agency theory also highlights the convergence of solutions that benefit both buyers and suppliers through digital SCF platforms (Reim et al., 2018; Wetzel et al., 2019; Pellegrino et al., 2024). These platforms facilitate robust governance mechanisms and standardized processes that ensure transparency, accountability, and fairness in buyer-supplier interactions. For instance, automated contractual agreements and smart contracts minimize the potential for opportunistic behavior, fostering trust and collaboration.

2.2. Digital Supply Chain Finance

Digital supply chain finance represents a significant evolution in the realm of trade finance, leveraging technology to streamline and enhance financial transactions within supply chains. Unlike traditional SCF models, which often rely on manual processes and paper-based documentation, digital platforms harness the power of digital technologies such as blockchain, artificial intelligence (AI), and cloud computing to offer innovative solutions and services (Banerjee et al., 2021; Reza-Gharehbagh et al., 2022). These platforms serve as digital marketplaces or ecosystems where buyers, suppliers, and financial institutions can collaborate, transact, and manage their financial relationships seamlessly and transparently (Song et al., 2021).

Digital SCF platforms can offer a wide range of features and functionality designed to meet the diverse needs of stakeholders across the supply chain (Wang & Cai, 2024; Shi et al., 2024). One of the potential benefits of digital platforms is their ability to provide real-time visibility and transparency into financial transactions, enabling stakeholders to track payment status, monitor cash flow, and manage working capital more effectively. Additionally, digital platforms can offer automated invoicing, invoice financing, and dynamic discounting capabilities, allowing suppliers to access liquidity and optimize cash flow based on their specific financing needs (Herbe et al.,

2024; Song et al., 2021). Besides, digital platforms eliminate many manual and paper-based processes associated with traditional SCF, reducing administrative burdens, errors, and processing times. By automating tasks such as invoice processing, approval workflows, and payment reconciliation, digital platforms can help to improve efficiency, accuracy, and overall transaction speed. Furthermore, unlike traditional SCF programs, which may be limited in scope or accessibility, digital platforms are often accessible via web or mobile applications, providing anytime, anywhere access to financial services and information (Caniato et al., 2019; Reza-Gharehbagh et al., 2022). This accessibility promotes inclusivity and participation among a broader range of buyers and suppliers, regardless of their size, location, or industry.

Digital supply chain finance platforms have revolutionized trade finance practices. Yet, there exists a notable gap in understanding the extent to which these platforms enhance the empowerment of suppliers and buyers while contributing to the certainty and resilience of the supply chain. While existing literature acknowledges the transformative potential of digital platforms (Banerjee et al., 2021; Gong et al., 2024; Yan et al., 2024), there remains a need for comprehensive research that delves into the nuanced dynamics and impacts of these platforms on supply chain stakeholders. This research aims to address this gap by critically examining how digital supply chain finance platforms leverage innovative financing approaches to empower suppliers and buyers. Furthermore, the study seeks to investigate the implications of these approaches on the certainty and resilience of the supply chain, offering valuable insights for practitioners and researchers in global trade finance. Table 1 shows the key development in digital SCF.

Table 1. Key developments in digital SCF

Themes	Conceptualize from the literature	References	Further development needed
Technological functions	Digital supply chain finance leverages technology to streamline and enhance financial transactions within supply chains.	Banerjee et al., 2021; Reza-Gharehbagh et al., 2022; Yan et al., 2024; Herbe et al., 2024	A deeper investigation into how different technologies (e.g., blockchain, AI) uniquely contribute to this enhancement and their impact on various supply chain stakeholders is needed.
Digital Ecosystems	Digital platforms serve as digital marketplaces or ecosystems for seamless and transparent financial transactions.	Song et al., 2021; Choi et al., 2023; Kucukaltan et al., 2024; Gong et al., 2024	Research is required to explore the long-term sustainability and scalability of these digital ecosystems in diverse industrial contexts.
Visibility and Transparency	Real-time visibility and transparency into financial transactions enable better tracking of payment status, monitoring cash flow, and managing working capital.	Caniato et al., 2019; Bhatia et al., 2024; Han & Fang, 2024; Kucukaltan et al., 2024.	There is a need for empirical studies to validate these benefits across different supply chains and identify any potential limitations or challenges.
Automated Financial Services	Automated invoicing, invoice financing, and dynamic discounting capabilities provide suppliers with liquidity and optimized cash flow.	Kong et al., 2024; Song et al., 2021; Wang & Cai, 2024; Yan et al., 2024	Further research should examine the specific conditions under which these features are most effective and their impact on supplier financial health and performance.
Efficiency Gains	Digital platforms reduce administrative burdens, errors, and processing times by eliminating manual and paper-based processes.	Caniato et al., 2019; Reza-Gharehbagh et al., 2022; Pellegrino et al., 2024; Kong et al., 2024.	Investigations are needed to quantify these efficiency gains and understand the implications for overall supply chain performance.
Accessibility and Inclusivity	Accessibility via web or mobile applications promotes inclusivity and	Caniato et al., 2019; Reza-Gharehbagh et	Research should focus on the barriers to access for small and medium-sized

	participation among a broader range of buyers and suppliers.	al., 2022; Yan et al., 2024; Bhatia et al., 2024.	enterprises (SMEs) and ways to overcome these barriers to ensure wider adoption.
Empowerment and Resilience	Digital platforms revolutionize trade finance practices but need a comprehensive understanding of their impact on the empowerment and resilience of supply chain stakeholders.	Banerjee et al., 2021; Gong et al., 2024; Shi et al., 2024; Kong et al., 2024.	A critical examination is required to explore the nuanced dynamics and impacts of digital SCF platforms on supply chain certainty and resilience, providing actionable insights for both practitioners and researchers.

3. Methodology

3.1. Research settings and sample

This study adopts a multiple-case research design (Eisenhardt et al., 2007; Yin, 2017) to explore the dynamics within the supply chain finance domain comprehensively. The selection of a multiple-case design offers significant advantages by enabling a more robust and nuanced understanding of the phenomena under investigation. By analyzing multiple cases, this approach allows for identifying patterns and variances across different contexts, enhancing the generalizability of the findings and providing a more comprehensive perspective on the subject matter. Eight prominent digital platforms worldwide have been purposively selected to represent diverse cases within this landscape. These platforms were chosen based on their significance, innovation, and influence within the industry, ensuring that the study captures a wide spectrum of practices and experiences. By incorporating cases from different geographical regions, this approach aims to provide a global perspective on the digital supply chain finance domain, thus enhancing the external validity and applicability of the research findings.

Focusing on distinct cases enables a nuanced examination of each platform's unique features, challenges, and contributions to the empowerment of suppliers and the benefits to buyers. The selection of a multiple-case research design facilitates a holistic understanding of the complexities and variations within the supply chain finance ecosystem (Yin, 2017; Gioia et al., 2013). Through an in-depth analysis of multiple cases, this study seeks to draw comparisons and contrasts and identify common patterns across different platforms. This approach enhances the depth and richness of the research findings, providing valuable insights into the underlying mechanisms shaping the supply chain finance landscape. Table 2 provides an overview of the case studies

included in this research, highlighting the diversity and representation of the selected platforms. By examining a range of cases, this study aims to capture a comprehensive snapshot of the supply chain finance domain, offering insights into the various practices, strategies, and operational procedures adopted by different platforms. The utilization of a multiple-case design enhances the robustness and validity of the research findings by enabling the comparison and contrast of outcomes and insights across diverse contexts (Yin, 2011). Through a systematic analysis of these cases, this research aims to uncover key factors influencing the operations, performance, and procedures within the digital supply chain finance landscape.

Table 2. Case narrative

Cases	Business Narrative
Case A	is a U.S.-based digital supply chain finance platform established in 2015. It connects buyers, suppliers, and financial institutions through a cloud-based platform, offering dynamic discounting, supply chain financing, and invoice financing. Key features include real-time visibility into financial transactions, flexible financing options, and seamless integration with ERP systems.
Case B	is a UK-based supply chain finance platform established in 2014. It connects buyers and suppliers to optimize working capital and improve cash flow through dynamic discounting and early payment options. The platform provides real-time visibility into cash flow, automated discounting options, and seamless integration with existing financial systems.
Case C	is a German digital platform for supply chain collaboration, procurement, and financing, established in 2013. It connects global buyers, suppliers, and financial institutions, offering supply chain financing, early payment, and trade financing. The platform features a digital marketplace for trade financing, real-time collaboration tools, and ERP system integration.
Case D	is a global supply chain finance provider headquartered in Singapore, established in 2016. It specializes in supply chain finance, working capital solutions, and asset-based lending, offering supply chain financing, invoice financing, and vendor financing. Key features include AI-driven financing solutions, risk management tools, and real-time access to liquidity.
Case E	is a digital payment solution within the SAP Ariba ecosystem, based in Germany and established in 2017. It facilitates secure and efficient payments between buyers and suppliers, offering real-time payment tracking and reconciliation, and seamless integration with SAP Ariba procurement solutions.
Case F	is a Canadian supply chain finance platform established in 2018. It offers tailored financing solutions such as supply chain financing, invoice discounting, and vendor financing. The platform provides customized financing solutions, risk mitigation tools, and real-time access to working capital.
Case G	is a Chinese digital supply chain finance platform established in 2015. It connects buyers, suppliers, and funders, offering dynamic discounting, invoice financing, and supply chain financing. Key features include AI-driven financing solutions, real-time visibility into financial transactions, and collaboration tools.
Case H	is an Australian financial technology company specializing in supply chain finance and working capital solutions, established in 2016. It offers dynamic discounting, early payment, and supplier financing, providing advanced analytics, automated invoicing, and seamless ERP system integration.

3.2. Data collection

The data collection process commenced with an initial outreach to the managers of the selected case organizations to gauge their interest, willingness, and contribution to the study. The lead researcher introduced the research objectives, emphasizing the importance of their insights in advancing our understanding of digital supply chain finance operations and implications. Positive responses from the managers indicated their willingness to participate, facilitating the effective progression of the data collection process. Subsequently, online meetings and discussions were held with managers and staff from various roles within the eight case firms. These interactions provided valuable insights into the organizations' performance, technologies utilized, operational insights, and implications for buyers and suppliers. Additionally, they assessed the companies' capacity to provide relevant and meaningful data for the study, ensuring the maximization of research value and validity.

The next stage involved conducting semi-structured interviews with key personnel from the case organizations. A total of 34 interviews were conducted with leaders, senior managers, and middle managers involved in various aspects of operations. Participants were selected based on their pivotal roles in decision-making, operations, support, development, and design of supply chain finance practices, ensuring rich and detailed accounts of challenges, motivations, and outcomes. The snowball sampling technique was employed to augment the breadth and depth of data collection. Middle managers and team leaders, crucial to operations, were contacted first and asked to recommend additional interviewees. This approach effectively identified key decision-makers within the organizations, ensuring a diverse and comprehensive pool of interviewees.

Data collection spanned from January 2024 to March 2024, utilizing online communication platforms such as Zoom and Skype for interviews. Each interview lasted between 80 and 120

minutes, allowing ample time for participants to share insights and experiences related to the research aim. Semi-structured interviews facilitated predetermined questions based on agency theory and exploration of emerging themes (Appendix 1 provides the Interview questions). The interviews were conducted in an open and non-directive manner, encouraging participants to share insights and experiences freely. This approach facilitated the capture of authentic and candid responses, enabling a deeper understanding of organizational operations and their impact on suppliers and buyers. Follow-up emails were conducted with some participants to clarify points, seek elaboration on specific topics, and gather additional insights not covered during initial interviews. All interviews were recorded with participants' consent, and notes were taken for data analysis. Additionally, archival documents such as reports and presentations were collected to triangulate and validate interview data, enhancing study reliability and credibility.

Table 3. Interview details

No	Interviewee	Gender	Education	Experience (years)	Interview time (min)
Case A					
1	Business Development Manager	M	BA	15	65
2	Supply Chain Specialist	M	BA	20	70
3	Billing Specialist	F	BA	25	60
4	Quality Assurance Manager	F	BA	21	90
Case B					
5	Operations Director	F	MBA	25	70
6	Solution Engineer	M	BA	18	75

7	Integration Specialist	M	BA	21	90
8	Project Manager	F	BA	14	90
9	Service Manager	F	MBA	19	85
Case C					
10	Operations Manager	M	MBA	23	90
11	Relationship Manager	F	BA	21	85
12	Data Analytics Manager	M	MBA	19	90
13	Innovation Lead	M	BA	15	80
Case D					
14	General Manager	F	MBA	24	65
15	Product Manager	M	BA	17	65
16	Business Analyst	M	BA	13	60
17	Supply Chain Specialist	M	BA	19	75
Case E					
18	Service Operation Manager	M	BA	18	75
19	Integration Specialist	F	BA	15	90
20	System Administrator	M	BA	16	70
21	Technology Officer	M	BA	20	85
22	Accounts Receivable Manager	F	BA	17	90
Case F					
23	Chief Operating Officer	M	BA	19	70
24	Business Development Manager	M	BA	15	65
25	Relationship Manager	F	BA	17	90

26	Data Analytics Manager	M	BA	18	80
Case G					
27	Head of Trade Finance	M	MBA	25	60
28	Head of Accounts Payable/ Receivable	F	BA	26	75
29	Senior Finance Analyst	F	BA	21	90
30	Quality Assurance Manager	M	BA	18	70
Case H					
31	Accounts Payable Manager	F	BA	15	70
32	Business Development Manager	M	MBA	19	85
33	Accounts Receivable Manager	F	BA	18	90
34	Relationship Manager	F	BA	21	80

3.3. Data analysis

The data analysis approach in this research adhered to a systematic and rigorous deductive methodology grounded in the principles of thematic analysis (Gioia et al., 2013). This methodology was complemented by a theory elaboration approach (Ketokivi and Choi, 2014), wherein agency theory provided the general theoretical foundation for examining the dynamics of digital supply chain finance (SCF) platforms. The theory elaboration process allowed us to investigate how agency theory's core constructs, such as information asymmetry, dependency, and governance, manifest and adapt within the specific context of digital SCF operations. The analysis involved meticulous coding of in-depth interview data and archival documents to identify

recurring themes and sub-themes. These were then iteratively refined and organized into Aggregate Dimensions that align with agency theory. However, instead of merely applying the theory, we used the empirical findings to elaborate on it by uncovering contextual idiosyncrasies unique to digital SCF platforms. For example, the study identified the role of real-time data analytics in mitigating information asymmetry and the emergence of blockchain as a novel governance mechanism, extending traditional conceptualizations of buyer-supplier relationships within agency theory.

This abductive reasoning process facilitated a disciplined iteration between the theoretical constructs and empirical data, ensuring that the findings reaffirmed core aspects of agency theory and introduced new insights relevant to the digital SCF context. By examining specific contextual contingencies, such as platform scalability, technological accessibility, and multi-stakeholder engagement, the study contributes to the broader theoretical discourse by reconciling agency theory with digital SCF platforms' unique demands and opportunities. This approach enhances the research's explanatory power and theoretical coherence, consistent with the principles of theory elaboration (Ketokivi and Choi, 2014).

To ensure the trustworthiness and credibility of the findings, several validation techniques were employed. Constant comparison was employed throughout the data analysis to discern similarities and differences across the cases, enhancing analytical rigor. Peer debriefing sessions were conducted to allow multiple researchers to review and validate the data analysis process critically. These sessions facilitated constructive discussions and feedback, ensuring the accuracy and coherence of interpretations. Furthermore, member-checking was employed to involve participants in the analysis process. Respondents were invited to review initial findings and provide feedback, ensuring an accurate representation of their perspectives and enhancing the

conclusions' credibility. By adhering to these rigorous data analysis procedures and involving multiple researchers, the study bolstered the credibility and validity of its outcomes. The analysis yielded valuable insights into the characteristics, implications, and challenges associated with digital supply chain finance. Figure 1 visually represents the data structure of the research, encapsulating its key components and relationships.

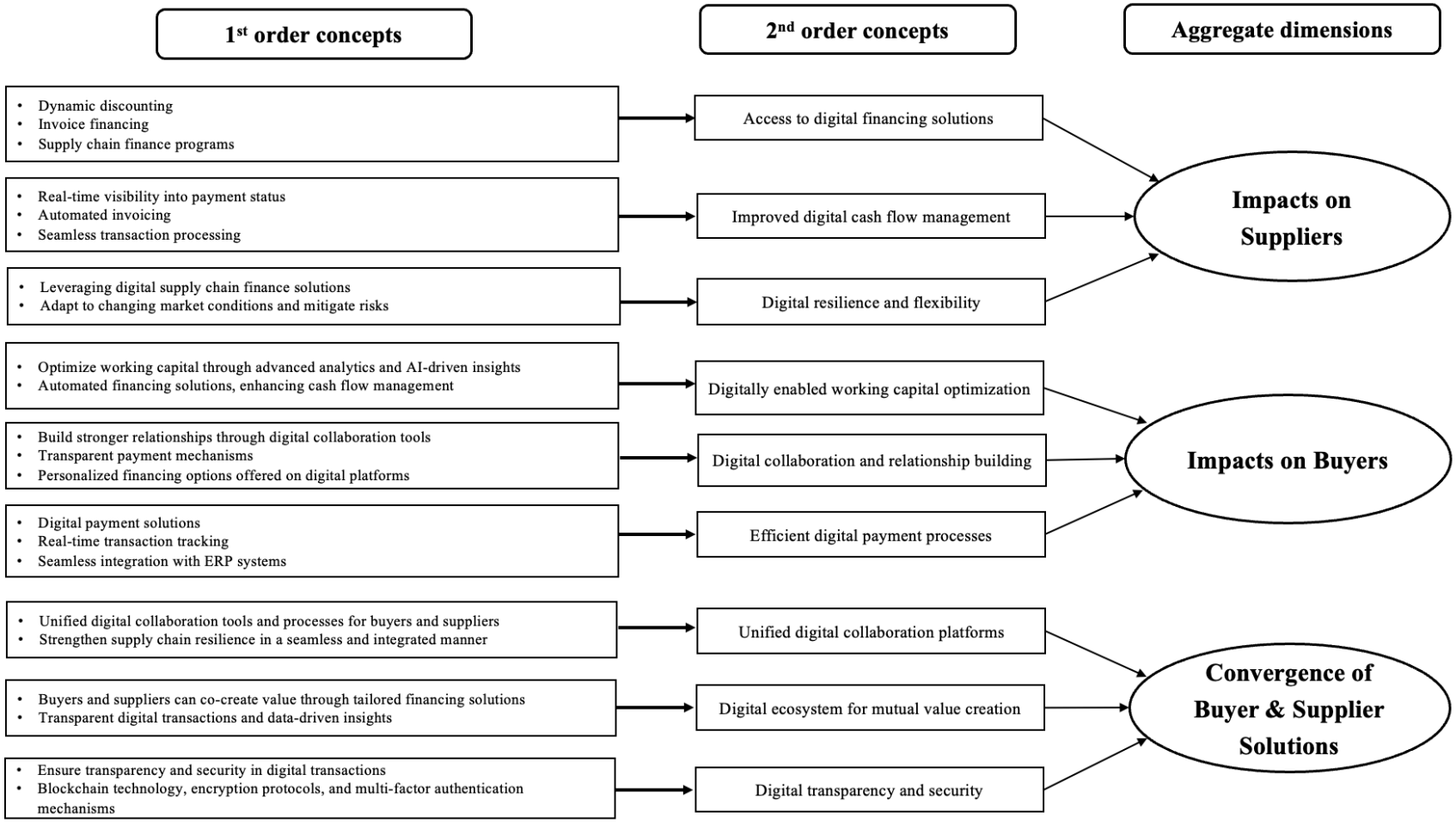

Figure 1. Data structure

4. Findings

4.1. Impacts on suppliers

Digital supply chain finance platforms significantly impact suppliers, facilitating access to digital financing solutions, enhancing digital cash flow management, and fostering digital resilience and flexibility.

Platforms such as cases A, B, and H revolutionize the landscape of supply chain finance by offering suppliers access to a myriad of digital financing solutions. Through dynamic discounting, suppliers can unlock liquidity by availing discounts on early payments, as elucidated by the Business Development Manager of case A: "*Case A's dynamic discounting feature allows suppliers to access liquidity quickly by offering discounts to buyers in exchange for early payments."* Similarly, invoice financing options provided by platforms like Case G enable suppliers to monetize their receivables and address short-term cash flow needs effectively. Additionally, supply chain finance programs offered by platforms such as Case D empower suppliers to leverage their outstanding invoices to secure financing at competitive rates, enhancing their financial flexibility and resilience.

The adoption of digital supply chain finance platforms equips suppliers with tools and capabilities to enhance digital cash flow management. Real-time visibility into payment status and cash flow projections provided by platforms like Case C enables suppliers to monitor their financial positions actively and make informed decisions. Through automated invoicing features, suppliers can streamline billing processes and accelerate payment cycles, as noted by the Accounts Receivable Manager of Case H's platform: "*Case H 's automated invoicing feature has transformed the billing process for suppliers, reducing manual efforts and expediting payment processing*." Seamless

transaction processing facilitated by platforms such as Case E further optimizes cash flow management, ensuring timely payments and minimizing payment delays.

Digital supply chain finance platforms empower suppliers to navigate changing market conditions and mitigate risks effectively. By leveraging digital financing solutions, suppliers can access liquidity swiftly to address unforeseen cash flow gaps and capital requirements, thus enhancing their resilience to financial shocks. These platforms typically offer features such as dynamic discounting, invoice financing, and early payment options, which enable suppliers to convert outstanding invoices into immediate cash flow. For example, a supplier facing an unexpected cash flow gap can use invoice financing to receive an advance on outstanding invoices, ensuring they have the necessary funds to meet immediate financial obligations.

The process begins with suppliers submitting their invoices through the digital platform, facilitating approval and financing from participating financial institutions. This streamlined and automated process significantly reduces the time and effort required to secure funding compared to traditional methods. As the Product Manager from Case D explained, "*Case D's platform has enabled suppliers to adapt quickly to changing market conditions by providing flexible financing options and real-time insights into their financial position. The ability to receive immediate cash advances on their invoices has been crucial in managing unforeseen cash flow gaps*". Moreover, these platforms offer real-time visibility into financial transactions, allowing suppliers to monitor their cash flow status and make informed decisions continuously. Suppliers can adjust their financing strategies and negotiate favorable terms based on real-time financial data and market trends. This adaptability is essential for maintaining financial stability and ensuring long-term sustainability.

Digital supply chain finance platforms are pivotal in empowering suppliers by providing access to digital financing solutions, enhancing digital cash flow management, and fostering digital resilience and flexibility. These platforms serve as catalysts for transformation in the supply chain finance landscape, equipping suppliers with the tools and capabilities needed to thrive in an increasingly complex and dynamic business environment.

4.2. Impacts on buyers

Digital supply chain finance platforms profoundly affect buyers, manifesting in digitally enabled working capital optimization, fostering digital collaboration and relationship building, and streamlining efficient digital payment processes.

Platforms like cases D, G, and H provide buyers with robust tools for optimizing working capital through advanced analytics and AI-driven insights. These platforms utilize advanced data analytics to provide real-time visibility into cash flow and working capital metrics, allowing buyers to make strategic financial decisions. As the Relationship Manager at Case H remarked, *"Our platform allows buyers to analyse their cash flow in real-time, optimizing working capital and enabling strategic decision-making*." By leveraging AI-driven insights, buyers can predict cash flow needs, identify funding gaps, and optimize the allocation of working capital, ensuring efficient utilization of funds and enhancing financial stability.

Automated financing solutions are another critical feature of digital SCF platforms that enhance cash flow management. Platforms like Case D offer automated invoice financing and dynamic discounting options, allowing buyers to access liquidity quickly and efficiently. The automation of financing processes reduces the administrative burden and accelerates the approval and disbursement of funds. A Financial Officer at Case D explained, "*Our automated financing*

solutions streamline financing decisions, providing buyers with flexible options to manage their cash flow effectively." These automated solutions enable buyers to maintain optimal cash flow levels, reduce the risk of liquidity shortages, and improve overall financial performance.

Digital SCF platforms facilitate stronger relationships between buyers and suppliers through collaboration tools and transparent payment mechanisms. The Relationship Manager at case C stated, "*Our collaboration tools have enhanced communication with suppliers, enabling effective collaboration on supply chain finance processes*." As exemplified by case E, transparent payment mechanisms foster trust and transparency in buyer-supplier relationships by providing real-time transaction tracking and visibility of payment status. Additionally, personalized financing options offered by these platforms strengthen relationships by catering to the unique needs of buyers and suppliers.

Efficient digital payment processes are a hallmark of digital supply chain finance platforms, enhancing efficiency and reducing transaction costs for buyers. A Billing Specialist at case A noted, "*Our digital payment solutions streamline payment processes, enabling quick and secure transactions*." Platforms such as case B offer seamless integration with ERP systems, ensuring smooth payment processing and reducing administrative burdens. Real-time transaction tracking provided by platforms like case C enables buyers to monitor payment status and track transactions, improving transparency and efficiency in payment processes.

Digital supply chain finance platforms empower buyers by facilitating digitally enabled working capital optimization, fostering digital collaboration and relationship building, and streamlining efficient digital payment processes. These platforms equip buyers with the tools and insights needed to optimize working capital, collaborate effectively with suppliers, and streamline payment processes, ultimately enhancing efficiency and driving value across the supply chain.

4.3. Convergence of buyers' and suppliers' solutions

The supply chain finance ecosystems function as digital marketplaces for seamless and transparent financial transactions (Song et al., 2021; Choi et al., 2023). These platforms foster the convergence of buyer and supplier solutions, creating unified digital collaboration environments. They establish a digital ecosystem for mutual value creation, ensuring transparency and security.

Platforms like cases C and E provide unified digital collaboration tools and processes for buyers and suppliers, facilitating seamless communication and collaboration. A representative from case C emphasized, "*Our platform serves as a unified hub for buyers and suppliers to collaborate on supply chain finance processes, enhancing efficiency and visibility*." Such platforms strengthen supply chain resilience by enabling buyers and suppliers to work seamlessly and integrate seamlessly, improving communication and streamlining operations.

Digital supply chain finance platforms create a digital ecosystem where buyers and suppliers can co-create value through tailored financing solutions and transparent digital transactions. A Quality Assurance Manager at case G highlighted, "*our platform enables buyers and suppliers to collaborate on optimizing working capital and managing cash flow effectively, driving mutual value creation*." Transparent digital transactions and data-driven insights provided by platforms like case A empower buyers and suppliers to make informed decisions, enhancing trust and collaboration across the supply chain.

Digital supply chain finance platforms prioritize digital transparency and security, leveraging technologies such as blockchain, encryption protocols, and multi-factor authentication mechanisms. A Product Manager from case D stated, "*Our platform ensures transparency and security in digital transactions through blockchain technology and robust encryption protocols*."

By implementing these security measures, platforms like cases D and F enhance trust and confidence in digital transactions, mitigating the risk of fraud and ensuring the integrity of financial data.

Digital supply chain finance platforms drive convergence of buyer and supplier solutions by providing unified digital collaboration platforms, establishing a digital ecosystem for mutual value creation, and ensuring digital transparency and security. These platforms facilitate seamless communication and collaboration between buyers and suppliers, empower them to co-create value through tailored financing solutions, and enhance trust and confidence in digital transactions, ultimately driving efficiency and resilience across the supply chain. Figure 2 summaries the main findings.

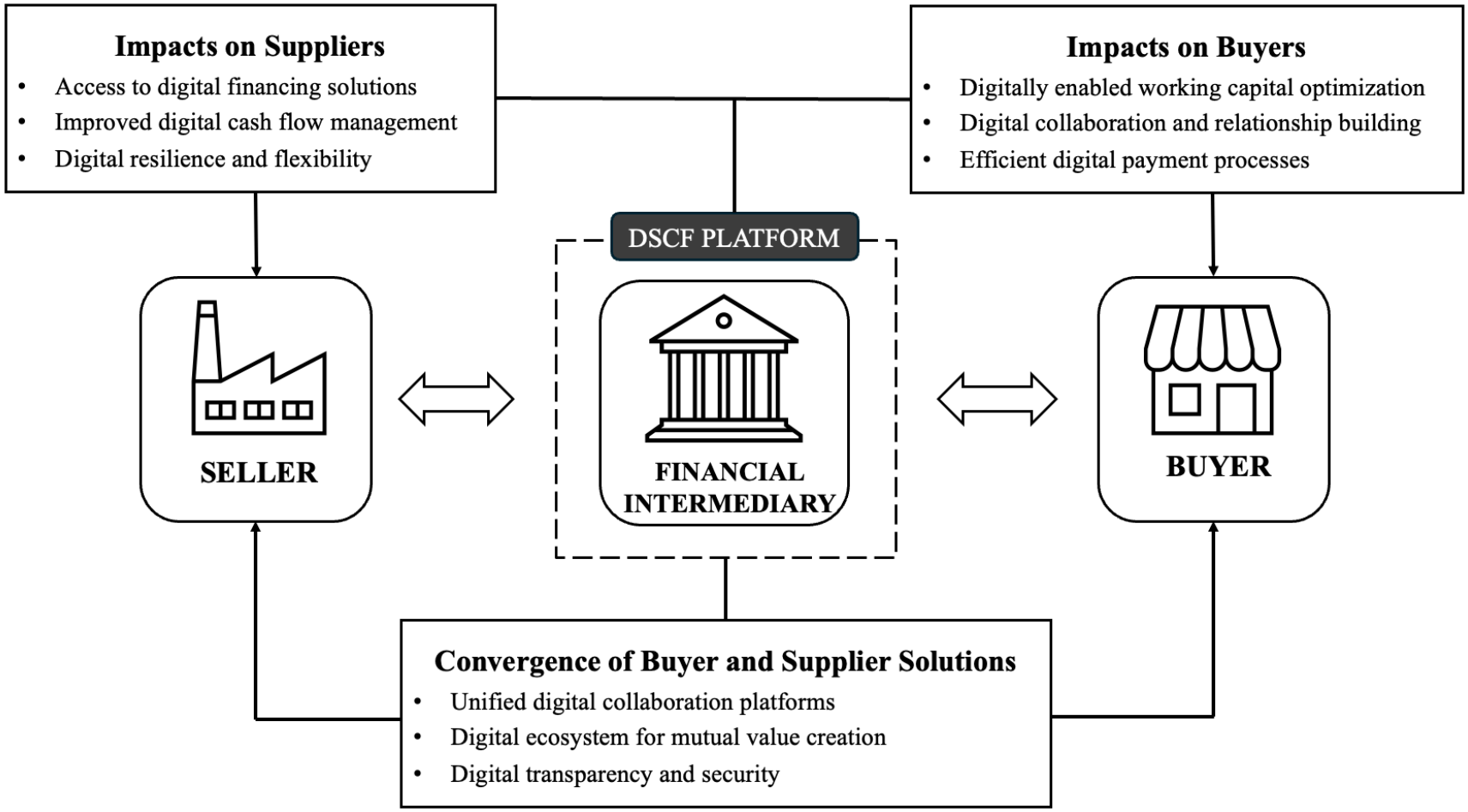

Figure 2. Summary of findings

5. Discussion

5.1. Principal-Agent Relationship

Digital supply chain finance platforms are crucial in reshaping the principal-agent relationship between buyers and suppliers. Traditional supply chain finance models often lead to asymmetrical power dynamics, where buyers hold more negotiating power than suppliers (Wandfluh et al., 2016; Dekkers et al., 2020). However, the innovative financing approaches employed by platforms like cases D, H, and G aim to rebalance this relationship. For instance, Case H's platform features automated invoice processing and real-time payment status tracking, which empower suppliers by reducing administrative burdens and providing greater visibility into financial transactions. This feature enhances suppliers' autonomy and transparency, aligning their interests with those of buyers. Similarly, Case C's use of blockchain technology ensures the integrity and authenticity of transactions, fostering trust and transparency between buyers and suppliers. A Supply Chain Specialist from Case D highlighted the impact of AI-driven financing solutions: "*Our AI-driven financing solutions assess credit risk accurately, providing fair and transparent financing opportunities for suppliers*." These personalized and fair financing opportunities strengthen the principal-agent relationship by aligning the interests of buyers and suppliers. Case G's real-time visibility into financial transactions enables suppliers to monitor cash flow and track payment status, which enhances transparency and trust. These platforms empower suppliers and rebalance the principal-agent relationship by providing greater autonomy, transparency, and access to financing options. This fosters a more equitable and collaborative supply chain ecosystem, which is crucial for trust, collaboration, and efficiency within supply chain finance ecosystems (Kucukaltan, et al., 2024; Shi et al., 2024). By reducing the risk of disputes, delays, and

misunderstandings, digital supply chain finance platforms enhance supply chain certainty. Therefore, we propose:

Proposition 1: A balanced principal-agent relationship within digital supply chain finance platforms enhances supply chain certainty by fostering trust, collaboration, and efficiency.

5.2. Risk Mitigation Strategies

Effective risk mitigation strategies are essential for ensuring the reliability and integrity of financial transactions within digital supply chain finance platforms (Yan et al., 2024; Kong et al., 2024). Cases C, D, H, and G employ various approaches to identify, assess, and mitigate supply chain finance processes risks. Case H's transparency and real-time visibility into financial transactions enable buyers and suppliers to promptly identify and address potential risks. Case C's data analytics tools provide insights into supply chain performance and risk exposure, empowering stakeholders to make informed decisions. Case D's predictive analytics forecast cash flow and liquidity gaps, enabling proactive risk management.

In contrast, Case G's blockchain integration enhances the security and traceability of transactions, reducing the risk of fraud or tampering. As a Relationship Manager at Case G explained, "*Our blockchain integration enhances the security and traceability of transactions, significantly reducing the risk of fraud or tampering*." These risk mitigation strategies leverage advanced technologies such as AI, blockchain, and predictive analytics to automate processes, identify risks proactively, and make informed decisions (Awaysheh et al., 2021; Pellegrino et al., 2024). By minimizing disruptions and uncertainties within supply chain finance processes, these strategies enhance supply chain certainty by reducing the likelihood of financial losses, fraud, and operational disruptions. Therefore, we propose:

Proposition 2: Effective risk mitigation strategies, enabled by advanced technologies, enhance supply chain certainty by minimizing disruptions and uncertainties within supply chain finance processes.

5.3. Information Sharing and Transparency

Information sharing and transparency are critical elements in fostering trust and collaboration within digital supply chain finance platforms (Wu et al., 2014). Cases C, D, H, and G prioritize transparency to enhance communication and decision-making processes between buyers and suppliers. Case H's platform provides real-time visibility into financial transactions, enabling buyers and suppliers to track payment status and monitor cash flow. Similarly, Case C's use of blockchain technology ensures the integrity and authenticity of transactions, fostering trust and transparency. Case Dl's predictive analytics and mobile applications empower stakeholders with insights into cash flow forecasts and financing options, promoting informed decision-making. As noted by a Billing Specialist at Case D, "*Our predictive analytics and mobile applications empower stakeholders with insights into cash flow forecasts and financing options, promoting informed decision-making*." Case G's real-time visibility into financial transactions enables suppliers to monitor payment status and track cash flow, enhancing transparency and trust. These features emphasize the importance of information sharing and transparency in supply chain finance. By providing stakeholders with timely and accurate information, these platforms facilitate collaboration and mitigate the risk of misunderstandings or disputes (Wu et al., 2014; Gelsomino et al., 2016). Transparency and open communication reduce information asymmetry, enhance decision-making, and build stakeholder trust (Herbe et al., 2024; Gong et al., 2024). Hence, we propose:

Proposition 3: Enhanced information sharing and transparency within digital supply chain finance platforms enhance supply chain certainty by reducing information asymmetry, mitigating the risk of disputes, and fostering stakeholder trust.

Table 4 summaries the findings from our case analysis.

Table 4. Summary of case findings

Criteria	SCF platforms	Digital SCF Platforms	Insights from the case analysis
Principal-agent relationship	• Typically characterized by asymmetrical power dynamics favoring buyers. • Limited transparency and communication between buyers and suppliers. • Suppliers often have limited autonomy and negotiating power.	Mitigation of Asymmetrical Power Dynamics	Automated invoice processing and real-time payment tracking reduce administrative burdens and provide suppliers with greater financial visibility, balancing power dynamics (Case H)
			AI-driven credit risk assessments offer fair and transparent financing opportunities, enhancing supplier negotiating power (Case D).
		Enhanced Transparency and Communication	Blockchain technology ensures secure and transparent transactions, improving communication and reducing information asymmetry (Case C).
			Real-time visibility into financial transactions allows suppliers to track cash flow and payment statuses, enhancing transparency (Case G).
		Increased Supplier Autonomy and Negotiating Power	AI-driven financing solutions empower suppliers with fair access to credit, boosting their autonomy and negotiating leverage (Case D).
			Real-time financial visibility enables suppliers to manage cash flow more effectively, increasing their negotiating power and autonomy (Case G).
Risk mitigation strategies	• Relies heavily on manual processes, leading to higher risk of errors and delays. • Limited visibility into transaction data and	Reduction of Manual Processes and Errors	Data analytics tools automate the analysis of supply chain performance and risk exposure, reducing reliance on manual processes and minimizing errors (Case C).
			Predictive analytics forecast cash flow and liquidity gaps, automating risk management and reducing manual intervention (Case D).
		Enhanced Visibility into Transaction Data	Real-time visibility into financial transactions allows for early detection and addressing of potential risks, improving overall visibility (Case H).

	supply chain performance. • Reactive approach to risk management, often addressing issues after they arise.	and Supply Chain Performance	Data analytics provides detailed insights into transaction data and supply chain performance, enhancing visibility and risk management (Case C).
		Proactive Approach to Risk Management	Uses predictive analytics for proactive risk management, forecasting potential issues before they arise (Case D).
			Blockchain integration improves transaction security and traceability, reducing fraud risks and enhancing the proactive management of potential issues (Case G).
Information sharing and transparency	• Limited visibility into financial transactions and supply chain processes. • Communication between buyers and suppliers may be sporadic or inconsistent. • Relies on manual processes for information sharing, leading to delays and errors.	Enhanced Visibility into Financial Transactions and Supply Chain Processes	Offers real-time visibility into financial transactions, allowing both buyers and suppliers to track payment status and monitor cash flow efficiently (Case H).
			Provides real-time visibility into financial transactions, enabling suppliers to oversee cash flow and payment status, thus improving transparency (Case G).
		Improved Communication Between Buyers and Suppliers	Utilizes blockchain technology to ensure transaction integrity and authenticity, fostering transparent communication between buyers and suppliers (Case C).
			Employs predictive analytics and mobile applications to offer insights into cash flow forecasts and financing options, facilitating better communication and decision-making (Case D).
		Reduction of Manual Processes and Information Sharing Delays	Digital tools for predictive analytics and mobile applications streamline information sharing and reduce reliance on manual processes, minimizing delays and errors (Case D).
			Blockchain technology automates transaction verification, decreasing the need for manual information sharing and reducing potential delays (Case C).

6. Conclusion

This research aims to elucidate the impacts of digital supply chain finance platforms on buyer-supplier interactions and overall supply chain efficiency. The findings reveal significant advancements in several key areas: First, digital platforms significantly enhance suppliers' financial management by offering diverse financing options, such as dynamic discounting and invoice financing, which improve liquidity and streamline cash flow management. Features like real-time payment tracking and automated invoicing further boost suppliers' financial resilience and efficiency. These platforms optimize working capital for buyers through advanced analytics and AI-driven insights, providing real-time cash flow visibility and facilitating automated financing solutions. This reduces administrative burdens and strengthens buyer-supplier relationships through transparent payment mechanisms and enhanced collaboration tools. Converging buyer and supplier solutions within these platforms creates a unified digital ecosystem that fosters improved communication, collaboration, and trust. Blockchain technology and other security measures ensure transaction transparency and integrity, creating mutual value and enhancing overall supply chain resilience.

6.1. Theoretical contributions

This research offers substantial theoretical contributions by elucidating the multifaceted impacts of digital supply chain finance platforms on the empowerment of suppliers and buyers through innovative financing approaches and their consequential effects on the overall certainty of the supply chain.

First, our research highlights how digital supply chain finance platforms address traditional limitations, such as asymmetric power dynamics and lack of transparency, by introducing

innovative financing approaches like dynamic discounting and real-time transaction tracking (Banerjee et al., 2021; Reza-Gharehbagh et al., 2022; Kong et al., 2024). These features empower suppliers with quicker access to liquidity and enhanced visibility into financial transactions, while buyers benefit from improved working capital optimization and strengthened supplier relationships (Kucukaltan et al., 2024; Bhatia et al., 2024). Additionally, the convergence of buyer and supplier solutions on digital platforms fosters collaborative value creation and streamlines supply chain finance processes, enhancing overall efficiency and certainty for all stakeholders involved. By leveraging advanced technologies such as AI, blockchain, and real-time analytics, digital platforms represent a paradigm shift from manual and fragmented processes to digitized, interconnected ecosystems (Gelsomino et al., 2023; Wetzel & Hofman, 2019; Moretto et al., 2019; Durach et al., 2021; Schmidt & Wagner, 2019; Ning & Yuan, 2023). This underscores the urgent need for organizations to embrace digital solutions to remain competitive in today's dynamic business landscape, thus advancing the scholarly discourse on the role of digitalization in revolutionizing supply chain finance practices.

Second, this research sheds light on the differentiated impacts of digital supply chain finance platforms on various stakeholders, including buyers and suppliers, and the convergence impacts on both (Banerjee et al., 2021; Reza-Gharehbagh et al., 2022). Traditional supply chain finance models often exhibit inherent limitations such as asymmetric power dynamics and lack of transparency, leading to suboptimal outcomes for both buyers and suppliers (Shi et al., 2024; Yan et al., 2024). However, digital SCF platforms introduce innovative financing approaches such as dynamic discounting and real-time transaction tracking, which empower suppliers by providing them with quicker access to liquidity and enhanced visibility into financial transactions. Similarly, buyers benefit from improved working capital optimization and strengthened supplier

relationships. Moreover, the convergence of buyer and supplier solutions on digital platforms fosters collaborative value creation and streamlines supply chain finance processes, further enhancing efficiency and certainty for all stakeholders involved.

Third, the research underscores the importance of effective risk mitigation strategies enabled by advanced technologies within digital supply chain finance platforms. Traditional risk mitigation approaches in supply chain finance are often manual and fragmented, leading to inefficiencies and increased vulnerability to financial disruptions (Wang & Cai, 2024; Kong et al., 2024). In contrast, digital platforms employ AI, blockchain, and predictive analytics to automate risk assessment, enhance transaction security, and provide real-time visibility into financial activities. These technologies enable stakeholders to identify, assess, and mitigate risks proactively, reducing the likelihood of financial losses, fraud, and operational disruptions. This research contributes to the theoretical understanding of risk management in digital supply chain finance by demonstrating how these strategies enhance supply chain certainty, highlighting a shift towards more integrated, technology-driven approaches to risk mitigation.

Finally, the study contributes to the discourse on the significance of information sharing and transparency in fostering trust and collaboration within digital supply chain finance ecosystems. Traditional supply chain finance models often suffer from information asymmetry, leading to mistrust and inefficiencies (Gong et al., 2024; Wu et al., 2014; Pellegrino et al., 2024). Digital platforms prioritize real-time visibility, blockchain integrity, and predictive analytics, ensuring that all stakeholders have access to accurate and timely information. This transparency reduces the risk of disputes, enhances decision-making processes, and fosters a collaborative environment. By elucidating how enhanced information sharing and transparency within digital supply chain finance platforms mitigate the risk of disputes and foster trust among stakeholders, the research

supports the proposition that these elements are vital for enhancing supply chain certainty. This insight contributes to the literature by emphasizing the role of transparent information flows and collaborative data management in achieving efficient and reliable supply chain finance operations.

6.2. Practical implications

The findings of this research offer practical implications for stakeholders involved in supply chain finance, including buyers, suppliers, and financial institutions, as well as policymakers and industry practitioners.

For buyers, the insights gleaned from this study underscore the importance of embracing digital supply chain finance platforms as strategic tools for optimizing working capital, enhancing supplier relationships, and mitigating supply chain risks. By leveraging innovative financing approaches offered by platforms like cases B, C, D, G buyers can streamline payment processes, improve cash flow management, and strengthen their competitive position in the market. Furthermore, combining buyer and supplier solutions on digital platforms facilitates collaborative value creation and fosters a more transparent and resilient supply chain ecosystem. Therefore, buyers should proactively explore and invest in digital solutions to capitalize on the transformative benefits offered by digitalization in supply chain finance.

For suppliers, this research highlights the opportunities presented by digital supply chain finance platforms to access liquidity more quickly, enhance cash flow management, and strengthen their financial resilience. By leveraging dynamic discounting, invoice financing, and supply chain finance programs offered by platforms like C, D, F, suppliers can alleviate working capital constraints, accelerate cash conversion cycles, and unlock growth opportunities. Moreover, digital platforms' transparency and efficiency give suppliers greater visibility into payment status and

transaction details, enabling them to make more informed business decisions and build stronger relationships with buyers. Therefore, suppliers should embrace digitalization and actively engage with digital supply chain finance platforms to capitalize on the benefits of innovative financing approaches.

For financial institutions, this research underscores the imperative of adapting their offerings and services to meet the evolving needs of buyers and suppliers in the digital age. By partnering with digital supply chain finance platforms or developing digital solutions, financial institutions can expand their market reach, enhance customer engagement, and differentiate themselves in a competitive landscape. Furthermore, financial institutions can leverage advanced technologies such as AI, blockchain, and real-time analytics to streamline credit assessments, automate financing processes, and mitigate risks associated with supply chain finance. Therefore, financial institutions should collaborate with digital platforms and invest in digital capabilities to remain relevant and competitive in the rapidly evolving supply chain finance ecosystem.

For policymakers and industry practitioners, the insights generated by this research offer valuable guidance for fostering an enabling environment for digital supply chain finance adoption and innovation. Policymakers can play a pivotal role in promoting digitalization by implementing supportive regulatory frameworks, incentivizing investment in digital infrastructure, and facilitating public-private partnerships. Likewise, industry practitioners can drive change by sharing best practices, collaborating on industry standards, and investing in talent development to build digital capabilities. By working together, policymakers and industry practitioners can create a conducive ecosystem that accelerates the adoption and diffusion of digital supply chain finance solutions, thereby unlocking value for all stakeholders involved.

6.3. Limitations and future research directions

While this study makes a meaningful contribution to the understanding of how digital supply chain finance (SCF) platforms empower supply chain actors and enhance supply chain certainty and resilience, several limitations must be acknowledged. However, these limitations can offer a foundation upon which future research can build more nuanced, generalizable, and theoretically enriched investigations. First, the study's methodological design is limited to a qualitative multiple-case approach. While this design offers deep contextual insights and supports theory elaboration, it inherently constrains the generalizability of findings beyond the specific cases and regions examined. The eight platforms studied represent a purposive sample selected for their prominence and technological sophistication. As such, the findings may not fully capture the experiences of smaller platforms, those in the early stages of development, or platforms operating in lower-income or under-regulated economies. Future research should address this limitation through the use of mixed methods or large-scale quantitative studies that test the propositions developed here across a broader and more diverse population of platforms, buyers, and suppliers. Longitudinal data collection could also help track changes in platform use, performance outcomes, and stakeholder relationships over time.

Second, the empirical focus is predominantly platform-centric, emphasizing the perspectives of platform managers and senior operational staff. Although these informants offer valuable strategic and managerial insights, excluding direct accounts from end-users—particularly small and medium-sized suppliers and buyers—limits the study's ability to capture bottom-up dynamics and user-level experiences. Moreover, by focusing primarily on managerial narratives, the study may underrepresent operational frictions, resistance to digitalization, or unintended consequences of platform adoption. Future research could incorporate a wider range of stakeholders, including

frontline users, technology providers, regulators, and financiers, to better understand how power asymmetries, digital capabilities, and governance mechanisms shape digital SCF ecosystems.

Third, this study is bounded by a specific temporal and regulatory context—data were collected during a defined period and reflect the prevailing regulatory, economic, and technological conditions. As digital SCF platforms operate in highly dynamic environments influenced by macroeconomic fluctuations, policy reforms, and technological innovation, the findings may have limited temporal durability. Future research could adopt a longitudinal or comparative institutional lens to examine how the evolution of legal frameworks, fintech policy environments, and geopolitical dynamics affect platform adoption and impact across different regions and over time.

Fourth, the theoretical lens adopted—agency theory—has provided a useful foundation for analyzing power asymmetries, governance mechanisms, and information flows within digital SCF platforms. However, this perspective may underplay other relevant dimensions, such as institutional pressures, cultural factors, and technological path dependencies. Future research could consider integrating complementary theoretical frameworks, such as institutional theory, resource orchestration theory, or socio-technical systems theory, to examine the broader configurations that enable or constrain platform development and diffusion.

Based on these limitations, several future research directions emerge that could contribute to advancing knowledge in digital SCF and related fields. First, one critical avenue lies in developing quantitative and hybrid empirical designs. Building on the propositions derived from this study, future research could employ structured surveys or transactional data analysis to measure the impact of digital SCF platforms on liquidity access, payment cycle efficiency, supply chain resilience, and buyer-supplier trust. These studies could also examine whether these impacts differ

significantly across firm size, sector, or regional context, thus contributing to a more stratified understanding of platform effects.

Another promising direction is the exploration of platform user heterogeneity and digital equity. While this study foregrounds the strategic benefits of digital SCF, it remains unclear to what extent these benefits are equitably distributed. Future studies could investigate whether small or marginalized suppliers face barriers in platform access, data literacy, or financing eligibility and whether digital platforms inadvertently reinforce existing structural inequities in global trade finance. Additionally, there is an opportunity to pursue comparative institutional research across diverse policy and regulatory regimes. Investigating how different national ecosystems enable or hinder platform adoption—via fintech regulations, data privacy laws, or central bank digital currency initiatives—would provide a more nuanced picture of digital SCF's global potential and constraints. This work could also explore the role of supranational initiatives (e.g., WTO, G20, or UNCTAD) in shaping platform standards and cross-border interoperability.

Future research should also consider digital SCF platforms' ethical and algorithmic governance aspects. As these platforms increasingly rely on automated credit scoring, predictive analytics, and blockchain verification, critical questions arise regarding transparency, accountability, and algorithmic bias. Studies could examine how algorithmic decision-making influences financing access for suppliers in data-poor environments or how platform governance structures manage issues of data ownership, compliance, and grievance redress. Moreover, integrating sustainability-linked financial mechanisms into digital SCF platforms represents a frontier area for exploration. With growing demands for responsible sourcing and ESG performance, future research could investigate how digital platforms embed sustainability criteria into financing terms, monitor environmental compliance, or incentivize greener procurement practices. This would contribute to

the emerging literature on green finance and sustainable supply chains while highlighting the technological infrastructures required for ESG monitoring. Finally, scholars could investigate the resilience-building role of digital SCF platforms in the context of systemic disruptions. Building on this study's insights into transparency and liquidity support, further research could explore how platforms perform under extreme conditions such as supply chain decoupling, cyber-attacks, or climate-induced disruptions. System dynamics modelling, scenario planning, and simulation-based approaches could complement empirical studies to forecast the robustness of SCF platforms under varying stress conditions.

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Appendix 1. Interview questions

Agency theory	Interview questions
Principal-agent relationship	1. How would you describe the flow of information between buyers and suppliers within the digital supply chain finance platform you are involved in? Can you share any challenges or instances of information asymmetry that you've encountered? 2. In your experience, how do the goals of buyers and suppliers differ within the platform, and how are these differences addressed to ensure alignment and mutual benefit?
Risk mitigation strategies	3. What types of risks are typically identified within the digital supply chain finance platform, and how are they categorized to inform risk mitigation strategies? 4. Can you provide examples of specific strategies employed by the platform to mitigate identified risks and ensure a robust risk management framework?
Governance mechanisms	5. How do contractual arrangements within the digital supply chain finance platform act as governance mechanisms? Can you elaborate on their role in shaping relationships and resolving conflicts? 6. In your experience, how are these governance mechanisms enforced, especially in instances of conflicts of interest, to ensure effective governance within the supply chain?
Information sharing and transparency	7. How does the platform ensure transparency in transactions, and what mechanisms are in place to facilitate information sharing among stakeholders? 8. Could you share insights into the communication channels used within the platform to enhance information exchange and foster transparency?
Power dynamics	9. From your perspective, how has the adoption of the digital supply chain finance platform influenced negotiating power among buyers, suppliers, and financial institutions? 10. Can you provide examples of how decision-making authority is distributed within the supply chain, and how the platform affects control dynamics?

Performance measurement and evaluation	11. What criteria and metrics do the digital supply chain finance platform use to measure its performance and success? 12. How do you perceive the alignment between performance measurement and stakeholder satisfaction within the platform, and what overarching goals are prioritized in this context?