Determinants of supply chain finance adoption among SMEs: evidence from a developing economy

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Abstract

Purpose – Little is known about the determinants of supply chain finance (SCF) adoption among small and medium-sized enterprises (SMEs) in developing countries. This study aims to address this relevant research gap and hence, draws on the resource-based view and transaction cost economies to empirically investigate five factors that make SCF adoption practicable among SMEs in Ghana.

Design/methodology/approach – The approach involves a sample of 257 SME managers/owners and modelling via structural equations modelling.

Findings – All five factors (innovative capability, information sharing, inter- and intra-firm collaboration, external financing and trade process digitization) were found to impact positively and significantly on SCF adoption. The findings provide SME managers/owners with a research model which guides them on how to settle the SCF process.

Research limitations/implications – This paper used a cross-sectional survey, which makes it impossible to access changes over time. In addition, the use of quantitative method limits respondents from expressing their feelings fully. Using a mixed or qualitative methodology will provide avenues for future research.

Practical implications – This paper offers a completive advantage for Ghanaian SMEs to strengthen their relationships while collaborating with each other. The findings suggest that by adopting SCF solutions, SMEs can optimize their liquidity and working capital. The factors underpinning SCF adoption are of incredible attractiveness for SME managers/owners to discover the relevant practice of SCF solutions. SMEs should adopt SCF strategies for improving their capability to respond promptly to transactions.

Originality/value – This paper is among the few papers that have examined these five factors in a developing economy context. The study also provides new understanding of the factors that influence SCF adoption in the context of a developing economy.

Keywords Supply chain finance adoption, Innovative capability, Trade process digitization, Information sharing, Intra- and inter-firm collaboration, External financing

Paper type Research paper

1. Introduction

Traditional financing schemes such as corporate borrowing and bank loans faced great liquidity pressures during the recent financial crisis and economic downturn (Beka Be Nguema *et al.*, 2021a; Chen *et al.*, 2022). This resulted in a drastic reduction in the sanctioning of new loans (advances) to firms with significant increase in the cost of corporate borrowing (Ali *et al.*, 2019; Ivashina and Scharfstein, 2010). The situation created worse problems in the upstream supply chain (SC) thus, profoundly contributing to the need for solutions and programmes that can support and optimize the working capital of firms, especially small and medium-sized enterprises (SMEs) (de Goeij *et al.*, 2021).

Supply chain finance (SCF) has been the alternative and preferred financial solution to improve the overall credibility of the whole SC (Caniato *et al.*, 2016; Paul *et al.*, 2022).

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According to Chen *et al.* (2022), SCF has been identified as the approach to resolving the financial difficulties of firms. It optimizes the flows of financial resources, information and materials in the SC. Additionally, it integrates suppliers upstream, buyers downstream and financial service providers. The adoption of SCF solution enables SMEs to secure financing scheme that optimizes firms' working capital, reduce trade credit and risk of default and finally, improve the effectiveness of the overall SC to which they belong (Ali *et al.*, 2019). De Goeij *et al.* (2021) argue that management of working capital of both single firms and the SCs they belong is improved through SCF solutions.

However, the applicability of the SCF concept to SMEs in developing countries is largely underdeveloped (de Goeij *et al.*, 2021) and lacks empirical studies (Song *et al.*, 2019; Beka Be Nguema *et al.*, 2021b; Phraknoi *et al.*, 2022). In addition, although previous research has conducted in-depth analysis of the benefits and prospects of SCF solutions among firms (Phraknoi *et al.*, 2022), empirical studies on the determinants of its adoption among SMEs are scarce, especially in developing countries (Song *et al.*, 2019; Phraknoi *et al.*, 2022). Phraknoi *et al.* (2022, p. 1436) state, "relatively little is still known about the factors that underpin SCF adoption from an SME perspective".

Such concepts like innovative capability (IC), external financing, trade process digitization, information sharing and inter- and intra-firm collaboration are important issues for both SCF service providers and SMEs in the SC because they underpin the adoption and implementation of SCF solutions (Chen *et al.*, 2022). In addition, because financial flows are linked to both information and material flows within and between firms (Martin and Hofmann, 2017), it is important that with respect to SME financing scheme, these underlying factors are investigated because they enable the financial – information – material flow linkages (Phraknoi *et al.*, 2022). Beka Be Nguema *et al.* (2021a, 2021b) argue that SCF is exacerbated by several factors including external financing, IC, information sharing, inter- and intra-firm collaboration and trade process digitization.

The practice of SCF solutions is impossible without IC such as investments in information technology (IT) among SC partners (Lu *et al.*, 2020). In addition, past research has shown that inter- and intra-firm collaboration is a type of relational means for SC governance and that SCF adoption is a behaviour of SC members (Wang *et al.*, 2020). Similarly, external financing as well as trade digitization have been noted to constitute a major element in the adoption of SCF solution (Beka Be Nguema *et al.*, 2021b). According to Lu *et al.* (2021), financial service providers constitute an important success factor to SCF adoption and implementation since they provide payment and risk mitigation services to firms in the SC.

Moreover, Song *et al.* (2019) state that information asymmetry constitutes a key reason why SMEs find it costly and difficult to acquire financing. Consequently, interorganizational information systems have been noted to facilitate coordination among SC partners (Lu *et al.*, 2020; Beka Be Nguema *et al.*, 2021a, 2021b). To provide a sound value proposition to members in the SC, knowledge of information, financial and material flows is compulsory (Martin and Hofmann, 2017). Burritt and Schaltegger (2014) argue that information flows not only oil the wheels of SCs but also address the complexities of a SC as an entity by integrating the focal organization, suppliers upstream and customers downstream. The preceding factors are examined to determine whether they underpin SCF adoption among SMEs in a developing economy context. Therefore, the following research question has been answered:

RQ: What are the determinants of SCF adoption among SMEs in the context of a developing economy?

The rest of the paper is organized as follows. Section 2 captures the review of literature and hypotheses development. The methods are presented in Section 3, while the results and discussion are presented in Sections 4 and 5, respectively. Finally, the conclusions and directions for future studies are captured in Section 6.

2. Literature review

2.1 The concept of supply chain finance and adoption factors

At the intersection of finance and supply chain management (SCM), SCF has been developed as an emerging topic and is a relatively recent approach to financing SC activities among SC partners (de Goeij *et al.*, 2021). It is a type of management behaviour that integrates commercial operations, financial management and logistics operations with the aim to unite external financial providers and various members in the SC, promptly respond to the capital needs of firms in the SC and ultimately achieve common value creation (Lam and Zhan, 2021; Chen *et al.*, 2021; Li *et al.*, 2023).

According to the Global Supply Chain Finance Forum, SCF refers to the use of financing and risk reduction practices and techniques to maximize the management of working capital and liquidity invested in SC processes and transactions (Caniato *et al.*, 2016). To increase the value of all the participating companies, Chen *et al.* (2022) described SCF as the inter-company optimization of financing and the integration of financing processes with customers, suppliers and service providers. In a wider context, it focuses on the integrated management of material and information flows, as well as financial flows in SCs (Nguyen *et al.*, 2022; Chen *et al.*, 2022). The fundamental goal is that it aims at increasing the working capital at the interorganizational level by using the solutions offered both by technology providers and financial institutions (Song *et al.*, 2019).

SCF appeared in the SCM literature as a scientific field that has gained further attention and interest from scholars, primarily due to the 2008 global financial crisis and the financial chaos that evolved (Wuttke *et al.*, 2019). In this regard, SCF solutions has become a relatively innovative practice that is increasingly being adopted by SMEs across the globe to solve their financing problems (Lekkakos and Serrano, 2016; de Goeij *et al.*, 2021). Although SCF is at its critical stage of development, little is known about the factors that underpin its adoption (Bi *et al.*, 2021; Li *et al.*, 2023). Extant literature has focused mainly on the instruments of SCF such as inventory financing (De Boer *et al.*, 2015; Song *et al.*, 2016; Martin and Hofmann, 2017; Xu *et al.*, 2018; Lam *et al.*, 2019; Chakuu *et al.*, 2020), dynamic discounting (Basu and Nair, 2012; De Boer *et al.*, 2015; Caniato *et al.*, 2016) and reverse factoring (Dello Iacono *et al.*, 2015; Caniato *et al.*, 2016; Liebl *et al.*, 2016; Bals, 2019; de Goeij *et al.*, 2021).

In addition, SCF instruments such as factoring, trade credit and reverse factoring which are primarily based on the perspective of specific solutions (Wang *et al.*, 2020), have been identified as different SCF solutions (Lekkakos and Serrano, 2016; Jia *et al.*, 2020; Liu *et al.*, 2022). Moreover, although past studies have contributed to the understanding of SCF drivers, these studies are far based on case studies and mathematical models (Wuttke *et al.*, 2013; Yan *et al.*, 2016; Chen *et al.*, 2022; Soni *et al.*, 2022). However, for a robust verification of results, more empirical evidence is required (Zhang *et al.*, 2019). This is because the effectiveness of SCF varies significantly among different industries. Further, the SCF literature has extensively focused on the antecedents of SCF adoption from mainly intra-organizational and financial perspective (Chakuu *et al.*, 2020). To promote SCF adoption, some SC-related factors play an important role because, in the SC, SCF practices are associated with activities that are transactional (Wang *et al.*, 2020). According to

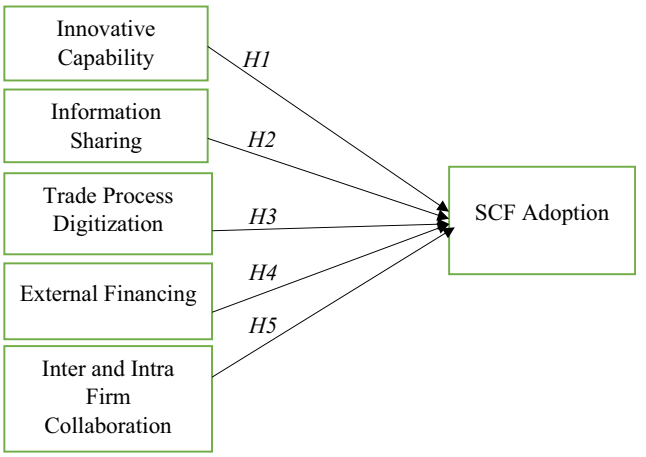
Li *et al.* (2023), the understanding of how SC-related factors influence SCF adoption is quite critical and urgent among SMEs.

2.2 Theoretical framework

The theoretical framework underpinning this study is shown in Figure 1. It consists of five determinants of SCF adoption. At present, research on the adoption of SCF solutions is not underpinned by any clear dominant theory (Phraknoi *et al.*, 2022). Diverse theoretical frameworks have been used in the SCF literature resulting in little consensus on relevant theoretical frameworks (Phraknoi *et al.*, 2022). Resource dependency theory, information processing theory, network theory, agency theory, resource-based theory and transaction costs economics (TCE) have all been adopted in multiple papers (Li *et al.*, 2023). As theorizing remains at a nascent stage, this paper draws on the theoretical pillars of SCM and finance to conceptualize the adoption and implementation of SCF as influenced by two dominant theories: the TCE and resource-based view (RBV) (Barney, 1991; Huo *et al.*, 2016; Ali *et al.*, 2019; de Goeij *et al.*, 2021). The selection of the TCE is justified in that it not only includes the most advocated or used theories in SCF (Song *et al.*, 2016) but also remains a critical concern when firms want a loan from external financiers (Song *et al.*, 2016; Ali *et al.*, 2019). All costs required to run a risk-free relationship are depicted by the TCE (Song *et al.*, 2016). The TCE posits that trade process digitization and information sharing are aimed to minimize coordination costs in SC relationships through visibility and collaborative improvement (Ali *et al.*, 2019). Also, choices of SC characteristics (e.g. IC, information visibility, etc.) in inter-firm relations are expected to be aligned with the underlying exchange hazards to minimize transaction costs (Williamson, 1981).

According to TCE, the adoption of SCF relations must be based on choices that align with the underlying transaction characteristics to effectively mitigate risks that may arise from transactions (e.g. non-performance of contracts by parties) in SCs. For example, firms' partner selection is generally considered to be one of the critical issues for effective SC relationships since risk mitigation suggests that a reliable partner must be selected.

Emerging as a response to the turbulence in the business environment due to technological innovation, globalization and economic crisis, the RBV has also been a long-standing and



Source: Figure by author

Figure 1. Theoretical framework

well-recognized theoretical framework for explaining how organizations succeed (Barney, 1991). The RBV argues from the perspective of the resources owned by organizations, positing that sources of competitive advantage of firms are the special resources they own. It is, therefore, argued that SMEs need to be adequately resourced to engage in SCF solutions. The combination of TCE and RBV theories explains how firms deploy SC features to deal with SCF activities and minimize risks. The RBV posits that competitive advantages can be achieved by firms if they possess valuable, non-substitutable and inimitable resources (Barney, 1991). According to Barney (1991), resources can be classified as organizational capital resources, human capital resources and physical capital resources. Firms' competitiveness and performance can be improved if all these resources are well-coordinated (Kauppi and Hannibal, 2017). Because the optimization of resources and performance has been the goal of SCM practices, most studies in the SCF field have based their research on RBV (El Baz and Roel, 2021). Also, SCF requires different combination of resources, processes and capabilities (El Baz and Roel, 2021). These theoretical underpinnings guide the current study. The section that follows discusses the hypotheses development.

2.3 Hypotheses development

2.3.1 Innovative capability and supply chain finance adoption. IC is conceptualized as the key for firms to obtain competitive advantage (Wang *et al.*, 2020). In the innovation system, SMEs represent the main body with great vitality (Lu *et al.*, 2020). Similarly, the power that is effective in ensuring the rapid growth of SMEs is IC (Beka Be Nguema *et al.*, 2021a, 2021b). However, to promote IC, SMEs need to rely on external contacts (Wang *et al.*, 2020). Further, to maintain their competitive advantage, SMEs require more interfirm resources (Lu *et al.*, 2020). To effectively adopt and implement SC financing scheme suggests that SMEs should have the capability to engage in innovative practices and satisfy some SCF adoption requirements (Lu *et al.*, 2020). Having the capacity in innovative activities has been shown not only to facilitate rapid search and provide access and retrieval of information but also to support communication and collaboration among SC members (Song *et al.*, 2019). As an example, Motorola was adopted by Blackman *et al.* (2013) as a case of guaranteeing its best suppliers to secure lower financing through IT-based systems to share vendor ratings and financial flow information with financial institutions. In SCF implementation, Pezza (2011) emphasized the role IT plays as a provider of online visibility for SC activities. As noted by Han *et al.* (2017), investments in IT can serve as an operations strategy used by SMEs not only to gain competitive advantage in the business environment but also to improve their performance. These, however, have had little empirical investigation in developing countries. Thus, the following hypothesis is formulated:

H1. There is a positive relationship between innovative capability and SCF adoption among SMEs.

2.3.2 Trade process digitization and supply chain finance adoption. Trade process digitization represents the advancement of new technology in firms' operational activities (Beka Be Nguema *et al.*, 2021a, 2021b). To provide for extension of visibility and effective control of online transactions and data tracking, digitization is an important tool (Ali *et al.*, 2019; Olan *et al.*, 2022). Firms' use of digitization in the trade process has become more prevalent due to globalization. Firms can secure management of their operations and become more transparent through new technology advancement (Maiti and Kayal, 2017). This improves SC operations among SC partners through enhanced decision-making (Beka Be Nguema *et al.*, 2021a, 2021b). Thus, digitization strongly strengthens the adoption of SCF solutions. Compared to the traditional procedure, significant cost minimization is achieved

through the digitization mechanism (Perego and Salgaro, 2010). Firms can accurately secure clearness, conformity and minimize the operational risk through digitization (Ali *et al.*, 2019). This strengthens the SC through effective implementation of SCF (Maiti and Kayal, 2017). Based on this assertion, it has been proposed that firms that maintain a major quality of digitization tend to adopt more developed SCF solutions (Caniato *et al.*, 2016). Relevant information that assists in adopting SCF solutions is assisted by digitization. Investments in IT are a key fundamental requirement for SCF adoption and implementation because the SCF itself is an automated process among the parties involved. According to Caniato *et al.* (2016), the implementation of SCF solutions can be possible only when members are engaged in digitization. Due to globalization and the discovery of new technologies, firms invest in IT to facilitate smooth operations and secure the management of data (Fairchild, 2005). Investments in IT enable firms to effectively track data, control online transactions and extend their visibility (Beka Be Nguema *et al.*, 2021a, 2021b). This suggests that IT strongly strengthens the decision-making and operating efficiency of firms. Compared to the traditional procedure, the IT mechanism offers significant reduction in costs (Perego and Salgaro, 2010). Firms minimize risk and accurately secure clearness and conformity through IT, which eventually leads to SCF implementation (Maiti and Kayal, 2017). It has been suggested that more developed financing solutions tend to be adopted by firms that invest in high-quality IT (Caniato *et al.*, 2016). IT investments enable firms to collect relevant information that assist them to engage in effective SCF activities. Based on these discussions, this paper proposes the following hypothesis:

H2. There is a positive association between trade process digitization and adoption of SCF solutions among SMEs.

2.3.3 Information sharing and supply chain finance adoption. A critical approach to achieving better results among firms is information sharing (Beka Be Nguema *et al.*, 2021a, 2021b). Prior literature establishes that information sharing among SC members and within the organization enables free flow of materials and other resources among partners (Beka Be Nguema *et al.*, 2021a, 2021b). This suggests that adoption of SCF solutions requires that SMEs must be able to share every information that underpins their SC and make the functioning of the SC visible to all members (Pu *et al.*, 2020). A growing consensus in the literature suggests that information sharing enhances effective implementation of SCF adoption among SC members (Yuan *et al.*, 2022). Information asymmetry has been cited as the biggest barrier that hinders the effective financing of SMEs (Song *et al.*, 2019). It has been shown that in addition to financing cost, information asymmetry not only reduces SCF more effectively but also enhances moral hazard and improves the availability of finance (Hofmann and Belin, 2011; Yan and Sun, 2015). Bi *et al.* (2022) found that information sharing and incentive alignment not only underpin SCF adoption but also are significant predictors of SME SC performance. The role of real-time information, as well as digital technologies in improving information sharing along the SC have also been highlighted by Caniato *et al.* (2019). They emphasized that these facilitate the selection of the most SC financing schemes. Information sharing in SCs can significantly enhance the credit quality terms, which facilitate their SCF adoption (Song *et al.*, 2016). Based on these discussions, the following hypothesis is formulated:

H3. There is a positive association between information sharing and SCF adoption among SMEs.

2.3.4 External financing and supply chain finance adoption. External financing such as the application of reverse factoring is a widely acknowledged SC financing solution for improving working capital management (Zhang *et al.*, 2019). Traditionally, banks control the offer of SCF instruments enabling the functioning of SCF (Chakuu *et al.*, 2020). It has been widely established that financial institutions (or external financiers) serve as the main source of financing for firms. However, because during the business development period, the true transaction information of the firm cannot be fully obtained by financial institutions, the risk involved in the business of SCF increases (Ali *et al.*, 2019). To this end, they allow their systems to be in accordance with the needs and requirements of businesses. Firms need to meet the requirement of furnishing financial institutions with the relevant information to enable the assessment of the possibility of default. The reliability of the information provided by firms to financial institutions is increased through SCF mechanisms (Yuan *et al.*, 2022). The burden is often borne by financial institutions to collect payments for SC actors in exchange for higher returns. In addition, the risk evaluation mechanisms concerning firms can be developed by financial institutions (Alora and Barua, 2019). The availability of external financing ensures that suppliers who have limited financial assets and are beholden to lengthy payment terms mitigate the burden, optimize financial flows and uncap profit growth potential (Huang *et al.*, 2020). Liebl *et al.* (2016) and Bals (2019) noted that reverse factoring is not only a practical SC financing solution for suppliers but also an important research topic in the SCF literature. A clear distinction between the traditional bank, relationship lending and SCF is that while the former focuses on the own credit and debt-paying ability of the enterprise, the latter operates from the perspective of the business credibility of borrowing enterprises based on the SC network in which they are embedded. Wandfluh *et al.* (2016) gave the reason to be that the flow of capital, logistics and transactions among organizations can better reflect the actual operation of enterprises. In this regard, trade relations between suppliers and buyers have been noted to play an essential role when it comes to financing of firms by financial institutions (Zhang, 2015). Introducing corporate finance systems and tools to work towards a more productive SCM is imperative for success by improving cooperation between SC partners and financial institutions (e.g. improved terms of financing, innovative funding methods, etc.). SCF solutions suggest that research is justified to refocus on the interconnection and relationships between SCM, financial results and corporate value, well beyond the narrow-minded cost reduction approach when evaluating SC management's financial aspects. In this regard, the integration of SCF service providers has been widely explored in prior SCF literature (Caniato *et al.*, 2019). Emphasis has been placed on the relevance of financial service providers as relevant to the successful adoption of SCF (Bi *et al.*, 2022). According to Wang *et al.* (2020), SCF involves an automated solution of immediate settlement of funds owned for goods purchased by a buyer firm from a supplier firm. This is normally achieved through an intermediary such as external financier who also charges an interest component on the loan. Major interests in the SCF field have steadily increased over the past decades following the 2008 global financial crisis. However, academic contributions and debate on SCF remained fragmented despite the crisis-enhanced research interest and the growing importance of SCF. At the same time, SCF's core principles and formative elements have been systematically recorded by few research efforts. Based on this theoretical framework, the following hypothesis is formulated:

H4. Financial institutions or external financiers strongly influence the adoption of SCF among SMEs.

2.3.5 Inter- and intra-firm collaboration and supply chain finance adoption. SCF refers to an approach in SCM where two or more firms, in addition to external financier such as a bank, engaged in collaborative SC practices that create value through planning, steering and controlling the flow of financial resources (Ali *et al.*, 2019). This collaborative agenda aims at fostering cooperation and coordination among firms at the interorganizational level (Seal *et al.*, 2004). It has been suggested that firm performance increase and drastic cost reduction do not only emanate from integrated SCs but also sustainable relationships among SC actors. SCF adoption requires cooperation among SC members to derive the maximum benefits from the SC (Wang *et al.*, 2020). Empirical evidence on collaboration suggests that companies rarely collaborate in such a theoretical manner and that lack of trust and inability to identify SC partners is often an insurmountable obstacle to SCF adoption (Yuan *et al.*, 2022). SCF does not focus on a single actor of the SC; rather, it is a process that integrates two or more members (suppliers, customers and service providers) in a SC that optimizes value through planning, steering and controlling financial flows (Ali *et al.*, 2019). Through inter- and intra-firm collaboration, the value of all participating SC members is not only increased but also optimize the use of their working capital (Chakuu *et al.*, 2020).

H5. There is a positive association between inter- and intra-collaboration and SCF adoption among SMEs.

3. Methods

3.1 Financing challenges of small and medium-sized enterprises in Ghana

This study uses empirical data from Ghanaian SMEs. There is no single definition for SMEs globally since the literature on SMEs is quite broad and diverse, with multiple or varying definitions (Li *et al.*, 2021). To this end, scholars have used different bases, such as firm size, number of employees, capital assets and turnover to define SMEs. The regulatory body for SMEs in Ghana is the National Board for Small Scale Industries. It uses a firm's fixed assets and number of employees to categorize SMEs. That is, SMEs include all enterprises with an annual turnover exceeding US$200,000 but less than US$5m. The Ghana Statistical Service in its industrial statistics classifies firms with ten employees or less as SMEs, while those with more than ten employees are classified as medium and large-scale enterprises (Mohammed and Bunyaminu, 2021).

Although SMEs are engine of growth in developing economies (Phraknoi *et al.*, 2022), they are confronted with financing challenges in raising working capital to support their operations because in Ghana, traditional financing instruments are either costly or unavailable to them (Baah *et al.*, 2023). They often suffer a buyer's long-term payment delay due to buyer financing, quality control and defect-free product payment terms incurring capital pressures. Financing challenges hamper startup, growth and competitiveness (Ali *et al.*, 2019). Up to date, these challenges plague SMEs and get intensified from the perspective of globalization. In this regard, they are confronted with various internal concerns including financial and operational issues (Yuan *et al.*, 2022). Their financing is through traditional lending schemes where loan decisions are based on SMEs' own credit (Baah *et al.*, 2023). SMEs hunt for working capital from financial institutions in the light of their terms and conditions. They are compelled to get credit facilities by traditional means because they are primarily constrained by poor financial indicators, limited working history, low productivity and high risk. Their development is hindered by the low turnover accounts receivable, inherent lack of internal funds and inability to access bank loans coupled with obstructive market share expansion and internalization, which threatened continued operation (Baah *et al.*, 2023). To mitigate their potential risk of lending to SMEs, banks

usually demand security. The absence of security is likely the most frequent hindrance faced by SMEs in obtaining working capital (Ali *et al.*, 2019). For SMEs to keep their business activities smooth and uninterrupted, SCF is an essential tool because while developing their operational planning in their overall mechanisms, SMEs tend to pass over the relevance of SCF factors (Hofmann and Belin, 2011).

3.2 Study design and instrument development

This study used the cross-sectional survey methodology, where questionnaires were administered to top (general) managers or owners of SMEs in Ghana. The questionnaire was divided into two parts: A and B. An investigation into the general background of respondents and their organizations in terms of age (measured by number of years in operation) and size (measured by annual turnover) was captured in Part A, while Part B contains items on the six study variables, namely, SCF adoption, IC, information sharing, external financing, trade process digitization and intra- and inter-firm collaboration. Following prior studies on SCF, all items were measured on a five-point Likert scale (1 = strongly disagree) to (5 = strongly agree). Before the questionnaires were administered an initial sample of 25 was drawn and pretested with four scholars and four practitioners of SCF. In this pilot test, respondents were required to examine the questionnaire and advise on its improvement. This resulted in improving the content validity and enhancing the clarity of sentences following modifications of several items and questions in the questionnaire. A typical example is the modification of items under IC based on the scholar's advice.

3.3 Selection of respondents

Data were collected from SMEs in the Accra-Tema industrial hub because a large proportion of small businesses in Ghana (i.e. more than 70%) are in this region (Baah *et al.*, 2023). Consistent with common sampling practice, the study considered managers who specifically are engaged in SCM activities, and therefore, believed to have professional knowledge about SCF as key participants in the study. These respondents were identified using the database of the Registrar of firms/companies. They were contacted via their contact details (phone contact/e-mail address). Respondents were selected using simple random sampling technique to give each SME the same chance of being selected. The sampling frame, which contains the list of all registered SMEs as of December 2021 was obtained from the Registrar General's Department.

3.4 Sampling and data collection

It is quite challenging to collect data since SCF is a new financing method and is not widely adopted in developing countries. The questionnaire was sent to the Research and Conference Committee of the researcher's institution for approval. Following approval, an official letter explaining the purpose/objective of the study as well as assuring anonymity of respondents was initially mailed to general (top) managers, chief executive officers (CEOs) and middle-level managers of SMEs followed by a phone call. This ensured that non-SMEs were not included in the sample. General (top) managers, CEOs, SC managers and financial managers were targeted because they have knowledge in SCF activities. To ensure credibility of response, the questionnaire initially introduced the SCF concept to each participant. In addition, the business network resource of the author's institution was used. This includes companies listed in the catalogue of the institution's enterprise cooperation as well as entrepreneurs on the alumni record of the institution to ensure that the response from participants is credible. Managers of SME clubs and communities supported the survey. The actual survey was conducted in March through May 2022. Initially, the online survey involved 500 questionnaires that were distributed via mail in March 2022. A total of 213 usable managers' responses were received.

To improve the response rate, follow-up telephone calls were made after three months. An additional 71 managers' response was elicited. After all unusable responses were eliminated from the original sample, there were 257 valid responses left representing an effective response rate of 36.7%. This response rate is consistent with prior literature.

3.5 Variable measures

All measures were adapted from validated instruments in prior literature (Appendix). Specifically, drawing on the literature of Lu *et al.* (2020), Beka Be Nguema *et al.* (2021a, 2021b), Ali *et al.* (2019) and Bi *et al.* (2022), IC was measured using the scale of Lu *et al.* (2020). IC has four items. Information sharing, which had four items was adopted from Beka Be Nguema *et al.* (2021a, 2021b). Inter- and intra-firm collaboration, trade process digitization and external financing were adopted from Ali *et al.* (2019), Bi *et al.* (2022), Beka Be Nguema *et al.* (2021a, 2021b), while SCF adoption was adopted from Lu *et al.* (2020), Li *et al.* (2021), Beka Be Nguema *et al.* (2021a, 2021b). Inter- and intra-firm collaboration has five items, while trade process digitization also has five items. External financing and SCF adoption have four and five items, respectively. In particular, the construction of SCF adoption is based on widespread, persistent usage and adoption drawing on the work of Beka Be Nguema *et al.* (2021a, 2021b). Respondents ranked the items based on a five-point Likert scale (1 = strongly disagree) to (5 = strongly agree).

3.6 Common method variance and non-response bias

Common method variance was ascertained by using three different methods. This approach is likely to pose a serious threat to the research. In the first place, and following Han *et al.* (2017), respondents' anonymity was protected when the questionnaires were being distributed, and different versions of the questionnaire were offered by rearranging the order of the question items and sections. In the second test and drawing on Kuo *et al.* (2017), Harman's one-factor test was used to ascertain whether the covariance between the independent and dependent variables was accounted for by a single factor. This was achieved using SPSS version 23. The result did not establish this case since the predictor and criterion variables were loaded onto different factors, with the first factor accounting for less than 50% (45.3%) of total variance. Finally, the construct correlation matrix computed with AMOS was undertaken to assess whether any constructs are correlated. As noted by Hans *et al.* (2017), the presence of common method variance is established in the data set if the constructs are extremely highly correlated (greater than 90%). The results indicate no highly related constructs. A *t*-test was conducted on the earlier sample (213 respondents) and the later data set (71 respondents) to establish that a non-response bias was not present in the data set. Based on these findings, the results were believed not to be affected by both common method variance and non-response bias.

3.7 The covariance-based method

The covariance-based approach to structural equations modelling (CB-SEM) was used to model the variables. This approach was used because, firstly, it has the notable advantage of controlling for measurement errors and simultaneously testing multiple relationships among latent exogenous and endogenous variables. Also, the CB-SEM was chosen over the partial least squares (PLS) due to reflectiveness of the constructs, which compared to the PLS, CB-SEM models estimate more effectively. Secondly, an estimation of the model's parameters (loadings and path values) to minimize the differences in the prediction of samples in the theoretical model and sample covariances. In this regard, and to confirm how well the sample data is fitted by the hypothesized model, the covariance matrix is

reproduced by the parameter estimation process of the observed measures, and overall goodness of fit measures. Thirdly, in CB-SEM model, emphasis is placed on overall model fit. In other words, the CB-SEM model is used when a dominant theory is to be confirmed. As this paper tests variables based on the TCE and RBV, which are dominant theories in SCM, the CB-SEM model is used to confirm the existence of this theory.

4. Results

4.1 Respondents' characteristics

Table 1 shows the results relating to the characteristics of the sampled firms. The results show that food/beverage/water business constitutes the highest number (29.6%) of the 257 sample. Manufacturing recorded the lease at 5.5%. These findings suggest that developing countries lack manufacturing activities which are fundamental to the growth of a nation. Also, 28% of the sampled firms are general (top) managers, while 22.2% are owners/CEOs. This suggests that a quite appreciable number of SME owners manage their businesses in Ghana. Also, 67 (26.1%) of the 257 SMEs are SC managers, while 61 (23.7%) are finance managers.

Industry type	*Total number*	%
Food/beverage/water	76	29.6
Manufacturing	14	5.5
Construction	35	13.6
Printing/paper production	61	23.7
Textile/apparel SMEs	7	2.7
Wood processing	42	16.3
Chemicals/paint	22	8.6
Total	*257*	*100.0*
Position of respondents		
General manager	72	28.0
Owners/CEO	57	22.2
Logistics/SC manager	67	26.1
Financial manager	61	23.7
Total	*257*	*100.0*
Firm age		
1–5 years	39	15.2
6–10 years	67	26.1
11–15 years	106	41.2
16–20 years	27	10.5
20 years and above	18	7.0
Total	*257*	*100.0*
Firm size		
Annual turnover (GH¢)		
<100 m	23	8.9
101 m–200 m	39	15.2
201 m–300 m	26	10.1
301 m–400 m	31	12.1
401 m–500 m	42	16.5
Over 500 m	51	19.8
Total	*257*	*100.0*

Notes: *GH¢12 = 1USD as at the time of conducting this study*
Source: Author's computations

Table 1. Demographic profile of respondents

The implication is that SMEs have a quite an appreciable number of managers for logistics/SC management activities. Hence, more accurate judgements can be made by logistics/SC managers for the required training in employee skills and personnel adjustments which are required for the adoption of SCF. Further, the finance departments of many SMEs recorded 61 (23.7%) of the 257 SMEs. Since finance constitutes one of the three pillars of SCF, the findings suggest that SMEs in Ghana have the potential to adopt SCF solutions. A majority of the firms fall within the 11–15 years bracket (41.2%), while only 7.0% have existed for more than 20 years. Also, this implies that most SMEs have not existed for many years and probably lack the skill in SCF practice.

4.2 Descriptive statistics

Table 2 shows the means and standard deviation as well as the variance inflation factors (VIF) of the constructs. The constructs SCF adoption, IT, IC, information sharing and information visibility recorded averages of 4.35, 3.76, 4.18, 3.50 and 3.82 with standard deviations 1.98, 0.87, 0.79, 1.06 and 0.88, respectively. Additionally, the values for all VIFs range from 1.000 to 1.565 and did not exceed the 5.0 threshold. This suggests that all the VIF values fall within the acceptable threshold (Hans *et al.*, 2017).

These values were obtained on a scale of 1 to 7, where 1 = strongly disagree and 7 = strongly agree. It can be confirmed from the results that the averages of the constructs highly represent the data since there are relatively small deviations compared to the mean values. This suggests that the data points are close to their averages. In addition, the highest and lowest scores for all the constructs fall within the acceptable scale, which suggests that the instrument does not open up errors and hence can be highly relied on for predictive phenomena.

4.3 Fornell–Larcker criterion

Table 3 shows the correlation matrix of the constructs. The values for the Cronbach's alpha, composite reliability and average variance extracted (AVE) all recorded values within the acceptable range of 0.70 and beyond in some cases. The highest correlation value after reviewing all the standardized estimates for the constructs was found to be 0.522. This implies that the issue of multicollinearity was not registered among the constructs. Also, the extent to which one construct is distinct from another is checked by estimating the discriminant validity of the constructs. Firstly, discriminant validity was assessed by making a comparison of the square root of the AVE of each construct with its cross-correlations to other constructs (Fornell and Larcker, 1981). The highest correlation with any other constructs for each construct is less than the square root of the AVE for each construct (Fornell and Larcker, 1981).

Construct	Mean	SD	Maximum	Minimum	VIF
SCF adoption	4.35	1.98	1.00	7.00	1.122
Trade process digitization	3.76	0.87	1.00	7.00	1.099
Innovative capability	4.14	0.79	1.00	7.00	1.000
External financier	4.09	1.12	1.00	7.00	1.342
Information sharing	3.50	1.06	1.00	7.00	1.088
Inter- and intra-firm collaboration	3.82	0.88	1.00	7.00	1.565

Source: Author's computations

Table 2.
Descriptive statistics

Construct	1	2	3	4	5	6
SCF adoption 1	0.98					
Innovative capability 2	0.462***	0.88				
Trade process digitization 3	0.476***	0.087*	0.76			
Inter- and intra-firm collaboration 4	0.522***	0.136*	0.197**	0.84		
Information sharing 5	0.201**	0.124**	0.318***	0.224***	0.85	
External financing 6	0.119*	0.444***	0.271**	0.098**	0.108**	0.74
Cronbach's alpha	0.78	0.81	0.98	0.74	0.88	0.93
Composite reliability	0.88	0.71	0.73	0.70	0.67	0.69
Average variance extracted	0.66	0.71	0.67	0.77	0.68	0.70

Source: Author's computations

Table 3. Fornall–Larcker Criterion

4.4 Measurement model

The reliability, validity and internal consistency (psychometric properties) of the measurement model were tested via confirmatory factor analysis. Table 4 shows the factor loadings of all the measuring items and their respective constructs. Test for convergent validity and internal consistency reliability was conducted first. The consistency of results across items on the same test is measured by internal consistency reliability (Han *et al.*, 2017). Drawing on Fornell and Larcker (1981), the indices for Cronbach's alpha, composite reliability and AVE of the constructs were estimated. The values of the Cronbach's alpha ranges from 0.74 to 0.88, which are well-above the recommended threshold of 0.70 (Fornell and Larcker, 1981). The values for composite reliability were also within and above the recommended threshold of 0.70, which imply that the internal consistency for each set of manifest variables in its respective construct. According to Fornell and Larcker (1981), convergent validity is attained if the AVE for every construct is higher than 0.50. The results show the range of values of AVE to fall within 0.66 and 0.77. The indicator reliability is evaluated using the indicator loadings. This represents the number of variations in items explained by the constructs. The factor loading values for all the items exceeded 0.70 (Carmines and Zeller, 1979).

4.5 Structural model estimate

The structural model as shown in Figure 2 was assessed following confirmation of the validity and reliability of the measurement model. Table 5 summarizes the results of the paths linking the constructs in the structural model. The results showed a statistically significant positive effect of all the five constructs. IC had a positive impact on SCF adoption at the 5% significance level ($t = 2.09$, p-value $= 0.004 < 0.05$). In this regard, *H1* is supported. Information sharing also had a statistically significant positive effect on SCF adoption at the 1% level of significance ($t = 4.792$, p-value $= 0.000 < 0.01$). Hence, *H2* is supported. Trade process digitization also recorded a statistically significant positive effect on SCF adoption at the 1% significance level ($t = 4.271$, p-value $= 0.000 < 0.01$). This led to confirm *H3*. External financing showed a positive effect on SCF adoption at the 5% level of significance ($t = 2.017$, p-value $= 0.012 < 0.05$). *H4* was supported in this regard. Finally, inter- and intra-firm collaboration recorded a statistically positive effect on SCF adoption at the 5% significance level ($t = 2.972$, p-value $= 0.001 < 0.01$) leading to support for *H5*.

5. Discussion

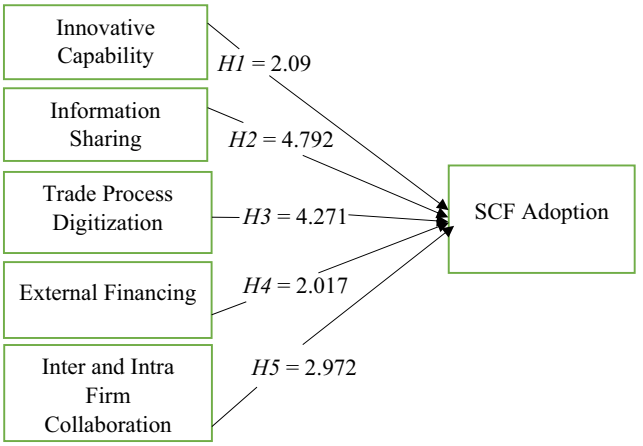
The purpose of this study was to investigate the determinants of SCF adoption among SMEs in developing countries with empirical data from Ghana using the TCE and RBV as

Item/factor	Code	Loading	*t*-value
Trade process digitization (Camara et al.*, 2015; Lu* et al.*, 2020)*	ITA	0.81	7.12
Interconnect different functional departments through a computer network	ITA1	0.72	12.89
Use information technology to integrate internal resources	ITA2	0.77	10.98
Use information technology to share resources with business partners	ITA3	0.90	8.89
Use IT to assess the resources of heterogeneous organizations in the global market	ITA4	0.92	6.26
Use information technology to enable seamless integration of logistics activities	ITA5	0.88	12.09
Use IT to support all business processes	ITA6	0.73	10.77
IT usage enabled integrated distribution and warehousing facilities	ITA7	0.76	15.20
Use IT to enable integrated inbound and outbound distribution of products	ITA8	0.79	8.88
External financing	FIN	0.81	7.21
External financing ensures sustainability of our operations/activities	FIN1	0.96	16.67
External financing increases the capital flow coordination in the supply chain	FIN2	0.99	14.11
External financing brings the high level of overall supply chain efficiency	FIN3	0.71	9.87
External financing considers high-risk prevention capabilities of core enterprise	FIN4	0.85	9.10
Information sharing (Pu *et al.*, 2020)	IFS	0.76	11.28
We exchange transaction information (e.g. order and payment processing) with our suppliers	IFS1	0.87	16.08
We consult with our suppliers about product design, the selection of raw materials and components related to the products	IFS2	0.84	15.11
We exchange information about price development and market conditions with suppliers	IFS3	0.98	7.99
Inter- and intra-firm collaboration	IFC	0.94	8.01
We make all relevant available information to our suppliers/vendors	IFC1	0.89	11.29
Our clients/customers can easily assess anything they want to know about us	IFC2	0.79	10.78
Exchange information to establish business planning	IFC3	0.72	13.44
Share proprietary information with supply chain partners	IFC4	0.77	8.35
Share accurate risk information with partners/suppliers	IFC5	0.75	7.77
Willing to share real time information on demand	IFC6	0.86	8.21
*Supply chain finance (SCF) adoption (*Caniato *et al.*, 2016*;* Wandfluh *et al.*, 2016*; Lu* et al.*, 2020)*	SCF	0.92	12.66
Get financing from supply chain partners based on real or movable property	SCF1	0.73	13.03
Get financing from supply chain partners based on accounts receivable	SCF2	0.84	8.55
Get financing from supply chain partners based on accounts payable	SCF3	0.79	6.06
Solve the financing problems by cooperating with supply chain partners	SCF4	0.92	5.78
Innovative capability (Narasimhan and Das, 1999; Tomlinson, 2011; Lu et al.*, 2020)*	INC	0.95	5.18
Introduce or develop new products and technologies in a short time and lower cost	INC1	0.76	10.02
Improve existing products and business processes in a timely manner	INC2	0.86	9.88
Continuously introduce new methods or technologies into existing processes	INC3	0.84	16.67
Continuously introduce new materials and technologies into production process	INC4	0.77	13.37
Make organizational changes and improvements according to sales requirements	INC5	0.74	8.06

Source: Author's computations, 2021

Table 4. Factor/items loadings of measurement model

the underlying theories. All five factors, namely, IC, trade process digitization, information sharing, external financing and inter- and intra-firm collaboration were found to impact significantly and positively on SCF adoption. These findings are supported by the TCE, which suggests that by adopting SCF solutions, SMEs are likely to optimize their firms' working capital, reduce the credit transaction costs and the risk of default. However, the RBV suggests that for SMEs to adopt and engage in SCF solutions, they need to acquire enough resources. The study provides preliminary empirical evidence on these five factors that impact the adoption of SCF solutions as a secure financing scheme for SMEs, and hence, are strategic enablers of SMEs' success in the context of a developing economy. Perhaps the



Source: Figure by author

Figure 2.
Theoretical framework

Path	*t*-value	*p*-value	Hypotheses
SCF adoption ← Innovation capability	0.312 (2.209)**	0.004	Supported
SCF adoption ← Trade process digitization	0.782 (4.792)***	0.000	Supported
SCF adoption ← Information sharing	0.515 (4.271)***	0.000	Supported
SCF adoption ← External financing	0.298 (2.017)**	0.012	Supported
SCF adoption ← Inter- and intra-firm collaboration	0.482 (2.972)**	0.022	Supported

Notes: ***<1%; **<5%; *<1%
Source: Author's computations

Table 5.
Structural model output

first study to examine the determinants of SCF adoption among SMEs in developing economy's context. These findings align with prior studies (Ali *et al.*, 2019; Lu *et al.*, 2020; Beka Be Nguema *et al.*, 2021a, 2021b; Li *et al.*, 2021; Nguyen *et al.*, 2022).

5.1 Innovative capability

The positive and significant relationship between IC and SCF as hypothesized by *H1* aligns with the results of previous studies on determinants of SCF adoption (Lu *et al.*, 2020; Li *et al.*, 2021). This finding suggests the importance of IC by SMEs in enabling effective SCF practices. Consistent with the basic premise of the RBV, possessing innovative resources and the capability to innovate serve an important requirement in SCF solution. This suggests a reasonable prediction accuracy of SCF adoption by SMEs. An important source of firm's resource heterogeneity has been the capability to innovate (Lu *et al.*, 2020).

5.2 Information sharing

Information sharing is positively related to SCF adoption, hence retaining *H2*. This finding suggests that SC operations are enhanced through information sharing among SC partners (Beka Be Nguema *et al.*, 2021a, 2021b). Thus, the moral hazard problem, as well

as information asymmetry between lenders and borrowers that characterize SCF solution is minimized (Lu *et al.*, 2020). The findings collaborate with Huang *et al.* (2020), who found that sharing information at higher levels can account for higher probability of SCF adoption. When intensive sharing of information occurs, external financiers generally hold the belief that a reliable relationship between customers and their respective suppliers exists and that their SCM practice is up to standard (Huang *et al.*, 2020). When SMEs share high levels of information, they are likely to attract a better credit line from external financiers that align with their financing needs. This is because there will be sufficient information available for external financiers. Further, as concluded in Lu *et al.* (2020), this finding suggests that SMEs' financing performance is ultimately enhanced through financing availability and minimal financing costs if, in terms of information, all SMEs are on the same page. This finding also complements findings from previous studies that SCF adoption can be promoted through a reduction in information asymmetry.

5.3 Trade process digitization

Trade process digitization had a significant and positive impact on SCF adoption which supports *H3*. Although this finding is not consistent with some prior literature (Bi *et al.*, 2022) who found no significant relationship between digitization and SCF adoption, it aligns with Caniato *et al.* (2016), who postulated trade process digitization among various clusters of SCF solutions to be one of the most relevant. Digitization of the trade process is required in the implementation of the most complex SCF solution (Caniato *et al.*, 2016). This suggests that the adoption of SCF solution is facilitated by digitizing the trade process of the SC. In addition, through the TCE, digitization paves a significant way to minimize costs as well as enables collaboration among SC partners (Chen *et al.*, 2021). With respect to paper-based process, trade process digitization provides significant cost savings through the permission of value-added services. These include the enhancement and faster visibility of invoices, and which provides extra visibility to suppliers in the management of accounts receivable or payable.

5.4 External financing

External financing, which was hypothesized by *H4* also had a positive and significant impact on SCF adoption. Indeed, external financing constitutes one of the three pillars of a SCF solution, which suggests that the implementation of SCF solution is impossible without external financing. By providing financing opportunity through SCF solutions, external financiers play a crucial role in the development of buyers and suppliers relationships. Furthermore, the improvement of relationships among SC partners is achieved through external financiers who provide financing alternatives under the SCF framework (Zhang, 2015). This finding is consistent with Beka Be Nguema *et al.* (2021a, 2021b), who found a positive relationship between financial institutions and SC effectiveness through SCF adoption.

5.5 Inter- and intra-firm collaboration

Finally, in line with Li *et al.* (2023), this study finds that SC collaboration positively affects SCF adoption by SMEs. Thus, inter- and intra-firm collaboration is a critical antecedent of SCF adoption. Information sharing and cost savings are facilitated by high levels of inter- and intra-firm collaboration among SC members. The retainment of *H5* suggests that SMEs can build strong relationships with their SC partners through the adoption of SCF solution. The higher possibility that SMEs would adopt SCF is significantly and positively related to inter- and intra-firm collaboration. Through collaboration, negotiation and digitization, they

can engage their SC partners (e.g. suppliers) to work under strategic alliance. Further, prior to a fixed time and through discounting from external financiers, their payment terms can be extended while the opportunity is being provided to their trading partners to obtain their payment back. A strong collaboration between suppliers and buyers in the business process assists them to act as an identical unit through the formation of strategic alliance (Ali *et al.*, 2019). Commercial and financial policies of firms, such as reverse factoring or inventory financing are influenced by inter- and intra-firm collaboration, which represents one of the key determinants of SCF solutions.

6. Conclusions

This paper explored the determinants of SCF adoption among SMEs in the context of a developing economy. From the findings, all the five elements which were examined positively and significantly constituted the SCF solution. The findings suggest that SCF solution is not only based on the flow of funds among SMEs but also requires the implementation of these five factors among buyers, suppliers and external financiers. This study is novel in that it is among the few that has examined the determinants of SCF adoption in a context of a developing economy.

6.1 Theoretical implications

This study contributes to literature in the following five ways. Firstly, empirical evidence is provided on the positive and significant relationship between five determinants, namely, IC, information sharing, external financing, trade process digitization and inter- and intra-firm collaboration and the adoption of SCF solutions from the perspective of a developing economy. Previous studies have not only examined limited variables as enablers of SCF decisions as well as not exclusively related to SCF adoption but they also focused on operational performance and SC effectiveness (Alora and Barua, 2019; Beka Be Nguema *et al.*, 2021a, 2021b; Bi *et al.*, 2022). However, since SCF is a new financing scheme among SMEs in developing countries, an understanding of the factors that underpin its adoption and implementation is critical. Beka Be Nguema *et al.* (2021a, 2021b) argue that examining the factors that underpin SCF adoption is a serious challenge for many SMEs in developing countries. Thus, it provides significant and new insights about the extent to which SMEs can adopt SCF solutions to keep their business operations smooth by increasing the working capital at the interorganizational level.

Secondly, the study extends the application of RBV to the SCF field. It identifies that SMEs can develop valuable SC capabilities by leveraging and bundling the resources of IC, external financing, trade process digitization, information sharing and inter- and intra-firm collaboration. This will enhance their working capital management and SC performance. Additionally, this paper extends the application of the TCE from traditional financing to SCF context. Thirdly, from a theoretical standpoint, findings from the new conceptual model provide relevant and reliable proof for SCF adoption, as depicted by the achievement factors of SCF as a means of improving the SC of SMEs. Fourthly, this paper responds to the calls for empirical studies on SCF (Yuan *et al.*, 2022; Li *et al.*, 2023). Further, most contributions in this field are conceptual, often lacking empirical evidence (Caniato *et al.*, 2019). On the one hand, past findings are based on case studies to explore the enablers, inhibitors and outcomes of SCF solutions (Caniato *et al.*, 2016) permitting further research into the external validity of the findings (Li *et al.*, 2023). These case study methodologies may be limited to some specific industries, whereas significant variations characterized different industries. On the other hand, previous studies primarily analyse the effects of information sharing and inter- and intra-firm collaboration on buyer-supplier finance rather than analysing specific

SCF solutions (Wuttke *et al.*, 2019; Li *et al.*, 2023). These findings are likely to lead to a limited understanding of the role of these variables in specific SCF solutions. Fifthly, this is one of the first studies which exclusively investigated the determinants of SCF adoption among SMEs in the context of a developing economy. Hence, it provides a theoretical model which can be used to guide SCF practices of SMEs in developing countries.

6.2 Managerial implications

From managerial perspective, this study provides some relevant new insights into the SC managers/owners of SMEs in developing countries. Firstly, the findings guide SME executives to adopt SCF as a mitigating strategy by means of optimizing their working capital and liquidity while assessing credit at the best cost from lenders. Secondly, the perfect identification of factors leading to the adoption of SCF are of incredible attractiveness for executives to discover the relevant practice of SCF. Thirdly, SME managers/owners are provided with a research model which guides them on how to settle the SCF process. SCF emphasizes that by increasing productivity through easy access to credit facility, SME managers expand their overall SC. This can be achieved by incorporating IC, information sharing, inter- and intra-firm collaboration, trade process digitization and external financing as critical success factors that optimize the flow of working capital among SMEs. For example, information asymmetry can be reduced by information sharing, which is not only valuable to SCF but also accelerates the flow of information among SC partners. SMEs need to leverage information to facilitate decisions with respect to changing markets. This further builds strategic relationships with key SC partners, responding quickly and flexibly to market demands and actively coordinating SC activities. While collaborating with each other, both buyers and suppliers gain competitive advantage through the strengthening of their relationships. The results emphasize the need of SC partners to link supply and demand orientation in realizing the positive effect of SCF adoption.

6.3 Limitations and future research

Like previous studies, this paper is without limitations, which provides future research avenues. Firstly, the paper used a cross-sectional survey, which makes it impossible to access changes over time. Similar studies using secondary data or longitudinal design could be more appropriate if such data were available. Secondly, a quantitative approach was used, and this limits respondents from expressing their feelings fully. In this regard, using a mixed method or a qualitative methodology serves as avenues for future research. Thirdly, although common method variance was controlled using different data sources, this limitation cannot be ruled out completely. This may render the results to be invalid and unreliable; hence, similar studies using data from multiple sources are likely to generate more valid results. Fourthly, only one developing country was used in this study hence, possible generalization of the findings to include other developing countries is far limited. Notwithstanding, the results can be generalized within the Ghanaian context and other countries in the sub-region.

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Appendix

Dear Respondent,

This research project proposes to provide empirical evidence on the determinants of supply chain finance adoption among small and medium sized enterprises (SMEs) in Ghana. SMEs within the Accra-Tema industrial hub are being sampled for this exercise and you have been selected to be part of the sample. I would therefore appreciate it if you could take some time off your busy schedule to diligently complete this questionnaire. I trust that your honest opinion (there is no right or wrong answer) would be provided. Be assured that this research is solely for academic purposes hence any information given will be treated as strictly confidential.

Part A

This part of the questionnaire requires information about firm characteristics. Please supply information as appropriate

1. Position/status of officer completing this questionnaire……..
2. Number of years at this position…….
3. Number of employees. Please tick.
   - ☐ < 100
   - ☐ (100 – 500)
   - ☐ (501 – 1000)
   - ☐ (1001– 2000)
   - ☐ (2001– 4000)
   - ☐ (4001 – 5000)
   - ☐ > 500
4. Annual sales/turnover: please tick.
   - ☐ < $50 m
   - ☐ $50m - $100m
   - ☐ $101m - $200m
   - ☐ $201 - $300m
   - ☐ $300m - $400m
   - ☐ $400m - $500m
   - ☐ > 500m
5. Total assets: please tick
   - ☐ < $100m
   - ☐ $100m - $200m
   - ☐ $201m - $300m
   - ☐ $301 - $400m
   - ☐ $401m - $500m
   - ☐ > 500m

Part B

Please indicate the extent to which you agree with the following item statements by checking the appropriate box/column where 1 = strongly disagree/never/not at all 2 = disagree/hardly occur/sometimes; 3 = fairly disagree/seldom/once a while; 4 = neutral; 5 = fairly agree/often/occasionally; 6 = agree/regularly/most of the time; 7 = strongly agree/to a greater extent/all the time.

Inter and intra firm collaboration	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Our logistics activities are well integrated with the through the logistic activities of key suppliers							
We have seamless integration of logistics activities with key vendors/suppliers							
Our logistics integration is characterized by excellent distribution, transportation, and/or warehousing facilities							
Our inbound and outbound distribution of the firm supplies with key suppliers/vendors is well integrated							
Our organization integrates purchasing of commodities and other equipment into strategic planning							

(*continued*)

Figure A1. Questionnaire for SME managers/ owners in Ghana

Innovative Capability							
Our firm maintains a high level of strategic relations with key suppliers							
We encourage a high level of suppliers' participation in our procurement process							
Our firm establishes quick ordering systems with key vendors/suppliers							
Our firm solves logistic problems jointly with key vendors/suppliers							
We include our key vendors/suppliers in our planning and goal-setting activities							
Our firm on frequent basis, arrange for delivery with vendors/suppliers							
We undertake vendor inventory management or consignment stock with suppliers							
We plan, forecast and replenish collaboratively with key vendors/suppliers							
Our firm dedicates capacity for key vendors/suppliers							
Exchange information to establish business planning							
Share proprietary information with supply chain partners							
Share accurate risk information with partners/suppliers							
Willing to share real time information on demand							
External Financing							
Our firm sees inventory financing as a risk prevention system (strategy)							
Inventory financing increases the capital flow coordination in the supply chain							
Inventory financing brings the high level of overall supply chain efficiency							
Inventory financing considers as high-risk prevention capabilities of core enterprise							
Inventory financing requires a high degree of technology for its application							
Dynamic discounting enables our firm to minimize disruption of operations							
We use dynamic discounting as a means of securing future cash input to ensure continuous cash flow							
We use dynamic discounting as a means of building trusting and lasting business relationship between our clients and customers							
We use dynamic discounting because of the potential transacting changes associated with it							
We use trade credit as a means of securing future cash input to ensure continuous flow of cash							
We use trade credit as a means of building a lasting and trusting business relationship between our clients and customers							
We use trade credit because of the potential transaction charges associated with it.							
We use reverse factoring as a means of securing future cash input to ensure continuous flow of cash							
We use reverse factoring as a means of building a lasting and trusting business relationship between our clients and customers							
We use reverse factoring because of the potential transaction charges associated with it							
Information Sharing							
Cost of order fulfilment reducing over the last 3 years							
Reduction in order fulfilment cost has improved							
Cost of order fulfilment is cost efficient							
Purchasing costs have reduced over the past 3 years							
Operating costs have reduced over the past 3 years							
Inventory costs have reduced over the past 3 years							
Supply Chain Finance Adoption							
Growth rate in internally generated funds							
Growth rate in return on assets							
Growth rate in return on investments							
Growth rate profit/accumulated fund							
Growth rate profit/accumulated fund							
Improvement in the order fulfilment process							
Improvement in the cycle time of ordering process							
Quality of order fulfilment process getting better							
Improvement in the order fulfilment process							
On-time delivery of medical suppliers from supplier							
Trade process digitization							

Figure A1.

(*continued*)

Trade process digitization							
Interorganizational logistics activities between our firm and major key suppliers are closely coordinated through IT							
Interconnect different functional departments through a computer network							
Use information technology to integrate internal resources							
Use information technology to share resources with business partners							
Use IT to assess the resources of heterogeneous organizations in the global market							
Use information technology to enable seamless integration of logistics activities							
Use IT to support all business processes							
IT usage enabled integrated distribution and warehousing facilities							
Use IT to enable integrated inbound and outbound distribution of products							

Figure A1.

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