

Working Capital Management across Supply Chains: A Review of Inventory, Receivables, and Supplier Payment Strategies

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Abstract

Working capital management is usually treated as a firm-level finance problem, yet decisions about inventory, customer credit and supplier payment are made inside supply chains, where one firm's liquidity gain can become another firm's liquidity cost. This review examines how these three operating decisions affect liquidity and profitability, both within the firm and across trading partners, using the cash conversion cycle and its supply chain extension as an organising framework. Three conclusions emerge. First, shorter cash conversion cycles are generally associated with higher profitability, but the relationship is concave, so both excessive and insufficient working capital reduce performance. Second, the effect of each component depends on bargaining power, financing constraints and product characteristics, which explains why a policy such as extending supplier payment terms can raise returns for a large buyer while weakening its suppliers. Third, collaborative arrangements and supply chain finance instruments can lower the financing cost of the chain as a whole rather than merely shifting working capital between partners, although their net value is not yet well established. By separating genuine operational improvements from transfers of financing between partners, the review offers a chain-level view of working capital and identifies priorities for future research, including chain-level measurement, the link between operational risk and liquidity, and evidence from emerging economies.

Keywords: working capital management; cash conversion cycle; inventory; trade credit; accounts receivable; supplier payment terms; supply chain finance; liquidity; profitability

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1. Introduction

Working capital is the capital a firm ties up in its day-to-day operations. In its operating form, net working capital equals inventory plus trade receivables minus trade payables. Although these balances are short-term by definition, they are persistent in aggregate and large in magnitude: for many manufacturing and retail firms, operating working capital accounts for a quarter or more of total assets (Hill, Kelly, & Highfield, 2010). Because every unit of currency held in inventory or extended to customers must be financed, the management of these balances bears directly on two outcomes that managers and investors care about: liquidity, meaning the ability to meet obligations as they fall due, and profitability, meaning the returns generated on the capital employed. Because working capital decisions shape both cash flows and the capital base, they are a direct channel through which operating choices create or destroy enterprise value (Lawal & Oduleye, 2018a).

The traditional finance view frames working capital as a trade-off between these two outcomes. Holding more inventory and granting more generous credit protects sales and avoids stock-outs, but it ties up funds that could earn a return elsewhere and raises financing costs. Holding less improves returns on capital but increases the risk of disruption and lost revenue (Deloof, 2003; Shin & Soenen, 1998). A large body of empirical work has tested this trade-off, mostly by regressing measures of profitability on the cash conversion cycle and its components.

A parallel stream of research in operations and supply chain management has argued that the firm-level framing is incomplete. Inventory levels are shaped by demand variability, lead times and information sharing with partners (Lee, Padmanabhan, & Whang, 1997). Receivables and payables are two sides of the same trade credit relationship, so that an extension of payment terms by a buyer appears as an increase in receivables at its supplier (Hofmann & Kotzab, 2010). From this perspective, a firm that "improves" its working capital by paying suppliers later may simply

push the financing burden upstream, often to smaller firms that face higher capital costs. Whether such a policy creates value depends on the chain, not just the firm.

Although both streams are well developed, they have largely evolved in parallel. Finance studies rarely consider how one firm's working capital policy affects its trading partners, while operations studies seldom connect inventory and payment decisions to measured profitability. This paper addresses that gap by reviewing, within a single framework, how operating decisions about inventory, receivables and supplier payments affect liquidity and profitability, both within the firm and across supply chain partners. It examines the empirical relationship between each component and firm performance, the operating and contractual strategies proposed for managing each component, and the way a supply chain perspective and supply chain finance instruments change the evaluation of these policies.

In doing so, the review contributes to the literature in three ways. It integrates evidence from corporate finance, financial economics and operations management that is usually reviewed separately; it distinguishes reductions in working capital that come from genuine operational improvement from those that merely shift financing to trading partners; and it extends the discussion to emerging-economy, public service and asset-intensive settings that receive little attention in earlier reviews.

The paper proceeds as follows. Section 2 describes the methodology. Section 3 synthesises the literature on the theoretical foundations of working capital management, on inventory, receivables and supplier payment strategies, on working capital across the supply chain, and on the aggregate evidence linking working capital to liquidity and profitability. Section 4 develops a conceptual model and a set of propositions from this synthesis. Section 5 discusses the findings, Section 6 sets out theoretical, managerial and policy implications, Section 7 acknowledges the limitations of the review, Section 8 outlines directions for future research and Section 9 concludes.

2. Methodology

The review follows a narrative and integrative approach rather than a formal meta-analysis, because the literature spans disciplines that use different methods and outcome measures. Studies were identified through searches of major databases (Scopus, Web of Science, EBSCO Business

Source and Google Scholar) using combinations of the terms "working capital management", "cash conversion cycle", "cash-to-cash", "trade credit", "accounts receivable", "accounts payable", "payment terms", "inventory and financial performance" and "supply chain finance". The search covered work published up to 2019, with priority given to peer-reviewed journal articles in finance, accounting, operations management and logistics.

Studies were included if they (a) examined at least one of the three operating components of working capital, and (b) related that component to liquidity, profitability, firm value or supply chain outcomes, either empirically or through formal modelling. Conference papers and practitioner reports were used only to describe practice. The selected literature was coded by component (inventory, receivables, payables, or aggregate CCC), by level of analysis (firm or supply chain), by method (econometric, analytical model, case study or survey) and by the direction of the reported relationship. Table 1 summarises the structure of the reviewed literature.

Because working capital outcomes in emerging economies depend heavily on operating conditions, the search was extended to adjacent research on procurement, maintenance and asset integrity, operational safety, financial governance and controls, and digital and energy infrastructure, particularly from Sub-Saharan Africa. These studies were included where they bore on the drivers of inventory, payment behaviour or liquidity risk. The findings were then synthesised thematically by component and level of analysis. Relationships that recurred across streams were used to derive the conceptual model and propositions presented in Section 4.

Table 1. Structure of the reviewed literature

Stream	Main disciplines	Typical methods	Representative studies
Aggregate CCC and profitability	Corporate finance, accounting	Panel regressions on listed firms and SMEs	Shin & Soenen (1998); Deloof (2003); García-Teruel & Martínez-Solano (2007); Baños-Caballero et al. (2012, 2014); Aktas et al. (2015)

Stream	Main disciplines	Typical methods	Representative studies
Inventory and financial performance	Operations management	Econometric analysis of inventory turns; event studies	Chen, Frank, & Wu (2005); Gaur, Fisher, & Raman (2005); Capkun et al. (2009); Hendricks & Singhal (2009); Eroglu & Hofer (2011)
Trade credit and receivables	Financial economics	Theoretical models; cross-country and firm panels	Smith (1987); Petersen & Rajan (1997); Ng et al. (1999); Cuñat (2007); Klapper, Laeven, & Rajan (2012)
Payables and supplier terms	Finance, purchasing	Firm panels; bargaining power studies	Fisman & Love (2003); Murfin & Njoroge (2015); Fabbri & Klapper (2016)
Supply chain WCM and supply chain finance	Logistics, SCM	Conceptual models; case studies; analytical models	Hofmann & Kotzab (2010); Pfohl & Gomm (2009); Wuttke et al. (2013); Gelsomino et al. (2016); van der Vliet et al. (2015)

Source: Author's classification of the reviewed literature.

3. Literature Synthesis

3.1 Theoretical foundations

3.1.1 The operating cycle and the cash conversion cycle

The operating cycle describes the time between purchasing inputs and collecting cash from customers. Part of this cycle is financed by suppliers through trade credit; the remainder must be financed by the firm. Richards and Laughlin (1980), building on Gitman (1974), formalised this residual period as the cash conversion cycle (CCC):

$$\text{CCC} = \text{DIO} + \text{DSO} - \text{DPO}$$

where DIO (days inventory outstanding) is inventory divided by cost of goods sold multiplied by 365, DSO (days sales outstanding) is trade receivables divided by sales multiplied by 365, and DPO (days payables outstanding) is trade payables divided by cost of goods sold multiplied by 365. A shorter CCC means that the firm needs to finance fewer days of operations from its own sources or from external lenders. The measure is attractive because it is dynamic, linking balance sheet stocks to income statement flows, whereas static ratios such as the current ratio say little about how quickly assets turn into cash (Richards & Laughlin, 1980).

Farris and Hutchison (2002) popularised the CCC, which they called the cash-to-cash cycle, as a supply chain metric, arguing that it connects operational performance (inventory turns, billing and collection processes, purchasing terms) to financial outcomes in a single number that operations managers can influence. The same components appear in the Supply Chain Operations Reference (SCOR) model as an indicator of asset management efficiency.

Several authors have extended this framework. Kim and Chung (1990) showed that investments in inventory and in customer credit should be evaluated together using discounted cash flows, because a change in one alters the timing of cash flows from the other. Moss and Stine (1993) and Filbeck and Krueger (2005) documented that CCC levels differ systematically by firm size and across industries, so comparisons between firms need care. In the operations literature, Kroes and Manikas (2014) showed that reductions in manufacturers' CCC are followed by improvements in financial performance, which confirms that the measure captures operating performance that matters to investors.

3.1.2 Liquidity and profitability: competing views

Two broad theoretical views predict different relationships between working capital and performance. The *aggressive* or efficiency view holds that lower investment in working capital raises profitability because it reduces the capital base, lowers financing costs and signals operational efficiency. Under this view, a shorter CCC should be associated with higher returns (Shin & Soenen, 1998; Deloof, 2003). The *conservative* or sales-support view holds that higher working capital can raise profitability: inventory prevents stock-outs and supports service levels, generous credit terms stimulate sales and allow customers to verify product quality before paying

(Long, Malitz, & Ravid, 1993), and early payment of suppliers can capture discounts that carry high implicit returns (Ng, Smith, & Smith, 1999).

Because both mechanisms operate simultaneously, more recent theory predicts a non-linear relationship. At low levels of working capital, increases support sales and reduce disruption costs, so performance rises. Beyond some point, the financing and opportunity costs dominate and performance falls. This implies an optimal level of working capital that balances costs and benefits (Baños-Caballero, García-Teruel, & Martínez-Solano, 2012, 2014; Aktas, Croci, & Petmezas, 2015).

Working capital decisions also interact with the firm's overall liquidity policy. Kim, Mauer and Sherman (1998) and Opler, Pinkowitz, Stulz and Williamson (1999) showed that firms with higher costs of external finance and more volatile cash flows hold more liquid assets, which implies that the appropriate level of working capital depends on access to finance. Ding, Guariglia and Knight (2013) found that Chinese firms with high working capital were able to use it as a buffer that protected fixed investment from financing constraints, and Chen and Kieschnick (2018) found that changes in the availability of bank credit significantly affect firms' investment in working capital.

3.1.3 The supply chain perspective

Three features distinguish working capital from other financial decisions and make a supply chain perspective necessary. First, receivables and payables are reciprocal: the payables of a buyer are the receivables of its supplier, so payment terms allocate financing between partners rather than eliminate it. Second, inventory positions are interdependent: a retailer that cuts stock may simply shift holding costs to its distributor or manufacturer through vendor-managed inventory or consignment arrangements. Third, the cost of capital differs across partners. When a large, investment-grade buyer extends payment terms to a small supplier with expensive credit, the total financing cost borne by the chain rises even if the buyer's own CCC falls (Hofmann & Kotzab, 2010; Pfohl & Gomm, 2009). These features mean that a firm-level metric can reward behaviour that harms the supply chain on which the firm depends.

3.2 Inventory management strategies

3.2.1 Inventory as a working capital component

Inventory is often the largest and least liquid component of operating working capital, and it is the one most directly controlled by operations managers. Unlike receivables and payables, which are governed largely by contracts, inventory levels result from production planning, sourcing lead times, forecast accuracy and service-level targets. Its financial cost includes the cost of capital tied up, storage, handling, insurance, obsolescence and shrinkage, which together are commonly estimated at 20 to 30 percent of inventory value per year in practitioner literature. In asset-intensive sectors such as energy, however, spare parts and materials inventory is closely tied to plant uptime, so reductions that look attractive on the balance sheet can raise the cost of unplanned downtime (Okonkwo, Ogunwole, & Okeke, 2018b). Predictive and condition-based maintenance can reduce the size of this buffer by forecasting failures and timing part replacement, which allows spares inventory to be held closer to actual need (Adaramola, Fadero, & Gideon, 2018; Obetta & Ninduwezuor-Ehiobu, 2018). Reliability engineering and integrity management programmes serve a similar purpose, since better knowledge of failure patterns lets firms plan critical spares rather than stockpile them (Gideon, Adaramola, & Fadero, 2019; Obetta, 2019). Risk-based inspection of ageing equipment (Obetta, 2018; Obetta & Ninduwezuor-Ehiobu, 2019) and drone-based inspection of power networks (Dagodzo, 2018a, 2018b) serve the same role, allowing maintenance materials to be ordered against planned work rather than held against uncertain failures.

3.2.2 Evidence on inventory and performance

The empirical evidence on inventory and financial performance is extensive. Chen, Frank and Wu (2005) documented a substantial decline in inventory levels among United States manufacturing firms between 1981 and 2000, driven mainly by reductions in work-in-process and raw materials. They found that firms with abnormally high inventories had poor subsequent stock returns, and that those with abnormally low inventories performed only moderately well, suggesting diminishing returns to inventory reduction. Capkun, Hameri and Weiss (2009) found a significant positive association between inventory performance (lower inventory relative to sales) and profitability measures for manufacturing firms, with the strongest effects for raw materials and work-in-process inventories.

In retail, Gaur, Fisher and Raman (2005) showed that inventory turnover varies systematically with gross margin, capital intensity and sales surprise, which means raw turnover ratios are poor benchmarks across firms. Hendricks and Singhal (2009) found that announcements of excess inventory were associated with significant negative abnormal stock returns, indicating that markets penalise demand-supply mismatches. Eroglu and Hofer (2011), using an industry-adjusted measure of inventory leanness, found that the relationship between leanness and profitability is concave in most industries: reducing inventory improves returns up to a point, beyond which further cuts reduce performance. This finding mirrors the non-linear results reported in the aggregate CCC literature.

Further studies support these conclusions while adding nuance. Chen, Frank and Wu (2007) extended their analysis to retail and wholesale firms and again found that firms with abnormally high inventories earned poor subsequent stock returns. Kesavan and Mani (2013) showed that abnormal inventory growth contains information about retailers' future earnings, and Alan, Gao and Gaur (2014) found that inventory turnover predicts future stock returns in retailing. Koumanakos (2008) found that higher inventory levels were associated with lower returns for Greek manufacturers, whereas Cannon (2008) found little evidence that inventory improvement alone raised return on assets for United States manufacturers. Shah and Shin (2007) showed that part of the financial benefit of information technology investment works through lower inventory. Hendricks and Singhal (2003, 2005) demonstrated that supply chain glitches and disruptions cause large and persistent losses in shareholder value, which illustrates the cost of running inventory buffers too lean.

3.2.3 Operating strategies for inventory

Several operating strategies can reduce inventory without degrading service. Lean and just-in-time production cut work-in-process and raw materials by synchronising production with demand; the evidence generally supports lower inventories and higher asset turns, although the benefits depend on stable demand and reliable suppliers. Better forecasting and information sharing reduce the safety stock needed to buffer uncertainty and dampen the bullwhip effect, the amplification of demand variability upstream (Lee et al., 1997), and end-to-end traceability systems, such as those proposed for pharmaceutical distribution, extend this visibility to stock in transit and across custody points (Aneke & Adesemoye, 2019). Vendor-managed inventory and consignment stock

transfer the ownership or management of inventory to the supplier; they improve the buyer's DIO but may simply relocate the financing burden upstream unless the supplier gains offsetting benefits such as better demand visibility. Postponement and modular product design keep inventory in generic form for longer, reducing the value at risk of obsolescence, while SKU rationalisation and network redesign reduce the number of stocking points and the inefficiencies that come with them.

The right inventory strategy depends on the product and its demand. Fisher (1997) argued that functional products with predictable demand call for physically efficient supply chains with low inventory, while innovative products with uncertain demand call for responsive chains that position buffer stock strategically. Lee (2002) extended this view to uncertainty on the supply side. Cachon and Fisher (2000) quantified the value of sharing demand information between partners, and Waller, Johnson and Davis (1999) showed that vendor-managed inventory can lower inventory and improve service in retail supply chains when supported by frequent replenishment and information sharing.

Analytical work has begun to integrate inventory decisions with financial measures. Protopappa-Sieke and Seifert (2010) showed that inventory policies optimised on cost alone can produce poor working capital outcomes when payment delays and financing restrictions are included, and that jointly optimising order quantities and payment terms improves both operational and financial performance. Chod (2017) and Yang and Birge (2018) modelled how trade credit interacts with inventory decisions, showing that suppliers who extend credit share in the downside risk of the buyer's inventory, which influences how much the buyer stocks. These models make clear that inventory and payment terms are jointly determined and should not be optimised separately. Advances in automation, analytics and process redesign have made such joint planning more practical, because firms can now track stock positions, orders and invoices in integrated systems rather than in separate functional silos (Agboada, Ezeako, Okoli, & Uzundu, 2018). Sustaining such gains, however, requires that improved inventory and replenishment practices be codified in standard operating procedures so they persist beyond the initial improvement project (Agboada, Ezeako, Okoli, & Uzundu, 2019).

The link between inventory and payment terms has a long history in operations research. Haley and Higgins (1973) analysed how trade credit terms should influence order quantities, and

Goyal (1985) extended the economic order quantity model to allow a permissible delay in payment, showing that credit periods reduce the effective cost of holding stock and justify larger orders. Later models examine inventory financed through asset-based lending (Buzacott & Zhang, 2004), the choice between supplier and bank financing (Kouvelis & Zhao, 2012), and buyers that finance capital-constrained suppliers directly or through purchase order financing (Tang, Yang, & Wu, 2018). Seifert, Seifert and Protopappa-Sieke (2013) reviewed this literature and concluded that trade credit offers considerable scope for further research in operations, particularly on its interaction with inventory and supply chain decisions.

3.2.4 Inventory in public service, infrastructure and energy-constrained settings

Working capital pressures look different in public service and infrastructure supply chains. In health systems, diagnostic laboratories depend on a steady supply of reagents and consumables with limited shelf life, so inventory decisions affect service quality as well as cost. Studies of laboratory infrastructure in resource-constrained settings stress that facility design, quality systems and layout shape throughput and the use of consumables (Aminu-Ibrahim et al., 2018; Ogbete et al., 2018, 2019; Yusuf & Abdulrazaq, 2018). Integrated laboratory and surveillance information systems improve the data available for forecasting demand (Abdulrazaq et al., 2019; Ekemezie et al., 2018), while weak delivery infrastructure can prevent innovations from reaching patients at all (Ilodigwe & Adesemoye, 2019b). Large capital projects in these sectors also tie up substantial funds in materials and work in progress (Aminu-Ibrahim et al., 2019).

Construction and public infrastructure supply chains face similar issues. Materials are often a large share of project cost, and sourcing them locally can shorten lead times and reduce the stock that must be held on site (Nwafor et al., 2019c). Inefficient public infrastructure delivery, by contrast, lengthens the period over which contractors must finance materials and labour before they are paid (Nwafor et al., 2019b), and the affordability and resilience of housing and urban infrastructure depend in part on these supply chain costs (Gil-Ozoudeh et al., 2018; Nwafor et al., 2019a).

Energy is another input whose reliability affects inventory policy. Where grid supply is unreliable, manufacturers may hold extra raw materials and finished goods to protect against stoppages and incur high costs for backup power. Studies of solar integration in small-scale

Nigerian manufacturing and of load distribution in hybrid solar installations suggest that more reliable on-site energy can reduce these costs (Sunday & Omoegun, 2018, 2019), while research on voltage control, solar resource estimation and hydrogen integration addresses the reliability of the wider power system (Oshevire et al., 2017; Odejebi & Ahmed, 2018a; Shittu et al., 2019).

3.3 Receivables and customer credit strategies

3.3.1 Why firms extend trade credit

Trade receivables arise when a firm sells on credit, effectively lending to its customers. Financial economics offers several explanations for why non-financial firms act as lenders. The *financing advantage* view holds that suppliers have better information about their customers than banks do, can monitor them through the ongoing trading relationship and can repossess goods in default, so they can lend more cheaply to customers that banks will not serve (Petersen & Rajan, 1997; Cuñat, 2007). The *quality guarantee* view holds that credit terms allow customers to inspect and verify goods before paying, which is particularly valuable for new suppliers and products whose quality is hard to assess (Long et al., 1993; Smith, 1987). The *price discrimination* view holds that credit terms allow suppliers to vary effective prices across customers without changing list prices (Petersen & Rajan, 1997). Finally, the *transaction cost* view holds that credit allows buyers to separate the payment cycle from the delivery cycle, reducing cash-handling costs. In practice, credit terms also form part of a firm's commercial and marketing mix, used alongside pricing and promotion to win and retain customers (Agyei, Izuchukwu, Feboh, & Idowu, 2018).

Ng, Smith and Smith (1999) documented that credit terms vary widely across industries but are remarkably stable within industries, and that the common two-part term (for example, a 2 percent discount if paid within 10 days, otherwise net 30) implies an annualised interest rate on late payment of more than 40 percent. This suggests that the terms serve as a screening device, separating customers who can access cheaper finance from those who cannot.

Other theories emphasise different motives. Ferris (1981) argued that trade credit lowers transaction costs by separating the exchange of goods from the exchange of money, and Emery (1984) presented trade credit as a financial decision in which firms lend when the return exceeds that available on marketable securities. Brennan, Maksimovic and Zechner (1988) showed that

vendor financing can serve as a form of price discrimination when customers differ in creditworthiness. Biais and Gollier (1997) modelled how suppliers' private information about customers allows trade credit to ease bank credit rationing, and Burkart and Ellingsen (2004) argued that lending in kind is harder to divert than cash, which allows suppliers to lend when banks will not. Giannetti, Burkart and Ellingsen (2011) found that firms buying differentiated goods and services receive more trade credit, and Fabbri and Menichini (2010) argued that suppliers' advantage in liquidating collateral explains why even unconstrained firms use trade credit.

3.3.2 Receivables, liquidity and profitability

Empirically, most studies find a negative association between DSO and profitability. Deloof (2003), studying large Belgian firms, found that gross operating income was significantly negatively related to days receivables, and interpreted this partly as reverse causality: less profitable firms may extend credit to win sales or may struggle to collect from weak customers. Similar negative associations were reported for Greek firms (Lazaridis & Tryfonidis, 2006), Spanish SMEs (García-Teruel & Martínez-Solano, 2007), Pakistani firms (Raheman & Nasr, 2007), United States firms (Gill, Biger, & Mathur, 2010) and Nigerian quoted firms (Akinlo, 2012). In contrast, Mathuva (2010) found that for Kenyan listed firms the relationship between receivables collection and profitability was negative but the inventory relationship was positive, highlighting that components do not always move together.

Tauringana and Afrifa (2013) asked SME managers to rank working capital components by importance and found that accounts receivable and accounts payable management mattered most for profitability, more so than inventory or cash management. This suggests that for smaller firms, credit and collection practices may be a more powerful lever than operational inventory improvements.

Survey evidence adds detail on how firms manage credit in practice. Pike and Cheng (2001) found that credit policies and practices in UK companies vary with firm size and that late payment is closely linked to how credit is managed. Peel, Wilson and Howorth (2000) found late payment to be a widespread problem for small firms, and Wilson and Summers (2002) showed that small firms set credit terms partly for marketing and quality-signalling reasons. Hill, Kelly and Lockhart (2012) found that the value shareholders place on extending trade credit depends on the firm's

financing costs and on its strategic motives for granting credit, and García-Teruel and Martínez-Solano (2010) showed that SMEs' use of trade credit varies with the legal and financial environment across European countries.

3.3.3 Strategies for managing receivables

Firms can shorten DSO or reduce its cost in several ways. Credit policy and customer screening, including credit limits, credit scoring and risk-based segmentation of customers, reduce bad debts and slow payment, and data-driven risk evaluation models developed for financial institutions in emerging markets offer transferable tools for this purpose (Akomolafe & Agu, 2019b). Billing accuracy matters because disputes and invoice errors are a major cause of delayed payment; order-to-cash process redesign therefore links receivables directly to operational quality, and stronger reconciliation controls help prevent the unmatched items and disputes that delay collection (Dogbatsey, Ebhojie, & Oyeleye, 2019). Early payment discounts shorten DSO at the cost of a price concession, and their value depends on the seller's cost of capital relative to the implied discount rate. Factoring and receivables securitisation convert receivables into cash before the due date; Klapper (2006) showed that factoring is particularly valuable for SMEs in countries with weak creditor protection, because the factor relies on the creditworthiness of the buyer rather than the seller. Captive finance and credit insurance, finally, allow sellers to offer terms while transferring credit risk.

Mian and Smith (1992) showed that firms choose between managing receivables in-house, using captive finance subsidiaries and factoring based on scale, credit-information economies and the degree to which receivables can be separated from the firm's other assets. The choice is therefore itself a strategic decision about which party in the chain is best placed to bear the financing and credit risk. Whichever structure is chosen, receivables and payables are exposed to error and fraud, so risk-based internal controls and technology-enabled internal audit form an integral part of working capital governance (Akomolafe & Agu, 2018, 2019a).

3.4 Supplier payment strategies

3.4.1 Payables as a source of financing

Trade payables are a major source of short-term financing. Petersen and Rajan (1997) and Fisman and Love (2003) showed that trade credit substitutes for bank credit when firms are financially constrained or when financial markets are underdeveloped. Fisman and Love found that industries more dependent on trade credit grew faster in countries with weaker financial intermediaries, suggesting that supplier financing helps relax financing constraints at the economy level. In emerging markets, where many firms have limited access to formal finance, supplier credit and relationship-based bank lending are often the main sources of short-term funding (Michael & Ogunsola, 2019a; Ezeako, Okoli, Uzundu, & Ibeh, 2019).

Country and crisis studies support this substitution role. Atanasova (2007) found that UK small firms facing bank credit constraints rely more on trade credit, and Ge and Qiu (2007) found that Chinese non-state firms, which face discrimination by state-owned banks, use more trade credit than state-owned firms. Evidence from financial crises shows that trade credit networks both absorb and transmit shocks: Love, Preve and Sarria-Allende (2007) found that trade credit provided by firms rose immediately after crises in emerging markets and then contracted, Garcia-Appendini and Montoriol-Garriga (2013) found that cash-rich United States firms increased the trade credit they extended during the 2007-2008 crisis, acting as liquidity providers to constrained customers, and Bastos and Pindado (2013) found evidence that trade credit partly substituted for scarce bank finance during crisis conditions.

From the firm's perspective, extending DPO shortens the CCC and reduces the need for other financing. This is why many large firms launched programmes in the 2000s and 2010s to extend standard supplier payment terms, sometimes from 30 to 90 or 120 days. Under the aggressive view of WCM, such programmes should increase profitability and value.

3.4.2 Evidence on payables and performance

The evidence on payables is more ambiguous than for inventory or receivables. Deloof (2003) found a negative relationship between days payables and profitability, which he attributed to less profitable firms waiting longer to pay their bills. In other words, long DPO may signal financial

weakness rather than strategic strength. García-Teruel and Martínez-Solano (2007) found no significant relationship between DPO and SME profitability once endogeneity was controlled for. The ambiguity reflects two opposing forces: delaying payment preserves cash, but it may sacrifice early payment discounts (whose implicit return often exceeds the firm's cost of capital) and may damage supplier relationships.

Research on bargaining power clarifies the distributional consequences. Klapper, Laeven and Rajan (2012) analysed thousands of trade credit contracts and found that the largest and most creditworthy buyers received the longest payment terms, primarily from smaller suppliers. This pattern is difficult to reconcile with the financing-advantage view of trade credit, which predicts that credit flows to constrained firms, and is more consistent with buyer market power. Fabbri and Klapper (2016) found similar evidence in China, where suppliers with weaker bargaining power extended more credit. Murfin and Njoroge (2015) found that when large, creditworthy buyers delay payments, small suppliers reduce their capital investment, particularly when they face tighter bank financing. This shows that payables extension can impose real economic costs upstream.

Financial distress amplifies these effects. Molina and Preve (2009) found that firms in financial distress cut the credit they extend to customers and lose sales as a result, while Molina and Preve (2012) found that distressed firms lean more heavily on credit from their own suppliers. Boissay and Gropp (2013) showed that firms facing payment defaults from customers pass a substantial share of the shock to their suppliers by defaulting in turn, so that trade credit chains transmit liquidity shocks upstream, with firms that have better access to finance absorbing more of the shock. Dass, Kale and Nanda (2015) argued that trade credit can also act as a commitment device that supports suppliers' relationship-specific investments and that its use depends on product market power, which suggests that unilateral changes to terms may erode the incentives on which a supply relationship rests.

3.4.3 Strategies for supplier payments

The literature distinguishes several supplier payment strategies. Under unilateral term extension, a buyer uses its bargaining power to lengthen payment terms; this improves the buyer's CCC but transfers financing costs to suppliers and can raise input prices, reduce supplier investment or increase supply risk (Murfin & Njoroge, 2015). Under early payment discount capture, a cash-rich

buyer pays early in return for a discount; because the implied return on two-part terms is high, this is often value-creating for firms with low capital costs (Ng et al., 1999). Dynamic discounting extends this approach electronically, with a discount that slides with the number of days paid early, letting buyers deploy surplus cash flexibly. Reverse factoring, or supplier finance, allows the buyer to confirm invoices to a bank or platform so that suppliers can sell them at a financing rate based on the buyer's credit rating; the buyer can then extend terms while suppliers receive cash earlier and at lower cost than they could obtain independently (Wuttke, Blome, Foerstl, & Henke, 2013; Lekkakos & Serrano, 2016). Finally, payment process standardisation, such as consolidating payment runs and paying on the due date rather than early by default, captures DPO gains that are often lost through process inefficiency rather than through contract terms.

Supplier payment terms do not exist in isolation; they are negotiated alongside price, quality, delivery and service commitments. Work on strategic procurement shows that firms can lower total cost by treating payment terms as one element of a broader sourcing and vendor governance strategy, rather than extracting longer terms at the expense of other contract conditions (Okonkwo, Ogunwole, & Okeke, 2018a; Okonkwo, Ogunwole, Okeke, & Mayo, 2019). Clear contract terms also reduce the disputes that frequently hold up payment in high-value service contracts (Uchechi & Ominyi, 2019), and streamlined bidding and tendering workflows shorten the overall procure-to-pay cycle (Uchechi, Ominyi, Anichukwueze, & Jones, 2019).

Table 2 summarises the main levers for each component and their expected effects on the focal firm and on its supply chain partners.

Table 2. Working capital levers and their expected effects

Component	Lever	Effect on focal firm liquidity	Effect on profitability	Effect on supply chain partners
Inventory	Lean/JIT, better forecasting, postponement	Improves (lower DIO)	Positive up to an optimum; risk of stock-outs if too lean	Neutral to positive if variability is reduced
Inventory	VMI or consignment	Improves for buyer	Positive for buyer	Supplier bears holding cost; may

Component	Lever	Effect on focal firm liquidity	Effect on profitability	Effect on supply chain partners
				gain demand visibility
Receivables	Tighter credit and collections	Improves (lower DSO)	Positive if sales are not lost	Customers lose financing; may switch suppliers
Receivables	Factoring	Improves	Depends on factoring cost	Neutral for customer
Payables	Unilateral term extension	Improves (higher DPO)	Short-term positive; possible higher prices	Negative for suppliers, especially SMEs
Payables	Early payment discount capture	Worsens	Positive if discount exceeds cost of capital	Positive for suppliers
Payables	Reverse factoring	Improves for buyer	Positive for buyer	Positive or neutral if financing rate is below supplier's cost of capital

Source: Author's synthesis of the reviewed literature.

3.5 Working capital across the supply chain

3.5.1 From firm-level to chain-level working capital

Hofmann and Kotzab (2010) provided one of the first systematic arguments for a supply chain-oriented approach to WCM. They showed that when each firm independently minimises its own CCC, the result is a shifting of working capital between partners rather than a reduction for the chain. They proposed a collaborative cash conversion cycle, measured across buyer and supplier, and argued that chain-level reductions are achievable only through measures that actually remove inventory or speed up cash flow, such as better coordination of inventory positions, or that reduce the cost of financing the remaining working capital, such as using the lowest-cost partner's balance sheet.

Randall and Farris (2009) illustrated this logic using CCC variables. They showed that when the weighted average cost of capital differs across partners, the chain can lower total financing costs by shifting inventory and receivables to the partner with the lowest cost of capital, and compensating the other partners through prices or terms. The same logic applies within multinational groups, where intercompany payment terms and transfer prices move working capital between subsidiaries and must be managed within transfer pricing and cross-border tax rules (Lawal & Oduleye, 2018b, 2019a). Grosse-Ruyken, Wagner and Jönke (2011) argued that the appropriate CCC depends on supply chain position, industry and strategy, so that benchmarking firms against a single target value is misleading.

3.5.2 Supply chain finance

Supply chain finance (SCF) refers to a set of instruments and practices that optimise financial flows across supply chain partners, typically by using the financial strength of one partner to reduce the financing costs of others. Pfohl and Gomm (2009) defined SCF as the inter-company optimisation of financing and the integration of financing processes with customers, suppliers and service providers. Gelsomino, Mangiaracina, Perego and Tumino (2016) reviewed the literature and distinguished a finance-oriented perspective, focused on instruments such as reverse factoring, from a supply chain-oriented perspective, which includes inventory financing and the optimisation of working capital across partners through operational means.

Reverse factoring has received the most attention. Wuttke, Blome and Henke (2013) found that adoption is driven by buyers seeking to extend payment terms while protecting supplier stability, and that success depends on supplier onboarding and information system integration. Wuttke, Blome, Foerstl and Henke (2013), in six European case studies, found that adoption follows distinct phases and that suppliers' willingness to participate depends on the financing rate relative to their alternatives. Van der Vliet, Reindorp and Fransoo (2015) showed analytically that the benefit to suppliers of reverse factoring can be eroded or even eliminated if buyers simultaneously extend payment terms, because the supplier's total financing period lengthens even as its rate falls. Lekkakos and Serrano (2016) showed that the value to SMEs depends on operational characteristics such as demand variability and the share of sales going to the sponsoring buyer.

Subsequent work has refined these findings. Wuttke, Blome, Heese and Protopappa-Sieke (2016) modelled when buyers should introduce supply chain finance and how adoption by suppliers unfolds, and Wuttke, Rosenzweig and Heese (2019) examined suppliers' adoption of a buyer's programme empirically, finding that adoption speed depends on supplier characteristics and on their relationship with the buyer. Dello Iacono, Reindorp and Dellaert (2015) modelled how reverse factoring diffuses among suppliers, and Grüter and Wuttke (2017) valued reverse factoring as an option held by suppliers. Caniato, Gelsomino, Perego and Ronchi (2016) found that SCF solutions solve financing problems only when supported by collaboration and process integration, and More and Basu (2013) identified obstacles to SCF in an Indian setting, including weak information systems and limited trust between partners.

Silvestro and Lustrato (2014) highlighted the role of banks in integrating financial and physical supply chains, Martin and Hofmann (2017) examined what companies need from financial service providers, and Wandfluh, Hofmann and Schoensleben (2016) studied how buyers and suppliers collaborate on financing in practice. Lind, Pirttilä, Viskari, Schupp and Kärri (2012) applied a financial value chain analysis to the automotive industry and found large differences in working capital across value chain positions. Caniato, Henke and Zsidisin (2019) traced the historical foundations of SCF and set out an agenda for future research.

Other SCF instruments include inventory financing (in which a logistics service provider or bank finances goods in transit or in storage), purchase order financing (which finances suppliers at the order stage rather than the invoice stage), distributor finance (in which a bank funds a manufacturer's downstream distributors against their purchase flows) and buyer-backed financing of supplier capital investment. Agboada, Ezeako, Okoli and Ibeh (2018) showed how banks in emerging markets can design distributorship and trade finance products around these supply chain flows, extending credit to small firms that would not qualify on a stand-alone basis. Evidence on these instruments is mostly conceptual or case-based. Wetzel and Hofmann (2019) mapped the literature linking SCF to financial constraints and corporate performance, concluding that while SCF can alleviate constraints for weaker partners, rigorous large-sample evidence on performance effects remains scarce.

3.5.3 Risk and resilience

A supply chain view also highlights the interaction between working capital and risk. Aggressive reductions in inventory and supplier terms increase the chain's exposure to disruptions. When upstream suppliers are financially stretched by long payment terms, they have less capacity to absorb shocks, which can amplify disruptions for the buyer. Chod (2017) showed that trade credit gives suppliers a stake in the buyer's inventory outcomes, which can discipline over-ordering but also exposes suppliers to buyer risk. Supply chain risk management frameworks developed for large capital projects similarly stress that supplier financial distress is a leading source of delivery risk (Agbabiaka, Okonkwo, Ogunwale, Mayo, & Okeke, 2019). The literature therefore suggests that working capital decisions should be assessed not only for their effect on returns but also for their effect on the financial resilience of key partners, which depends on integrated governance and control as well as on liquidity buffers (Akomolafe & Agu, 2019c).

More broadly, Christopher and Peck (2004) argued that resilient supply chains require redundancy, flexibility and collaboration, while Tang (2006) reviewed how inventory, sourcing and financial measures can be combined to manage supply chain risk. Operational incidents are a further source of liquidity risk: accidents and unplanned shutdowns interrupt production, trigger unbudgeted spending and can delay deliveries and therefore collections. Research on occupational safety in energy, drilling, construction and aviation shows that data-driven risk control, hazard identification, near-miss reporting and leadership-driven safety cultures reduce the frequency of such disruptions (Obriki & Arumosoye, 2018, 2019; Arumosoye & Obriki, 2018, 2019; Nwangwu et al., 2018; Obogo et al., 2019a, 2019b; Obogo, Uduokhai, & Ozobu, 2019; Adeyelu, 2018, 2019).

Environmental and legal risks matter as well. Climate-related hazards such as flooding threaten logistics routes and facilities (Badmus & Olamide, 2019), and contamination liabilities can create large, uncertain cash outflows that must be provided for (Azeez & Badmus, 2018; Lamidi & Olamide, 2018). Exposure to tax and stamp duty disputes and to high-volume claims also affects cash planning (Uchechi, 2018; Uchechi, Ominyi, & Jones, 2018), as do consumer protection obligations in multinational markets (Anichukwueze et al., 2019).

3.6 Aggregate evidence on liquidity and profitability

3.6.1 Working capital and profitability

The most consistent finding across the reviewed literature is that, on average, firms with shorter cash conversion cycles are more profitable. Shin and Soenen (1998), using a large sample of United States firms over 1975 to 1994, found a strong negative relationship between net trade cycle and both operating profitability and risk-adjusted stock returns. Wang (2002) found similar results for Japan and Taiwan, Deloof (2003) for Belgium, Lazaridis and Tryfonidis (2006) for Greece, García-Teruel and Martínez-Solano (2007) for Spanish SMEs and Ebben and Johnson (2011) for small United States firms. Enqvist, Graham and Nikkinen (2014) found that the relationship strengthens during economic downturns, suggesting that working capital efficiency matters most when external financing is scarce.

Earlier evidence from Soenen (1993) and Jose, Lancaster and Stevens (1996) had already shown that United States firms with shorter cash conversion cycles tended to be more profitable across most industries. Similar negative associations have since been reported for Mauritian small manufacturers (Padachi, 2006), Nigerian quoted firms (Falope & Ajilore, 2009), Japanese firms (Nobanee et al., 2011), Portuguese SMEs (Pais & Gama, 2015), Norwegian SMEs (Lyngstadaas & Berg, 2016), firms from four African economies (Ukaegbu, 2014) and other samples (Knauer & Wöhrmann, 2013).

However, later studies that allowed for non-linearity found an inverted U-shaped relationship. Baños-Caballero et al. (2012) found a concave relationship between CCC and profitability for Spanish SMEs, and Baños-Caballero et al. (2014) found that the optimal level of working capital is lower for financially constrained firms. Aktas et al. (2015) found that, for United States firms, moving toward the optimal level of working capital, whether from above or below, improved stock and operating performance, and that freed-up capital was channelled into productive investment. Kieschnick, Laplante and Moussawi (2013) found that an additional dollar invested in net operating working capital was worth less than a dollar held in cash, and less still for firms with greater financing constraints or default risk.

Afrifa and Padachi (2016) confirmed a concave relationship between working capital level and profitability for UK SMEs, and Wasiuzzaman (2015) found that working capital efficiency

raised firm value in Malaysia, particularly for financially constrained firms. Zeidan and Shapir (2017), in a detailed case study, showed that a firm could shorten its CCC without harming sales, raising both profits and its share price, which they described as a rare free lunch in corporate finance.

Not all studies agree. Sharma and Kumar (2011) found a positive association between the CCC and profitability for Indian firms, Abuzayed (2012) reported that more profitable Jordanian firms had less incentive to manage working capital tightly, and Afza and Nazir (2009) found that aggressive working capital policies were associated with lower returns in Pakistan. These contrary findings reinforce the view that the effect of working capital depends on context.

3.6.2 Component-level effects

Table 3 summarises representative findings by component. The pattern that emerges is consistent: inventory and receivables tend to be negatively related to profitability on average, with evidence of an optimum; payables show mixed results that depend on bargaining power and financial health.

Table 3. Summary of selected empirical findings

Study	Sample	Main finding
Shin & Soenen (1998)	US listed firms, 1975-1994	Shorter net trade cycle associated with higher profitability and stock returns
Deloof (2003)	Large Belgian firms, 1992-1996	Profitability negatively related to DIO, DSO and DPO
García-Teruel & Martínez-Solano (2007)	Spanish SMEs, 1996-2002	Shortening DIO and DSO raises ROA; DPO not significant after controls
Raheman & Nasr (2007)	Pakistani listed firms, 1999-2004	Negative relationship between CCC components and profitability
Capkun et al. (2009)	US manufacturers, 1980-2005	Lower inventory (especially raw materials and WIP) linked to higher profitability
Hendricks & Singhal (2009)	Excess inventory announcements	Significant negative stock market reaction

Study	Sample	Main finding
Eroglu & Hofer (2011)	US manufacturing industries	Concave relationship between inventory leanness and profitability
Akinlo (2012)	Nigerian quoted firms	Longer CCC and receivables period associated with lower profitability
Baños-Caballero et al. (2012, 2014)	Spanish SMEs; UK listed firms	Inverted U-shaped relationship; optimum lower for constrained firms
Kieschnick et al. (2013)	US firms, 1990-2006	Incremental investment in working capital valued below cash
Aktas et al. (2015)	US firms, 1982-2011	Convergence to optimal working capital improves performance and investment
Murfin & Njoroge (2015)	US suppliers to large buyers	Payment delays by large buyers reduce small suppliers' investment

Source: Compiled by the author from the cited studies.

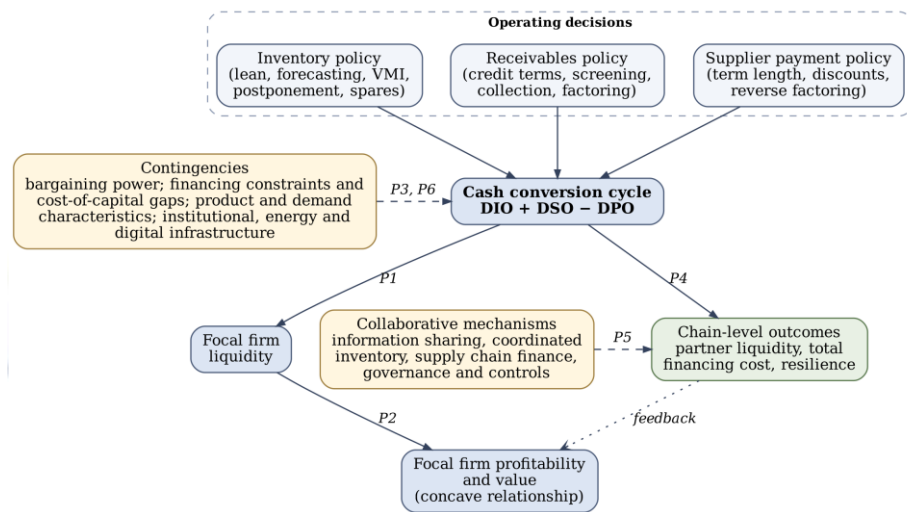


Figure 1. Conceptual model of working capital management across supply chains

Source: Developed by the author from the literature synthesis. Solid arrows show direct relationships; dashed arrows show moderating influences; the dotted arrow shows the feedback from chain-level outcomes to focal firm performance.

4. Conceptual Model

The synthesis in Section 3 points to a small number of relationships that recur across the finance, operations and supply chain literatures. Figure 1 draws these together in a conceptual model. The model treats operating decisions about inventory, receivables and supplier payments as the starting point, the cash conversion cycle as the mechanism through which those decisions reach the firm's finances, and liquidity and profitability as the focal firm's outcomes. It adds chain-level outcomes, which firm-level studies usually omit, together with the contingencies and collaborative mechanisms that shape how the relationships play out.

4.1 Constructs and relationships

Operating decisions are grouped into inventory policy (lean production, forecasting and information sharing, vendor-managed inventory, postponement and spare parts planning), receivables policy (credit terms, screening, collection and factoring) and supplier payment policy (term length, early payment discounts and reverse factoring). Each decision changes one component of the cash conversion cycle: inventory policy changes days inventory outstanding, receivables policy changes days sales outstanding and supplier payment policy changes days payables outstanding (Richards & Laughlin, 1980; Farris & Hutchison, 2002). The cash conversion cycle in turn determines how many days of operations the firm must finance from its own resources, and therefore its liquidity.

Two features distinguish the model from a purely firm-level view. First, the cash conversion cycle of the focal firm is linked to chain-level outcomes, namely the liquidity of its suppliers and customers, the total financing cost borne by the chain and the chain's resilience to shocks (Hofmann & Kotzab, 2010; Randall & Farris, 2009). Second, the model recognises that these chain-level outcomes feed back to the focal firm through input prices, supplier investment and the risk of disruption (Murfin & Njoroge, 2015; Hendricks & Singhal, 2005). Contingencies and collaborative mechanisms act as moderators: the former shape the strength and direction of the core relationships, and the latter determine whether working capital improvements are created or merely transferred.

4.2 Propositions

The model gives rise to six propositions that can guide empirical testing.

Proposition 1. Operating decisions that remove inventory, accelerate collections or eliminate process inefficiencies shorten the cash conversion cycle and strengthen focal firm liquidity. This proposition is supported by the evidence that the components of the cycle respond to operating improvements and that shorter cycles reduce reliance on external finance (Kroes & Manikas, 2014; Zeidan & Shapir, 2017).

Proposition 2. The relationship between working capital and profitability is concave. Reductions in working capital raise profitability up to an optimal level, beyond which further reductions lower profitability through lost sales, stock-outs and supply disruption (Baños-Caballero et al., 2012; Aktas et al., 2015; Eroglu & Hofer, 2011).

Proposition 3. The effect of supplier payment terms is moderated by bargaining power and by differences in the cost of capital. Extending payment terms improves the liquidity of a powerful buyer, but it weakens supplier liquidity more when suppliers are smaller, more financially constrained or more dependent on the buyer (Klapper et al., 2012; Fabbri & Klapper, 2016; Murfin & Njoroge, 2015).

Proposition 4. Reductions in focal firm working capital that are achieved by reallocating inventory or financing to partners raise total chain financing costs and reduce chain resilience when the receiving partner faces a higher cost of capital (Hofmann & Kotzab, 2010; Randall & Farris, 2009; Boissay & Gropp, 2013).

Proposition 5. Collaborative mechanisms, including information sharing, coordinated inventory planning, supply chain finance and sound governance and controls, moderate the link between focal firm working capital and chain-level outcomes. Where such mechanisms are present, focal firm and partner liquidity can improve together (Wuttke, Blome, Foerstl, & Henke, 2013; van der Vliet et al., 2015; Caniato, Gelsomino, Perego, & Ronchi, 2016).

Proposition 6. Weak financial, energy and digital infrastructure raises the optimal level of working capital and increases reliance on trade credit as a substitute for bank finance. Under these

conditions, the gains from aggressive working capital reduction are smaller and the risks to partners are greater (Fisman & Love, 2003; Ge & Qiu, 2007; Ukaegbu, 2014; Sunday & Omoegun, 2018).

5. Discussion

5.1 Interpreting the evidence

Several cautions apply when interpreting the evidence. First, causality is difficult to establish. A negative relationship between DSO or DPO and profitability may reflect weak firms struggling to collect and pay rather than the effect of policy. Studies using lagged variables, generalised method of moments estimators or event designs reduce but do not eliminate this concern. Second, most studies use accounting ratios derived from year-end balance sheets, which may not represent average working capital during the year and can be managed through end-of-period window dressing. The reliability of these measures therefore depends on the quality of the underlying accounting systems and reporting controls (Bola-Sadipe, Aliliele, & Eboh, 2019), which remain uneven in many Sub-Saharan African organisations (Dogbatsey & Ebhojie, 2018). Third, the optimal level differs by industry, business model, supply chain position and financial constraints, so averages across heterogeneous samples may conceal significant variation. Fourth, firm-level studies rarely observe the effect of a firm's working capital policy on its suppliers and customers, which is precisely where the supply chain literature suggests important costs may lie.

5.2 Operational improvement versus financing transfer

Taken together, the evidence supports a conditional view. Reducing working capital through genuine operational improvement, such as shorter lead times, better forecasting, fewer billing errors and faster order-to-cash processes, tends to raise both liquidity and profitability and is likely to benefit partners as well. Reducing working capital by reallocating it to partners, through unilateral term extension or pushing inventory upstream, can raise the focal firm's measured returns but may increase total chain costs and risk. Collaborative instruments such as reverse factoring and coordinated inventory planning can, under the right conditions, deliver gains for the chain as a whole.

Viewed through the conceptual model, much of the apparent disagreement in the literature reflects differences in where studies place the boundary of analysis. Studies that observe only the focal firm tend to find that shorter cycles pay, because they capture the gains from Proposition 1 and the left-hand side of the concave relationship in Proposition 2 but not the costs that Propositions 3 and 4 locate with partners. Studies of trade credit contracts and buyer power, by contrast, observe those costs directly. The contrary findings from some emerging markets are consistent with Proposition 6: where external finance is scarce and infrastructure unreliable, firms rationally hold more working capital and extend more credit, so the optimal cycle is longer.

6. Implications

6.1 Theoretical implications

The review has three implications for theory. First, working capital should be modelled as a contingent rather than a monotonic driver of performance, with the optimal level depending on financing constraints, bargaining power and operating context. Second, the unit of analysis matters: firm-level models omit the redistribution of financing between partners and therefore overstate the benefits of aggressive policies. Third, theories of trade credit developed in financial economics and models of inventory and payment terms developed in operations research describe the same phenomenon from different angles, and integrating them offers a more complete account of how operating decisions create or shift value.

6.2 Managerial implications

For managers, the central implication is that working capital should be managed as a supply chain variable rather than as an isolated firm-level target. Improvement efforts should begin with operational changes that genuinely shorten the cash cycle, such as better forecasting, shorter lead times, accurate billing and disciplined order-to-cash and procure-to-pay processes. Where financing costs differ across partners, collaborative arrangements such as reverse factoring or coordinated inventory planning can place financing with the lowest-cost partner. Managers should be cautious about unilateral extensions of supplier terms, monitor the financial health of critical suppliers, and set working capital targets by reference to their industry, supply chain position and access to finance rather than to generic benchmarks.

6.3 Policy implications

For policymakers, the review suggests that payment practices are not purely private matters. Where large buyers impose long payment terms on small suppliers, the resulting financing burden can depress investment and growth among smaller firms. Payment-practice disclosure, prompt-payment codes and late-payment legislation can help to limit these effects. In emerging economies, where trade credit often substitutes for scarce bank finance, policies that strengthen credit information systems, support factoring and supply chain finance platforms for smaller firms, and improve the reliability of energy and digital infrastructure can reduce the working capital that firms must hold and the cost of financing it.

7. Limitations

Several limitations should be acknowledged. First, the review is narrative and integrative rather than a formal systematic review or meta-analysis, so the selection and weighting of studies involve judgement and the strength of relationships cannot be estimated quantitatively. Second, the search was restricted to English-language sources published up to 2019 and to the databases listed in Section 2, so relevant work in other languages or outlets may have been missed, and published studies may over-represent significant findings.

Third, the reviewed studies use different definitions of working capital, profitability and firm value, different samples and different estimation methods, which limits direct comparison. Fourth, much of the adjacent literature drawn on for emerging-economy, public service and infrastructure settings is conceptual rather than empirical, so its implications for working capital are inferred rather than tested. Finally, the conceptual model and propositions in Section 4 are derived from the synthesis and have not yet been tested empirically.

8. Future Research

Several avenues for future research follow from this review.

First, most empirical work measures working capital at the firm level. Studies using matched buyer-supplier data, which became more feasible with the availability of customer-supplier

relationship databases, could test whether CCC improvements at focal firms are offset by deterioration at partners and whether collaborative practices produce net chain-level gains.

Second, more studies using natural experiments, such as changes in payment legislation (for example, the European Union Late Payment Directive) or exogenous shocks to buyer bargaining power, would strengthen causal claims about the effects of payment terms on supplier performance.

Third, analytical models increasingly combine inventory and trade credit decisions, but empirical tests of these models are rare. Research linking operational variables such as lead time, demand variability and product life cycle to optimal working capital levels would help managers set appropriate targets rather than relying on broad benchmarks. Embedding such targets in data-driven decision systems for financial planning is a promising direction (Lawal & Oduleye, 2019b).

Fourth, evidence on SCF remains largely conceptual or case-based. Large-sample studies of reverse factoring programmes, including their effects on supplier survival, investment and pricing, and on the accounting treatment of buyer obligations, are needed.

Fifth, the interaction between lean working capital and supply chain vulnerability deserves more attention. Research could examine whether firms with tighter working capital, or whose suppliers are financially stretched, suffer larger losses from disruptions.

Sixth, most evidence comes from the United States and Western Europe. In emerging economies such as those of Sub-Saharan Africa, South Asia and Latin America, trade credit is often more important relative to bank credit, institutions are weaker and SMEs face severe financing constraints. Studies from these contexts, including Nigeria, Kenya and Pakistan, exist but are mainly firm-level regressions; supply chain-level and SCF research in these settings is limited. Sector studies point to settings such as health financing, where delayed payments from insurers and public purchasers place acute working capital pressure on providers (Ilodigwe & Adesemoye, 2019a), and to the role of entrepreneurial and financial management skills in how small enterprises manage cash (Michael & Ogunsola, 2019b). Building the skills needed to use modern treasury and supply chain finance tools is a further challenge in these economies (Wikiri, 2019; Nwangwu et al., 2019).

Finally, electronic invoicing, financing platforms and emerging technologies such as distributed ledgers promise to reduce information asymmetries that underpin trade credit. Adoption of web-based payment portals is growing in Sub-Saharan Africa, but it depends on trust, infrastructure and perceived usefulness (Agyei, Izuchukwu, Feboh, & Idowu, 2019). Realising the benefits of such platforms requires integrated data pipelines across enterprise systems (Badmus, Dosunmu, & Ozowara, 2019a) and secure, compliant handling of shared financial data across platforms and jurisdictions (Mbonu, Aliliele, Uzoka, & Oluoha, 2019; Dosunmu & Ogundele, 2019). Their effects on working capital practice and the allocation of financing across chains are an open question.

The systems that support working capital processes, from enterprise resource planning to payment platforms, also carry operational and security risks. Research on cloud architectures and resource allocation (Ahmed & Odejebi, 2018a, 2018b; Ahmed et al., 2019; Odejebi & Ahmed, 2018b; Odejebi et al., 2019), identity and directory services (Oshoba et al., 2019; Ladapo et al., 2018, 2019), and cybersecurity assurance, insider threats and incident response (Akeju et al., 2018; Fadayomi et al., 2019; Mbonu, Iwuanyanwu, Uzoka, & Oluoha, 2019) addresses the reliability and integrity of these systems. Data protection governance (Mbonu et al., 2018), standardised IT support (Anyanwu, 2019), disciplined software deployment (Badmus et al., 2018) and platform governance in regulated environments (Badmus, Dosunmu, & Ozowara, 2019b) are further preconditions for trusted digital financing across supply chains, and reliable telecommunications networks are needed for these platforms to reach smaller firms (Amayo & Popoola, 2017).

9. Conclusion

This paper examined how decisions about inventory, receivables and supplier payments shape liquidity and profitability within firms and across supply chains. More efficient working capital generally supports higher profitability, but only up to an optimal level beyond which further reductions harm performance. Inventory outcomes are rooted in supply chain processes, so cutting stock without addressing lead times, demand variability and information sharing yields limited and sometimes negative returns. Receivables and payables reflect information, risk sharing and bargaining power, which means that payment terms often redistribute financing costs between firms rather than reduce them.

The proposed conceptual model brings these conclusions together by linking operating decisions, the cash conversion cycle, focal firm outcomes and chain-level outcomes, and by identifying the contingencies and collaborative mechanisms that determine whether working capital improvements are created or merely transferred. Managing working capital well therefore requires looking beyond the firm's own balance sheet to the financial health and resilience of the supply chain on which it depends.

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