TECHNOLOGY AND DIGITIZATION IN SUPPLY CHAIN FINANCE

HANDBOOK

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ACKNOWLEDGMENTS

Foreword

Too many micro-, small-, and medium-sized enterprises (MSMEs) face significant challenges accessing the finance and other resources they need to thrive. IFC, as a member of the World Bank Group, is committed to supporting these businesses by mobilizing private and public sector stakeholders to expand financial inclusion.

This handbook shares IFC's expertise and lessons learned with financial service providers interested in the digital integration of 'traditional' retailers and distributors. It draws on knowledge from IFC's portfolio of client engagements in supply chain finance, and expertise in digital financial services accrued from over a decade of advising financial services providers on their digital journeys.

As this handbook makes clear, the digital integration of traditional retailers and distributors is a pathway for financial inclusion. The rapid penetration of digital technology and mass-market consumer adoption of digital payment services means there is a growing opportunity to connect retailers to the benefits of digital supply chain management, payments, and banking services more broadly – all by leveraging relationship data.

At the same time, the COVID-19 pandemic has placed tremendous strains on supply chains, with firms of all sizes struggling to maintain production, manage liquidity, and preserve working capital. As buyers and suppliers focus on maintaining liquidity, supply chain finance programs are an exceptionally important tool for banks to support struggling economies. Digital supply chain finance programs can play a vital role in supporting supply chains and increasing access to finance for MSMEs, particularly sub-suppliers and retailers.

Digital integration can help facilitate small- and medium-sized enterprise (SME) growth and employment, increase access to finance along the supply chains, reduce distribution costs, and ultimately improve the purchasing power of end consumers. At the same time, retailers and distributors generate a large volume of payments in their economies. Such transactions can improve the economics for financial institutions to serve the unbanked. They can bring the scale needed for nascent mobile money and agent banking ventures to become sustainable.

This opportunity is not without significant challenges. Distribution chains are complex, reaching consumers through a variety of channels and intermediaries. Modern retail is also very complicated, using technology to manage and integrate sales, inventory management, payment and financing. While technology can help to enhance compatibility and bridge the gap to the underserved, the reality is that many traditional retailers in emerging markets still have limited access to technology channels that support digital payments and finance. Furthermore, the business performance and creditworthiness of retailers and small-scale suppliers is difficult and costly to assess. Data on sales and payments can provide the necessary knowledge to enable more cost-effective credit scoring and risk management. This handbook aims to provide financial institutions with an understanding of how they can address these challenges and opportunities.

As incomes rise and economies grow, there are important incentives for local and multinational firms in the fast-moving consumer goods industry and retail sector to invest in ways to serve the next wave of consumers. Working together, consumer goods chain businesses and banks can use the large amounts of payment and purchase data to better assess and manage risk and ultimately expand lending services to new clients – SMEs and small retailers along supply chains – beyond their established markets.

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CONTENTS

Section 1

Section 2

Section 3

Section 4

Section 5

Section 6

Annexes

SECTION 4. LEVERAGING TECHNOLOGY IN SUPPLY CHAIN FINANCE

INSTRUMENTS 58

SECTION 5. DELIVERY OF SUPPLY CHAIN FINANCE 80

SECTION 6. IMPLICATIONS OF TECHNOLOGY ON BUSINESS FUNCTIONS 90

DEFINITION OF INSTRUMENTS AND GLOSSARY 98

ANNEX 1. CASE STUDIES 108

ANNEX 2. PRODUCT CASE STUDIES 132

ANNEX 3. TOOLS 138

ANNEX 4. IFC SUPPLY CHAIN FINANCE & DIGITAL FINANCIAL SERVICES

OFFERING 153

ANNEX 5. REFERENCE MATERIALS 155

ACRONYMS

AI	Artificial Intelligence
APIs	Application Program Interfaces
CCC	Cash Conversion Cycle
DIO	Days Inventory Outstanding
DLT	Distributed Ledger Technology
DPO	Days Payable Outstanding
DSI	Day Sales of Inventory
DSO	Days Sales Outstanding
EBA	Euro Banking Association
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
FCI	Factors Chain International
FCS	Fragile and Conflict-affected States
FMCGs	Fast-moving Customer Goods
GDPR	General Data Protection Regulation
GTFP	Global Trade Finance Program
GSCF	Global Supply Chain Forum
GSCFF	Global Supply Chain Finance Forum
IaaS	Infrastructure as Service
ICC	International Chamber of Commerce
IDA	International Development Association
IFC	International Finance Corporation
ITFA	International Trade and Forfaiting Association
KYC	Know Your Customer
MSMEs	Micro-, Small- and Medium-sized Enterprises

NAFIN	Nacional Financiera
NBFCs	Non-banking Financial Companies
NPLs	Non-performing Loans
OEM	Original Equipment Manufacturer
P2P	Peer-to-Peer
POS	Point of Sale
SaaS	Software as a Service
SCF	Supply Chain Finance
SCM	Supply Chain Management
SKU	Stock Keeping Unit
SME	Small and Medium-sized Enterprises
SSA	Sub Saharan Africa

Executive Summary

The spread of digital tools, the increased availability of data on both business and financial interactions, and the improvments in data processing capacities are all critical to the expansion of supply chain and distributor finance. Digital integration of traditional retailers/suppliers and distributors/manufacturers is a pathway for addressing working capital challenges and driving financial inclusion, as well as a driver in employment and economic growth to ever smaller businesses. Linkages to mobile money services and agent banking are expanding outreach to informal retailers while helping nascent mobile money operations become sustainable.

Small- and medium-sized enterprises (SMEs) are hindered by a persistent gap in financing estimated at $8.1 trillion in emerging markets alone ($5.2 trillion among formal SMEs[1]; $2.9 trillion among informal SMEs). Survey results of SMEs testify to a common problem: more than 40% of working capital is dedicated to paying suppliers.[2] Conversely, small suppliers face delays in receiving payments from buyers, which results in slower capital flows for funding and growing production. IFC estimates at least 20% of the overall SME financing gap is due to supply chain payment delays.[3]

Supply chain finance (SCF) is a broad set of products that seek to leverage information and relationships from the interactions of buyers and sellers within a supply chain in order to improve the efficiency and lower the cost of providing finance to supply chain participants. Supply chain finance products can, for example, categorize the risk level of a counterparty in order to tailor financing, and determine key factors in trading parties (revenue, sector, working capital ratios, and geographic location) to establish accurate financing thresholds.

Digital integration of traditional retailers/suppliers and distributors/manufacturers in supply chains is a pathway for addressing working capital challenges and driving financial inclusion. The rapid penetration of digital technology (mobile networks, cloud-based systems, tablet computers, etc.) and mass-market consumer adoption of digital payment accounts and services means there is now a growing opportunity to connect 'traditional' retailers, including those previously underserved SMEs and households in emerging markets, to the benefits of digital management, electronic payments, and banking services.

Digital integration can help facilitate SME growth and employment, increase access to finance along the supply chains, reduce distribution costs, and improve the purchasing power of end consumers. At the same time, these retailers and distributors generate a large volume and value of payments in their economies. Such transactions can improve the economics for financial institutions: they can bring the scale needed for nascent mobile money and agent banking ventures to become sustainable.

The spread of digital tools for business and finance, and the increasing availability of data on both business and financial interaction, is a boon to the development and deployment of supply chain finance. Digitized supply chain interactions are providing useful and valuable information to design new products and manage financial risk more effectively. Growing digital connectivity between even the smallest businesses allows SCF providers to offer services to businesses that previously lacked access to financial resources that would better enable them to run their businesses. Data analytics and platform services enable the processing of data and delivery of funds to be highly automated, thereby increasing productivity and efficiency for both financial institutions and their clients, while reducing costs to onboard. Such gains lend credence to the belief that providing supply chain finance to smaller businesses is both viable and no longer reliant on a single corporate as off-taker to provide finance to their respective suppliers or distributors.

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[1] SME Finance Gap: Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets. International Finance Corporation (IFC), 2017. (https://www.smefinanceforum.org/sites/default/files/Data%20Sites%20downloads/SME%20Report.pdf)

[2] Ziegler, T., H. Blume and T. Paula. Business Access to Alternative Finance: A Deep-dive into Mexico & Chile. Cambridge Center for Alternative Finance, 2018. (https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2018-business-access-to-alternative-finance.pdf)

[3] Saleem, Qamar. Supply Chain Finance Program Development: How it's Shaping Up Globally and in Asia. ",ICC Academy, 2019. (https://icc.academy/events/icc-academys-8th-supply-chain-finance-summit/)

A broad portfolio of supply chain finance instruments gained traction in the United States and Europe in the 1990s and 2000s, when supply chains became more externalized and fragmented, and thus spurred the need for financing across different links. At the same time, electronic data interchange (EDI) and the internet began to establish linkages to large firms' enterprise resource planning (ERP) systems, while digital innovations and broader connectivity access made increased data accumulation and advanced analytic techniques possible. Mobile networks and end devices, including phones, tablets, and point-of-sale (POS) devices, began to enable even the smallest players to participate in digitized supply chains. To further facilitate participation, new applications for ordering and purchasing, as well as for stock management, sales, and payments were introduced (and regularly updated) to the market. As a result, financial institutions and other providers began offering these services to previously underserved businesses, including those in emerging markets.

Today, these digitized interactions can provide transparency for a wide range of both physical and financial interactions and behaviors, including regularity of purchases and sales (and therefore cash flows), supplier performance, inventory turnover, and even types and frequency of end-consumer interactions. This data can improve credit risk assessments by using both digitized trade flow information and broad behavioral

State-of-the-art supply chain financial optimization consists of maximizing Days Payable Outstanding to reduce working capital needs, while reducing costs by extracting discounts from payables via dynamic discounting or payables auctioning services.

For 'long tail' suppliers, aggressive promotion of card-based payments (or multitude variants) results in rebates, which reduce costs.

and heuristic information. Furthermore, with the newer cloud-based services and managed service models complementing end-device penetration, small firms are accessing a growing portfolio of business and transactional services from their supply chain partners, from third-party providers, as well as from financial institutions. In short, the wealth of data generated by the digitization of supply chain transactions and advances in data analytics are driving new opportunities for assessing risk and tailored delivery of finance, resulting in expanded availability of products and services.

Emerging Trends

The following trends have helped supply chain finance emerge as an option for previously underserved SMEs through digital channels.

Transparency Through Supply Chain Digitization

A key benefit of supply-chain digitization is the generation of increasingly standardized data on transaction flows and participants in the supply chain. Increased transparency and information at every stage (ordering, tracking goods in motion, work in progress, inventory management, and sales) are key enablers for the delivery of supply chain finance to SMEs. Most progress to date has been in response to business needs with respect to: i) increasing efficiency in support of just-in-time processes, ii) improving batch tracking and quality control, and/or iii) increasing visibility to end-product distribution and customers. In some cases, national policies have assumed a leading role. For example, in Argentina, Chile, Indonesia, Mexico, Peru, Brazil, Italy and Turkey, nationally-mandated electronic invoice submissions formalize and improve transparency in commerce in

order to improve tax collection. And while some jurisdictions allow smaller transactions to proceed without electronic invoices, an increasing portion of SME business activity is captured in e-invoicing from suppliers or buyers, creating a data trail to be used in supply chain financing. *Note: An example of such an invoicing system in Mexico is provided in the case study in Annex 1.*

Platform Approaches Reaching Scale

Unlike traditional forms of financing between a borrower and lender, supply chain finance typically requires coordination of workflows and information among multiple parties (i.e., at minimum, a buyer, a supplier, and a funder). Until recently, connectivity and coordination systems required substantial investment. This limited SCF schemes to large corporate supply chains with the resources to deploy systems and integrate across parties and typically around a large corporate buyer or supplier. Smaller corporations were unable to cover the costs to access value chains, which meant that deployment of SCF programs to value chains composed entirely of SMEs was not possible.

Furthermore, single-firm solutions for provisioning supply chain finance frequently encountered complications. For example, corporate anchors did not want to deal with several proprietary payables solutions for each funder. Instead, they preferred a 'one-stop-shop' for all payables, regardless of financing and preferably tied into existing systems. At the same time, aggregating SMEs for single-purpose financing relationships could not be justified from a cost/return perspective, nor was this seen as capable of providing the necessary information on a small firm's activity to credibly assess the financing risk.

Fortunately, the emergence of more inter-operable processes and transactions and easy to use systems (i.e., systems that seamlessly exchange data regardless of the underlying software used), combined with increasingly sophisticated managed service models, accelerated the development of digital platforms that allowed for multiple parties in a supply chain (and their funders) to aggregate data, approve participants, track the performance of trade agreements, and, consequently, provide tools for SMEs to make informed financing decisions.

These platforms now take many forms. Some build upon mandated national e-invoicing hubs, some are e-commerce platforms (such as Alibaba and Amazon), some are stand-alone FinTech initiatives (*as the case study of Mintif in Annex 1 illustrates*) targeting the needs of corporates to more easily manage payables across multiple markets, while still others are focused on aggregating SMEs and managing information on behalf of single or multiple corporates. These latter models are nascent but gaining traction.

It is conceivable that such platforms may eventually leverage pre-existing communication and messaging platforms and imbue them with functionalities to coordinate trade and payments. The platforms with the best chance for success will be those that can offer value propositions to buyers, sellers, and funders alike while aggregating the greatest amount of data.

Rise of Predictive Financing

The combination of a greater transparency of data and the interoperability of systems is changing standard operating procedures. Normally, financiers only get involved after the trade deals have been agreed and the payable and receivable evidence that financial institutions usually require for lending has

been established. In the new digital model, lenders are now able to better review supply and distribution processes at the end of the supply chain. This means that those with strong data analytical capabilities will be better able to predict performance of potential borrowers and provide funding when and where it is needed. At present, e-commerce platforms are leading the way, with their aggregation power and their strategic position in the flows between buyers and sellers. Financial institutions need to recognize these developments and seek out partnerships if they are to benefit from comparable access to supply chain management information.

Embracing Digital Innovation in a Supply Chain Finance Initiative

The aforementioned digital innovations have led to the development of entirely new supply chain finance business models. These models simultaneously present opportunities as well as risks for traditional financial institutions. For example, banks finally have the means to profitably deliver supply chain finance to the large and underserved SME market, creating promising revenue streams and a cost-effective means for providing broader services to this segment.

However, digital innovation is also removing the barriers to entry for new competitors with the capacities to marginalize financial institutions. Therefore, for those financial institutions in emerging markets seeking to introduce or expand a supply chain finance offer, it is critical they understand the implications of these digital innovations, both for overcoming traditional constraints and for determining how to optimally deliver services.

To expedite the learning process, this handbook offers guidance on:

1. **Defining the target markets and clients.**

2. **Aligning the finance product to the needs of the target market and client.**

3. **Understanding when and where digital solutions can overcome constraints to delivering supply chain finances.**

4. **Determining an optimal business model in light of disruptions due to digital innovation.**

INTRODUCTION

This handbook on Technology and Digitization in Supply Chain Financing is the sixth in a series published by IFC as a means to expand and advance digital financial services. Previous handbooks in the series have addressed the hardware and software components of a successful digital financial services deployment, risk management in mobile and agent banking, the use of data analytics to expand access to financial services, and the use of technology in advancing Agri-finance.

This handbook builds on previous supply chain advisory work and research (including IFC's EM Compass Note on supply chain finance[4] and the Supply Chain Finance Knowledge Guide[5]), and is intended to provide information and guidance on the use of technology in supply chain finance to financial service providers, including microfinance institutions, banks, mobile network operators, FinTechs, and payment service providers.

Central banks across Africa have mandated that payments during the COVID-19 pandemic be digital to avoid transmission through bank notes. This will result in an even greater acceleration in the digitalization of transactions, particularly by small businesses who have to date been predominantly cash-focused. The COVID-19 pandemic will also result in significant disruptions to supply chains resulting from quarantine requirements and other restrictions covering social distancing, transport, and logistics. The disruptions may also accelerate the adoption of digital tools and digital payment systems within supply chains, as they offer possibilities to minimize person-to-person contact in market-based transactions as well as production systems.

The authors hope this handbook will reach a broad industry audience at an opportune time, considering the pace of digital innovation and the potential of supply chain finance for emerging market economies and both large and small enterprises across the globe. The handbook was written with the expectation that the audience will benefit from illustrations of how digital technology has changed supply chain operations, and the implications on supply chain finance as well as the new opportunities this presents for banks and their customers — especially those enterprises that have been excluded from traditional financial products and services. It is further expected that these shared experiences and lessons learned from the pioneers in these markets will augment and serve the text as evidence accrued first-hand.

Finally, this handbook seeks to help guide financial institutions that are considering adopting digital innovations to establish or expand their supply chain finance portfolios. It is intended for those decision-makers and product managers who determine which digital innovations will be suitable to their clients and operations.

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[4] Technology-Enabled Supply Chain Finance for Small and Medium Enterprises is a Major Growth Opportunity for Banks. IFC EM Compass Note, 2017. (https://www.ifc.org/wps/wcm/connect/fdc6f3a9-c6d1-4c49-9b5d-e5b0d5d3a7a7/EMCompass+Note+39+Supply+Chain+Financing+FINAL2.pdf?MOD=AJPERES&CVID=lPgy6Tr)

[5] IFC Supply Chain Finance Knowledge Guide, August 2019. https://www.ifc.org/wps/wcm/connect/region__ext_content/ifc_external_corporate_site/south+asia/resources/supply+chain+finance+knowledge+guide

This handbook offers the reader

- **Clarity on supply chain finance markets' needs and opportunities.**
- **The digital capabilities available to launch and operate a supply chain business efficiently and sustainably.**
- **Models for delivering these services.**

and is organized into six chapters:

			Handbook Tools
Section 1	**A New Opportunity for Supply Chain Finance**	An introduction to Supply Chain Finance	Assessing target market and need
Section 2	**Supply Chain Finance Actors**	Who are the main actors in supply chain finance? What are their needs and challenges?	Tools build upon previous tool output
Section 3	**Technology and Business Model Innovations**	What technologies are emerging and how will they impact Supply Chain Finance?	
Section 4	**Leveraging Technology in Supply Chain Finance Instruments**	What are the emerging technology trends? How do they enable business innovations?	Supply Chain Finance Instrument Assessment
Section 5	**Delivery of Supply Chain Finance**	What are the options for the delivery of supply chain finance solutions acquisition, credit decisioning and processing?	Tools build upon previous tool output
Section 6	**Implications of Technology on Business Functions**	What are the implications for business functions? What technology applications can be employed for front end, (processing) and for the back end?	Solution Option Modeling Digital Business Model Assessment
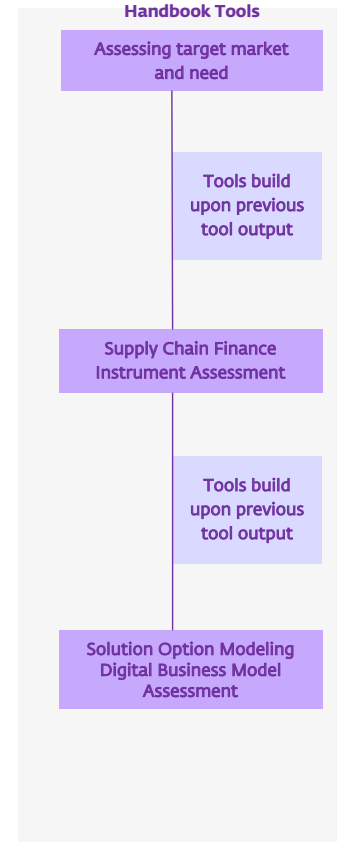
Section 1

A New Opportunity for Supply Chain Finance

Organizing resource flows in the production and sale of goods has been the domain of supply chain management since the early days of mass production and distribution. The financing of input purchases, labor, and other elements of production and distribution all come from internal resources or external working capital funding (unless the buyer pays prior to production).

In a fully integrated production process, a large corporation could fund the working capital for its supply chain. However, with the specialization and globalization of the fabrication of goods, production processes have become more complex and supply chains increasingly disbursed. For most firms today, financing requirements spanning a complex set of relationships are not being absorbed by a single party.

Advancements in information technology have enabled the growth and complexity of supply chains and created opportunities for specialization and scale. These same technologies can also be leveraged to assess risk and enable financial service providers to extend financing to an increasingly wide range of actors along the supply chain.

Figure 1: Supply Chain Financial Flows
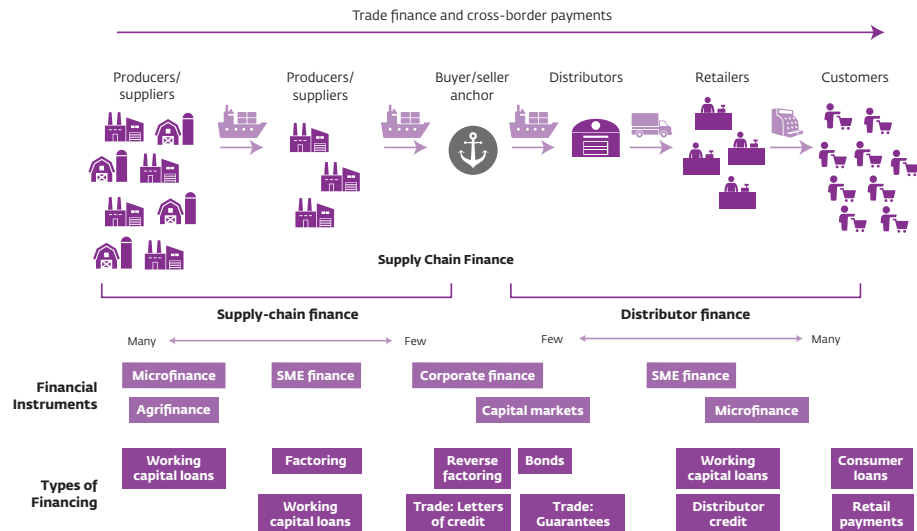
Section 1 discusses innovations in technology and business models and their implications on supply chain management and its evolution. It then focuses on how these innovations are impacting supply chain finance, and volunteers a view of supply chain evolution in Figure 3: Supply Chain 4.0 before ending with the potential market opportunities SMEs offer.

Financing requirements of firms in a supply chain are largely for working capital, as a supplier gets paid only at or after delivery of goods and services. Similarly, a distributor's capital is tied up in stock until the goods have been sold.

Supply Chain Finance

Supply chain finance consists of the provision of credit linked to open account transactions between a seller and a buyer, where the sale happens through the submission of an invoice and without a guarantee of a third party, a contract, or an immediate payment. Conventionally, open account terms involve an understanding between a buyer and seller for payment within 30, 60, or 90 days from the submission of an invoice. There is no involvement of a bank or financial intermediary in this type of agreement until the invoice is either purchased or leveraged for financing. Supply chain finance solutions refer to the financing of an outstanding receivable or payable to a buyer or seller for a period of 30 to 90 days.

Supply chain finance is typically associated with trade finance (i.e., the financing of transactions across national borders where options for recourse are fewer and more difficult to enforce). With trade finance, partnering financial institutions may step in to undertake risk on behalf of clients they know well, serving as a surrogate source of trust among established bank networks, and enabling the transaction to take place.

SCF solutions are cheaper than traditional working capital lines or open lines of credit. While working capital lines have greater flexibility, they also have greater associated risks and come at greater expense in terms of origination costs. By assessing the risk of payment between two parties in an open account transaction, SCF transactions are typically less costly than other working capital financing solutions. In traditional working capital loans, in fact, financial institutions assess risk on the borrower's credit history, historical financial performance, and the availability of collateral. This has often made lending unfeasible for SMEs in emerging markets, as such information is expensive to gather and assess, and the costs of monitoring and collecting also exceed potential returns for banks. Furthermore, the lengthy application procedures, documentary requirements, and assessment times may only partly address the working capital needs of the business.

Upstream and Downstream Supply Chain Finance Solutions

When assessing SCF solutions, delineate into upstream and downstream transactions.

Upstream transactions refer to the purchase by intermediary firms of receivables that sellers of products and services claim from their buyers.

Downstream SCF solutions typically refer to actors financing inventory for resale to consumers or processing.

Please note that throughout this handbook, the concepts of upstream and downstream refer to the role within the supply chain; hence, an actor can be both.
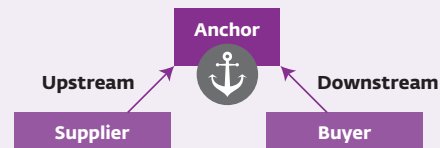
Due to high onboarding costs and information barriers, supply chain finance options have traditionally been limited for SMEs and the value chains of mid-size corporate anchors. However, technology and business model innovations are rapidly removing these obstacles and providing new opportunities for funders and borrowers to finance supply chain transactions. The benefits to lenders from creating or expanding an SCF portfolio and entering the SME market are multi-fold:

- **Easier/less risky entry point into enterprise financing.**
- **Strong networks of financial providers can lead to a broader portfolio of business services.**
- **Strong financing networks can help support better penetration of consumer markets.**
- **Greater potential to expand lending while mitigating risk exposure through shorter term, directed credit.**

Supply chains traditionally consisted of a series of largely discrete, siloed steps (e.g., product development, manufacturing, distribution, sales). Digitization broke these silos down, and the chain became a fully integrated ecosystem that provided transparency to all the players involved – from the suppliers of raw materials, components, and parts, to the transporters of those supplies and finished goods, and ultimately to the customer. Progress on these fronts included planning and execution systems, smart procurement, logistics and warehousing visibility, and advanced analytics. These gains

Figure 2: General Options for Working Capital Management

	Benefits	Challenges
Cash	• *immediate availability* • *control*	• *limited cash availability may limit stock* • *cumbersome cash flow management* • *inefficient use of capital that could be directed towards productive investments*
Informal and personal loans	• *immediate availability, familiarity*	• *high costs of capital (financial or social)* • *personal liability/risk* • *limited predictability from friends/family*
Working capital and term loans	• *fungibility allows to manage working capital needs* • *business liability, develops credit worthiness*	• *burdensome application for borrower* • *limited availability from lenders due to high origination costs* • *high cost due to risk, limited information or limited availability* • *may require collateral*
Supplier credit (i.e., supplier accepts to be paid later)	• *transaction link reduces risk for lender; going concern needs future supplies so would prioritize repayment* • *no cost or lower cost than commercial financing* • *business liability*	• *inefficient use of capital and risk for corporate supplier* • *limited by availability of working capital at the supplier* • *lacks fungibility for borrower* • *limited amount may not satisfy working capital needs*

have implications for both the supply chain and, more importantly, for supply chain finance.

Supply chain finance has evolved in parallel with the transformation of supply chain management. Prior to the impact of technology, supply chain finance meant optimizing working capital ratios and providing funding sources to a company. Today, the shift of supply chains towards more collaborative and diffused structures means corporate anchors at the head of a supply chain must ensure that a wider range of supply chain partners (i.e., suppliers and distributors) have appropriate working capital to ensure production and continuity in the business.

Through leveraging data from integrated supply chains, supply chain finance can now extend beyond the

first tier of suppliers and distributors to those whose overall financial status may not be visible to an anchor or its partner financial institutions. Extending financing to these players (often SMEs) requires new models for assessing risk and interfacing with clients.

The Transformation of Supply Chains and their Management

The evolution of supply chain finance and related trends are illustrations of the transformation of supply chain management. The need to rely on transparency and timeliness of information regarding materials, products, resources, and workflows, has made supply chain managers natural early adopters of technology solutions. Consequently, supply chains have been adopting and embedding technology and connectivity.

With the gradual distribution of the production process, supply-chain management has come to focus on improving the visibility of the supply chain actors. Supply chains traditionally relied on actors beyond the first tier of suppliers, or distributors with whom the anchor corporate had direct transactions. Now there is a growing need for coordination with second and third tier suppliers and/or retailers to ensure delivery, optimize processes, and maximize profit. Integrated and efficient information flows across actors are keys to enabling these collaborative approaches and to achieving greater efficiencies and improved performance.

Competitive pressures and customer expectations are pushing organizations to address two factors governing the performance of the supply chain: speed and variability. Speed, in this case, is a company's ability to keep pace with continuously transforming market conditions, varying customer expectations, customized product features, and collaborative partner networks. Variability is how well an organization can respond to changes in customer orders relating to destination or content – up to or even during shipment – and how responsive it is to changes in demand forecasts or technical engineering updates. Demand-driven supply chains are likely to become the norm, necessitating that supply chain managers adjust the structure and model of supply chain performance across all actors.

Figure 3: Supply Chain 4.0

Full data transparency (overarching)

Prices
Product
Sales Weather
Events Channel
Promotions

Forecasting

End-to-end performance management (overarching)

Factory
Machines give feeback on current production capacity

Integrated, ad hoc mobile planning

Influencing customers with specific, situational offerings

Autonomous truck
Always know exact location and condition of each shipment

Automatic reconfiguring of network

Warehouse
Robots do the picking, transporting of goods, etc.
Drones scan stock and support dynamic pricing

Drone delivery

Predictive shipping
Share capacity

Customer
Can reroute shipping via mobile phone

Source: McKinsey

Box 1
Elements of a Collaborative Supply Chain

Business partners have to agree upon the following to build a solid, collaborative supply chain:

Product: *Collaborative supply chain partners exchange data on the products they trade by using common definitions and the same part-number coding. To know the product means to know its merchandise category and therefore to know whether it is a commodity, a fast-moving good, or a complex structure with a multilevel bill of materials.*

Place: *Anchor businesses are seeking greater, more centralized control over their supply chains, leaning towards fewer indirect (tier 2, tier3) suppliers in their supply chains. Fewer links do not mean less complexity – quite the opposite. Process transactions must be streamlined, and fewer supply chain partners mean more robust exchanges of data and reliance on a counterparty's ability to fulfill expectations.*

Time: *Collaboration is based not only on respecting time of delivery, but also – and most importantly – on earning a return on investment in product cycles in the shortest possible period. Collaboration between supply chain partners demands strict adherence to agreed delivery times of goods and payments.*

Quantity: *Delivering contractually agreed quantities maintains the proper level of trust in a collaborative supply chain. In many circumstances, suppliers still need to stack inventories to fulfill customer expectations, at the cost of penalizing their working capital.*

Quality: *This refers not only to the product but also to data exchanged. This leads to an automated flow with supply chain partners defining common data standards and employing standards-based inter-operable software. To undergo a successful digital transformation, an organization is now largely dependent on the digital transformation of every partner along its value chain and the digital transformation of all the processes and information flows between those different partners. Quality of data also helps to accelerate the adoption of electronic trade finance that represents a significant enhancement of banks' business opportunities.*

Complexity: *Consumer preferences for innovation and products that are tailored to their needs will drive complexity. Supply chain collaboration allows anchor companies to quickly react to crises and disruptions using software applications that run 'what-if' scenarios and hypotheses. Improving supply chain visibility is the area of greatest need to manage the supply chain more strategically. Corporations rely on sophisticated technologies to increase visibility by sharing data, documents, and any other asset that may improve the level of cooperation with their trading partners.*

Source: *Anchor companies are seeking to improve their ability to trace the origins of materials and goods in their supply chain. To do so, they plan to collaborate with suppliers capable of providing reliable and timely data. Digitization allows complete transparency on where and how all products are sourced. Sustainable sourcing becomes the collaborative platform's way to ensure fair trade, and funding providers are starting to adopt it to gauge a company's credit risk. Forward-looking companies are establishing a code of conduct for their suppliers, seeking to deploy partnership programs that benefit the corporation itself, the supplier, the factory workers, and the environment. The World Bank is backing schemes in which suppliers are paid early—in just days—on invoices to prevent cash flow issues. Instead of paying high interest rates locally on the street in emerging regions, suppliers are scored on specific metrics related to working conditions, environmental responsibility, and overall responsible production. Suppliers that score higher on their sustainability scorecards are rewarded with better interest rates when borrowing to finance their working capital.*

Deliver: *Products shipped to clients require certification of origin documents that are continuously updated, validated, and secured by the contribution of multiple trading partners in the supply chain. The collaborative exchange of information across all supply chain participants in a delivery process enriches the data of the product and the change of ownership from buyer to supplier. The same product data enhances the possibility to trace back the provenance of all components of the finished goods' bills of material. The use of third-party logistics service providers, of shipping carriers, and freight forwarders is fully regulated and automatically controlled by the execution and perfection of digital contracts. Shipping documents (e.g., advance shipping note, customs clearance papers) determine the finest repository in a shared repository that takes care of the proprietorship and uniqueness of documents that belong to different owners.*

Price: Without a doubt, collaboration is based on mutual interests and the right compromise between reciprocal objectives. The price that supply chain participants pay for traded goods measures the strength of the collaboration. Price also gauges a company's willingness to establish new levels of collaboration. The price of a product (or a service) goes beyond the commercial transaction; price also constitutes an element of collaboration between a financial service provider and its corporate counterpart. If a lender identifies a company while attempting to reach a price level that could be a good starting point for a new collaborative endeavor, that lender could intervene to offer the company financial support to propose the right price level. This is where the financial institution's knowledge of market conditions—especially when companies are trading cross-border—translates into an extra level of support.

Cost: Supply-chain-related costs are a top concern among businesses globally, particularly due to ever-increasing customer expectations for product quality. Collaborating partners keep continuous control over cost structures, and unforeseen deviations are jointly approached to find mutually beneficial solutions.

Service: Cutting costs is a logical reaction to higher levels of market uncertainty, but collaborating businesses focus on delivering value to customers. Banks may assist their corporate clients with all the new and unexplored dynamics that arise when establishing corporate internationalization strategies. These initiatives support corporate strategies – especially those of SMEs – to

access more than pure finance, (the traditional domain of financial intermediaries). That is why we refer to the following as relatively 'new' territories for banks: Supporting corporate clients in identifying foreign business opportunities, locating or analyzing foreign markets, contacting potential overseas customers and partners, advising on supporting programs to address and remove internationalization barriers related to SMEs' limited managerial skills and knowledge, and stimulating international activity among large corporations and SMEs.

Figure 4: Supply Chain Finance Actors
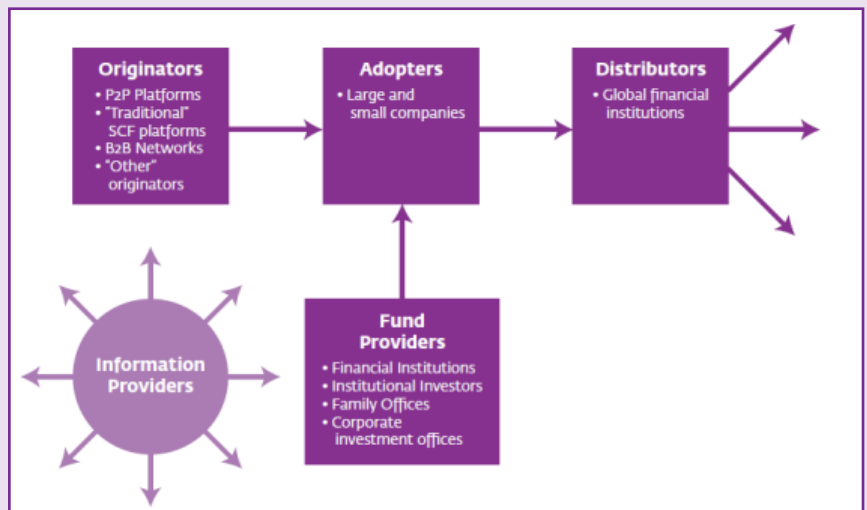
The evolution of supply chain management can be characterized by the need for supply chain managers to integrate four key factors across functions and actors of their supply chains:

- **Visibility:** Every party exchanges the agreed level of information and data with their supply chain counterparts (i.e., suppliers, clients, intermediary partners such as logistics service providers, and customs offices).

- **Trust:** Tighter exchanges of information and data sharing allow the supply chain practitioner to better profile the supply chain counterpart and establish a level of interaction to reach common objectives.

- **Sustainability:** Supply chain transactions must be contractually fair to all parties. They must also be environmentally sensitive and ensure labor rights (e.g., no child labor) are well respected. All these elements constitute a sustainable supply chain. By improving these principles, a sustainable supply chain also strengthens the relationships and trust between trading parties against challenges and disruptions.

- **Efficiency and standards:** Adherence to standards, transparency, and business ethics are increasingly important for actors along a supply chain – both to enable collaboration and to ensure product quality.

Figure 5: Innovations Impacting Supply Chain Finance

Simplified communication, access, and usage of digital services

Automated routine tasks

Simpler logistics management and more flexibility in production, thanks to greater visibility of the supply-chain by the anchor manager

Data on transactions, which increases transparency and enables advanced analytics (e.g. artificial intelligence) to integrate all information points into supply chain management and participation decisions by the various actors.

Improved production, management, and real-time information are the bases for embracing digital transformation of supply chains. With digital innovations reaching all supply-chain actors and enabling the seamless flow of information, solutions are emerging to facilitate all aspects of the supply chain, enabling managers to adjust production based on real-time data. This increases efficiency, lowers cost of inputs, and addresses working capital and liquidity challenges across various levels of the supply chain. Digital innovations in the supply chain management provide the following results:

The first area to be digitized was the physical product chain management between anchors (often larger corporates). Corporates, particularly in Europe and North America, invested in specialized technology solutions, realizing significant efficiency gains as first movers by improving internal processes and acquiring more power within their supply chains. Enterprise resource planning solutions from major players like SAP, IBM, Oracle and several others dominated and were quite complex. Implementation took years to finalize, given the abundance of paper documentation and disparate data sources to digitize and organize. Now, companies in emerging markets are taking advantage of existing practices and procedures, leapfrogging to new technology adoption with more agility and adaptiveness, due to the fact that they have not had to deal with complex IT legacies.

The second area has always been tightly connected to the evolution of global industry dynamics: value chains are becoming more interconnected and complex. Technology is digitizing the exchange of documents, and this information is ushering in ever-increasing efficiency and coordination of information across a wide number of actors. As low-cost technology solutions penetrate deeper into supply chains, greater numbers of businesses, including tier 2, tier 3, or informal businesses not directly transacting with the anchor, can be integrated with other supply-chain actors. This means gains in access to information or financing that were traditionally limited to direct sellers and retailers of larger anchor corporates.

Technologies Transforming Supply Chain Finance

4. Analytics
Big Data & Artificial Intelligence

3. Managed Services and Platforms
Software & Infrastructure
Platforms

2. Standardization and Interfaces
APIs
Distributed data management
Identity management & verification

1. Digital Infrastructure
Connectivity
Payments
Electronic invoicing

Transformation of Supply Chain Finance

In the aftermath of the credit crisis, supply chain finance emerged as a strategic practice for large corporations and financial institutions owning and running proprietary supply chain finance platforms that turned large anchor buyers' payables into bank security. The appetite for approved invoice-based finance started to go beyond large buyers' tier 1 suppliers, permeating down to smaller companies within these networks as well as smaller corporate anchors. However, permeation has been slow, and the majority of programs only cover up to one-fifth of the overall transaction volumes of client anchor corporates.[6]

New Technologies

Digital innovations are making it possible for supply chain finance to broaden its scope, reaching smaller tier 2 and tier 3 sellers or retailers, and lowering costs of financing by leveraging channels, data analytics and processes integrated. There are four areas through which digital innovations have transformed the economics of supply chain finance for financial institutions:

1. Digital Infrastructure: Advances in infrastructure and software architecture (e.g., standardization and inter-operable interfaces) have enabled the growth of new types of services easily accessible by financial institutions and supply-chain actors. This has implications for communication, storage and management of information for businesses and supply chain finance lenders. Businesses benefit from the internet to access data from the cloud and managed services. The continued growth of cloud computing in emerging markets can lead to the digitization of supply chain processes as well as payments, and reduce barriers to specialized services for sellers, buyers, and anchors in a value chain. Businesses are making cloud data storage and application hosting central to their IT spend strategies and a core of their business models.

2. Standardization and Interfaces: With advances in internet access, cloud computing, and managed services, the adoption of standard methods of system interoperation is disrupting traditional banking business models. These methods enable businesses to utilize multiple third-party services in conjunction with their own systems while limiting customization. This has cost-reduction ramifications and therefore great scaling potential. It also has security implications, as tried-and-tested integration methods minimize exposure to new access vulnerabilities.

3. Managed Services and Platforms: Cloud solutions, Distributed Ledger Technology (DLT), artificial intelligence, the 'Internet of Things', and automation are all among the digital innovations playing roles to reduce the costs of inefficiencies and leakage in logistics management.

4. Data Analytics: Data analytics presents a unique opportunity. Data are samples of reality, recorded as measurements and stored as values. There are many ways to encode information, but any piece of digitized information converts things into numbers that can drive an analysis, thus serving as a source of potential insight for operational value. As the use of digital technology and smartphones expands in emerging markets, new data sources become available. At the same time, with increased interconnectivity many goods/tools are enabled to send and receive data, connecting and communicating directly with one another and through user-interfaces in smart-phone applications, known as the 'Internet of Things'. The availability of

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[6] PwC, Working Capital Report 2018/19. PwC, (2018).

new data in combination with advances in computing power gives rise to new methods of data analytics, which can be used for a specific purpose (e.g., credit scoring), but can also be employed to increase operational efficiency. Data and analytics enable supply chain financing to expand the customer base and provide a higher-quality service.

New Models, New Entrants

Technology is shifting the market structure, resulting in the emergence of innovative business models in a segment traditionally led by financial institutions. FinTechs, including SCF providers, peer-to-peer (P2P) lenders, platforms and market places are testing new business models proposing to expand the reach of supply chain finance through better unit economics and tailored product offerings are emerging as competitors as well as partners to banks. At the same time, financial institutions are leveraging technology to serve the tier 2 and tier 3 SMEs.

Technology-based business models propose to: i) reduce integration costs with corporate anchors; ii) reduce the timing of invoice approval and verification; and/or iii) leverage predictive analytics to extend advance financing to upstream suppliers as well as to downstream distributors and retailers. Their offerings span integrated white label processing, investment opportunities via use of the platform (with parameters tailored to the financial institution), or connections between financiers and supply chains that reduce systems and invoice integration costs.

Figure 6: Examples of Technology Solutions in Supply Chain Finance

Lending Area	Informal MSMEs
Factoring	• *Surecomp's allFAC* • *Codix*
Invoice Discounting, EIPP programs	• *GT Nexus* • *Ariba* • *Bottomline* • *Fundtech* • *OB10*
Trade Finance— Letter of Credit based	• *CGI* • *Misys* • *Banks' own proprietary systems*
Supply Chain Finance— Buyer approved payables programs	• *Fundtech* • *Kyriba* • *Orbian* • *PrimeRevenue* • *SipplierCard* • *GSCF* • *Banks' own proprietary systems*
Buyer-approved Invoice Platforms	• *CGI* • *Demica* • *Fundtech* • *Orbian* • *PrimeRevenue* • *S1 through ACI*
Receivables management	• *I-flex, part of Oracle, with Flexcube* • *Temenos, with Globus* • *SAP's lending system* • *CML* • *Fundtech* • *Premium Technologies* • *GSCF*
Purchase Order to Pay Financing	• *Fundtech* • *TradeCard* • *SAPs ERP Financials*

New Supply Chain Finance Entrants

Opportunities are expanding for new entrants with a more entrepreneurial approach, a specialized business model, and a risk appetite to gain share in a potentially lucrative market. Software vendors, digital managed service providers, and FinTechs have all harnessed digital innovation to develop products and services in supply chain finance. Some provide turnkey solutions for financial institutions or corporate anchors, others directly address the needs of SMEs and create linkages to corporate and financial partners.

Increasingly, financial institutions are partnering with technology platform providers to offer working capital solutions to key clients and their trading partners (e.g., suppliers, distributors). At the same time, SMEs want to ensure they can make a business case for supply chain finance. To facilitate the SMEs with their bottom-up request for financial support, financial institutions are taking the strategic approach of building strong partnerships with FinTech firms, B2B, and P2P platforms. This means that the initial model of financial institution-centric SCF platforms, whereby financial institutions were both originators and funders, is morphing into a model where a variety of specialized participants can cover a wider spectrum of necessities and offer more tailored solutions.

Figure 7: Platforms as Supply Chain Finance Facilitators

Engagement

Functionality

Settlement processors	Product providers	Integrated services
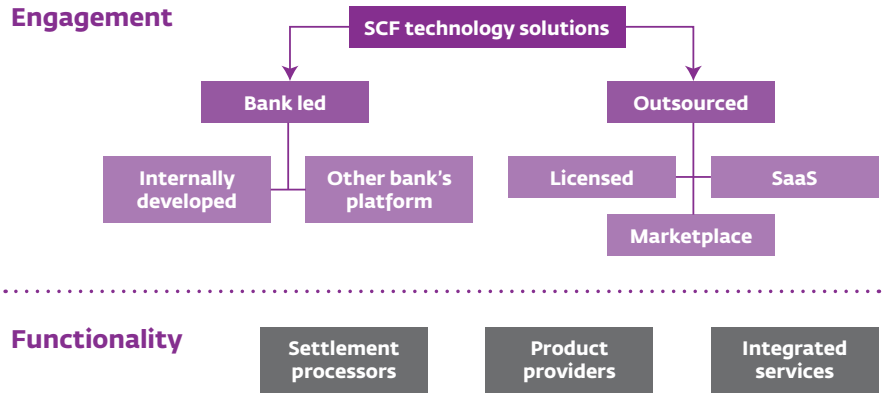
SCF technology set-up can be done through:

- **Developing the platform internally**
- **Using the bank's platform**
- **Licensing the usage of the external technology**
- **Using an external platform on a white-labeled basis**

External (SaaS) option:

- Usually requires less maintenance and fewer resources
- Does not require investment in hardware and software for the platform and databases
- Frees up resources otherwise used for the regular maintenance
- Provides high level of flexibility in extending the product range
- Provides high level of flexibility in integration with other bank systems
- Ensures effective onboarding; especially when number of suppliers/distributors is large and significant effort is required to onboard and support these counterparts

Figure 8: Actors Engaged in SCF via Platforms

Figure 9: Evolution of Supply Chain Finance
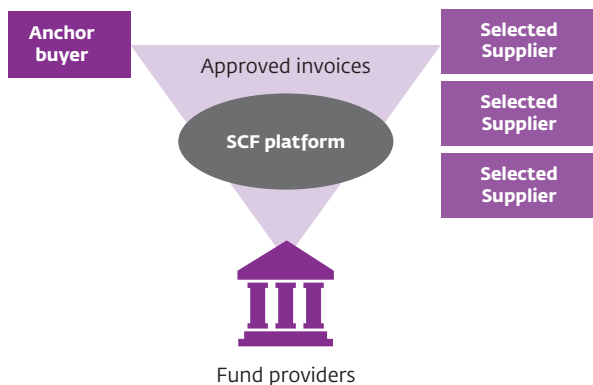
The entrance of FinTech players has definitely changed the SCF market. The original ecosystem, with a financial institution funding the approved invoices of an anchor buyer's selected suppliers through a proprietary origination supply chain finance platform (Figure 8), has now evolved into multiple models related to the number of relationships in the network and to the value distributed in the system (Figure 9).

Wealth management firms and pension funds have increased the pool of funders, while P2P FinTech firms are now targeting the untapped (lower left corner of Figure 9). They finance SME suppliers with loans using the supplier's receivables as security for repayment. Bilateral relationships between the P2P platform and suppliers do not require the direct participation of anchor buyers, thus reducing the number of relationships in the network.

The upper right corner of Figure 9 sees the appearance of B2B marketplace finance players that use B2B exchange platforms to transact purchase orders and unapproved invoices for funding. In this model, companies will exchange payments via the same network infrastructures they already use for B2B transactions, such as purchase orders, sales orders, product co-engineering specs, inventory tracking and tracing, and sales and procurement forecasts. These B2B platforms (e.g., Ariba Network, Basware,

GT Nexus, GXS, Tieto, Tradeshift, Elemica, E2open, Covisint) have been in place for years and connect hundreds of thousands of companies, logistics providers, and distributors in extended networks of trading partners.

FinTech companies are demonstrating entrepreneurship and pro-activity in covering opportunity gaps in the SME space. At the same time, they see financial institutions as collaborative partners, rather than enemies to replace. Dis-intermediation, a strategy many FinTech start-ups used as a way to sideline the financial institutions that traditionally provide SCF services, is being rejected by good market practices that show several adjacencies and very clear areas of opportunity for both. Savvy financial institutions are looking at technology entrants as an opportunity rather than a threat.

The Market Opportunity

Firms need working capital in value chains to maintain liquidity through their cash conversion cycle (CCC), which is the set of processes to convert investments in raw materials, inventory, labor and other resources into cash flows from sales. The length of the cycle (measured in days) is a key metric for working capital needs. The longer the conversion period, the larger the working capital needs of the firm. Suppliers and distributors, particularly for SMEs in emerging markets, typically have longer cycles. These businesses often have to pay up-front for inputs needed for production and receive delayed payments for products sold. An analysis by PwC shows that firms in emerging markets are significantly more constrained than in advanced economies. For example, in Asia and Latin America, conversion intervals for small businesses average above 90 days, 43% and 57% longer than in North America, respectively.[7] Working capital is needed to fill the gaps between initial cash outflows and later cash receipts. Capital constraints can have lasting negative impacts on a firm's growth and jeopardize its health.

Figure 10: Working Capital Cycle is an Indication for Market Size

| 48 DSO |
| 55 DIO |
| 66 DPO |

| 69 DSO |
| 69 DIO |
| 74 DPO |

| 78 DSO |
| 77 DIO |
| 71 DPO |

Large: Revenues > $1Billion
Medium: Revenues $500M–$1B
Small: Revenues < $500M

- DSO=Days sales outstanding
- DIO=Days inventory outstanding
- DPO=Days payable outstanding

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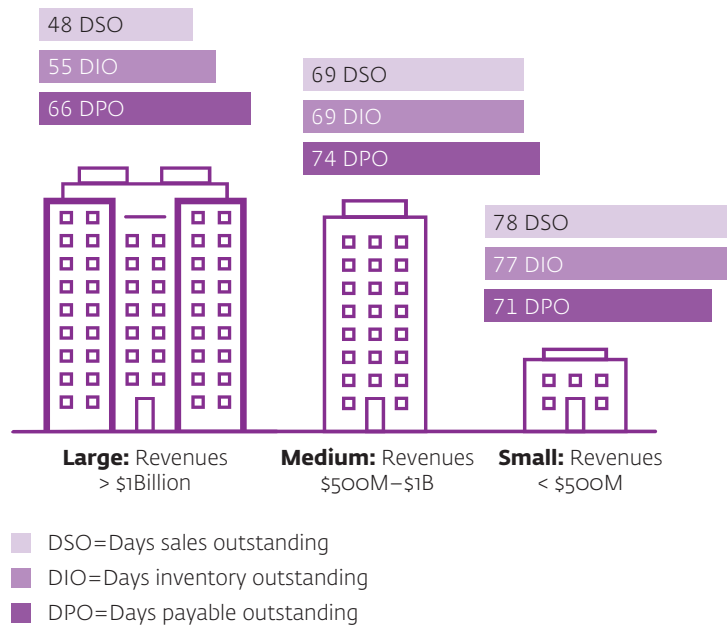
7   Navigating Uncertainty: Working Capital Study 2018/19. PwC, 2018. Cited intervals are for firms with revenue < EUR 0.5 billion.

Box 2
The Working Capital Cycle

To understand a firm's need for working capital, it is helpful to assess a firm's experience with respect to their own working capital cycle.

Three indicators germane to the need for working capital are:

Days Sales Outstanding (DSO): DSO refers to the average collection period required to close receivables for goods or services sold on credit. DSO is a calculation of account receivables as a percentage of total credit sales multiplied by the number of days for the time period being considered. A high DSO suggests a firm has working capital locked up in outstanding receivables and unable to leverage that capital for the business.

Days Payable Outstanding (DPO): DPO indicates the average time it takes a firm to pay its bills. It is calculated by assessing the outstanding accounts payable multiplied by the days of the time period assessed (e.g., 90 days for quarterly, 365 for annually) and

divided by the cost of goods sold over that period. From a cash flow perspective, a higher DPO indicates an increase in working capital by holding back funds due to suppliers.

Days Inventory Outstanding (DIO): DIO is also known as the Days Sales of Inventory (DSI); DIO indicates how many days a firm's current stock will last before replenishment is needed.

While the value for each of these measures is highly dependent on the context and company business model, research by PwC reveals that small firms have greater challenges in managing these business factors than larger firms.[8] On average, the DSO in emerging markets – the number of days required to be paid by a buyer – is 66% greater for small firms compared to larger counterparts. Also, it takes 82 days on average to convert sales into cash for smaller businesses. The same report indicates that nearly 77% of interviewed firms cited cash-flow as a key concern due to slow-paying corporates.

Similarly, a comparison of gross averages of Net Working Capital Days across regions shows that firms in Asia and the Middle East have consistently longer working capital cycles than those of Europe or North America. Latin America and Africa have similarly large working capital gaps along smaller firms and important industry sectors, such as retail.

The implications for upstream supply chain production are that firms may not be able to commit to larger orders or may turn down new orders that could lead to greater growth while they are hindered by lack of finance for inputs and production resources. For downstream, limited availability of funds hinders turnover and the anchor institution's ability to grow sales.

Figure 11: Working Capital Defined

Working Capital	Current Assets		Current Liabilities
Working Capital Days =	**Days Inventory Outstanding** +	**Days Sales Outstanding** −	**Days Payable Outstanding**

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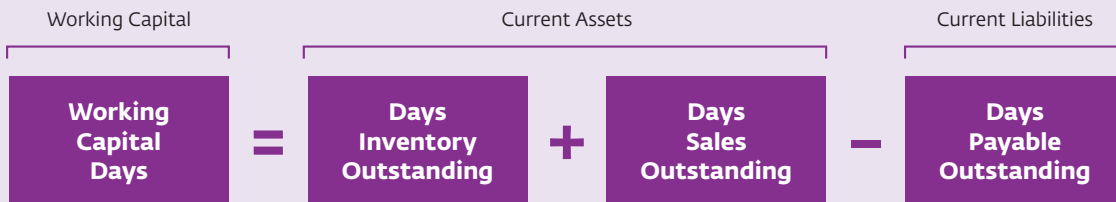
8   PwC, Working Capital Report 2018/19. PwC, (2018). Large firms have revenues > €1 bn, mid-size firms have revenues between €500m and €1 bn, and small firms have revenues below < € 500 m per year. (https://www.pwc.com/gx/en/services/advisory/deals/business-recovery-restructuring/working-capital-opportunity.html)

Many suppliers and distributors face challenges in financing their working capital because, in part, financial institutions have limited appetite for working capital lending. For SMEs in particular, the information, financial skills, and legal support required by financial institutions may not be available, and collateral requirements can be significant.[9] Young firms with no credit history and limited lender relationships face even more hurdles while seeking financial support. Most traditional financial institutions find that the profit potential from small clients is insufficient to support onboarding or 'Know Your Customer' (KYC)[10] costs and associated client risk – particularly for working capital finance, which is typically short term.

Moreover, when supply chains cross borders (a common phenomenon), the level of complexity increases dramatically, and financial institutions must grapple with: i) the credibility of parties on the other side of the border (which they do not know); ii) enforcement processes in different jurisdictions (with which they are unfamiliar); and, iii) currency risks (in the case of international trade). These restrictions have been exacerbated

by Basel III-induced increased capital requirements, which have reduced financial institutions' lending capacities.[11]

Thus, financial institutions allocate their increasingly scarce capital to more profitable products, markets, and clients (i.e., more business with large creditworthy corporates, and less with SMEs and emerging markets).[12]

However, even as there is downward pressure on cross border transaction settlements, trade and open account[13] trade transactions have experienced dramatic growth over the past few decades: 80% of world trade is under open accounts.[14] Supply chain finance has represented a low portion of bank financing presenting a tremendous opportunity for growth.

Figure 12: Traditional Trade Finance versus SCF (by percentage)
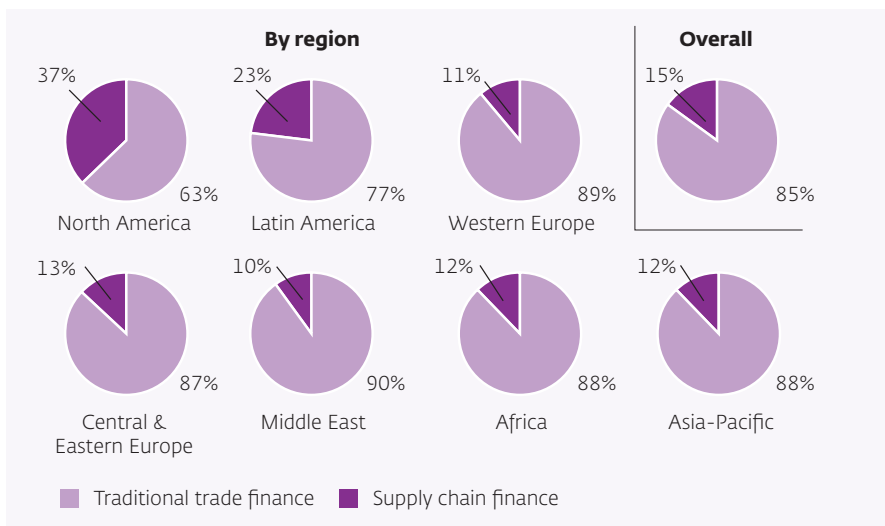
9   According to IFC's SME finance specialists, banks typically ask SMEs for 100%-200% collateral for credit lines

10 Know Your Customer (KYC) is the process of a business verifying the identity of its clients and assessing their suitability, along with the potential risks of illegal intentions towards the business relationship. The term also refers to the bank regulations and anti-money laundering regulations, which govern these activities.

11 Basel III is an international regulatory accord that introduced a set of reforms designed to improve the regulation, supervision and risk management within the banking sector.

12 De-Risking by Banks in Emerging Markets: Effects and Responses for Trade. IFC EM Compass Note, 2016.(https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial+institutions/resources/de-risking+by+banks+in+emerging+markets+effects+and+responses+for+trade)

13 As defined by the Global Supply Chain Finance Forum, Open Account trade refers to trade transactions between a seller and a buyer where transactions are not supported by any banking or documentary trade instrument issued on behalf of the buyer or seller. Conventionally, open account terms are understood as the open time period agreed between a buyer and seller for payment on an invoice, often 30, 60 or 90 days. There is no intermediary institution or instrument in this type of agreement until the invoice is either purchased or leveraged for financing with an intermediary body. Global Supply Chain Finance Forum.

14 Trade finance and SMEs- Bridging the Gaps in Provision. WTO, 2016. (provision https://www.wto.org/english/res_e/booksp_e/tradefinsme_e.pdf)

IFC estimates a $4.7 trillion finance gap for SMEs in emerging markets, with working capital and trade finance being a key component of that gap. An additional $2.9 trillion more is needed inside the informal sector firms, bringing the total financing gap to $8.1 trillion.[15]

The 2017 IFC report, *SME Finance Gap*, delves into regional assessment of the SME finance constraint characteristics by region and firm size.[16] The East Asia and Pacific regions represent the overwhelming majority of the finance gap due to longer cash cycles, followed by Latin America and the Caribbean.

In terms of the domestic supply chain finance gap in emerging markets, IFC estimates that at least 20% is capital locked up in supply chains, either in the form of receivables or inventory.

Figure 13: Global SME Financing Gap

South Asia — $46 $291
Middle East and North Africa — $57 $138
Sub-Saharan Africa — $86 $245
Europe and Central Asia — $140 $636
Latin America and the Caribbean — $111 $1,098
East Asia and Pacific — $278 $2,110

MSME Finance Gap as Percentage of GDP
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80

Finance Gap ($Billions)
■ Micro   ■ SME
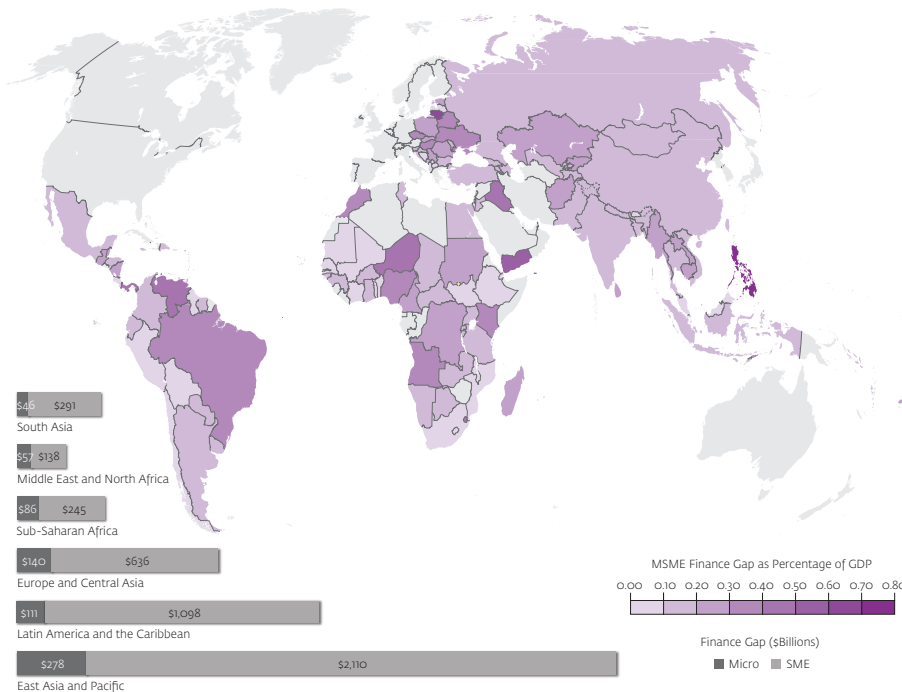
Source: 2018 Global Trade – Securing Future Growth. ICC, 2018. (https://iccwbo.org/publication/global-survey-2018-securing-future-growth/)

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[15] SME Finance Gap. IFC, 2017.

[16] SME Finance Gap. IFC, 2017. The report also analyzes gender, sectoral, and formal/informal firm aspects of the financing constraint.

The size of the market opportunity in a country can be derived by estimating the level of domestically produced goods and sales for a number of larger corporations in the market in each of the principal sectors of the economy. Based on data from the balance sheets of corporates, average payment terms with the various entities in the value chain can be established to calculate the potential volume of transactions and the financing that would be required to fund the working capital employed in the production process.

IFC's Supply Chain Finance Knowledge Guides provide greater details on IFC's proprietary methodology to assess market opportunities in greater detail. Annex 4 contains a Market Sizing Methodology Tool based on this including an illustrative application.

Figure 14: Worldwide SMEs Constrained in Access to Finance

Number of Financially Constrained MSMEs as Percentage of Total Number of MSMEs

0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00

Number of MSMEs (millions)

■ Unconstrained   ■ Partly constrained   ■ Fully constrained

Latin America and the Caribbean — 21.7, 3.2, 2.7

Sub-Saharan Africa — 21.2, 17.4, 5.7

East Asia and Pacific — 37.4, 5.0, 21.7

Europe and Central Asia — 9.0, 1.6, 1.8

Middle East and North Africa — 3.7, 0.8, 1.1

South Asia — 3.9, 1.5, 3.0

Section 2

Supply Chain Finance Actors

As previously noted (on page 21), the transformation of supply chains has increased the extent to which positions and roles of particular businesses vary, depending on the transaction and their supply chain. For instance, a car tire producer can be a supplier to an anchor buyer/distributor in an upstream transaction, while at the same time it can be a buyer in a downstream transaction referring to an anchor distributor of natural rubber or chemical compounds.

Therefore, any exploration in supply chain finance should begin by mapping the various actors across a particular chain and identifying the role and position (e.g. tier 1, tier 2, tier 3) of each actor vis-à-vis the supply chain anchor. While there can be various intermediaries (e.g., processors, independent warehouses, resellers), the primary actors along the supply chain are the following:

Figure 15: Supply Chain Actors

Upstream · **Downstream**

Sub-suppliers → Suppliers → Anchor → Distributors → Retailers

Financing the procurement side of the corporate business

Financing the sales and distribution side of the corporate business
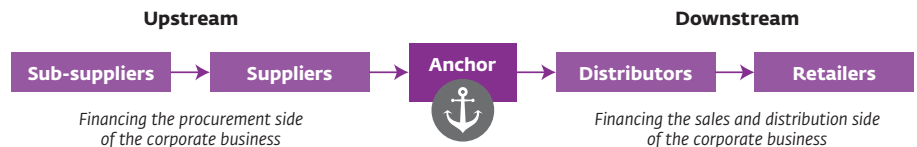
The Buyer

Buyers play a wide range of roles, ranging from a small business purchasing inputs to a large corporate playing the role of anchor in an upstream supply chain. Anchor buyer companies are corporations, typically large in revenue (above $750 million), that operate as buyers in a trade relationship. They may be characterized as foreign or domestic, a parent company, exporters, licensors and importers of foreign products, or manufacturers who package and distribute under an international or domestic brand. Like the seller archetypes described later in this handbook, the scenarios are too numerous to cover, so a few notable examples have been selected to illustrate SCF challenges.

Operations are often manual and lack transparency, creating highly inefficient (and costly) processes, giving suppliers limited visibility and reach into their markets, and exacerbating challenges of accessing supply chain finance. Over 90% of goods distribution in emerging markets goes through ad-hoc relationships.

Figure 16: Anchor buyer archetype: The brewer and bottler of domestic beer company

Size	National subsidiary of multinational anchor institution.
Key business characteristics	Produces popular beer for growing domestic market and some export via parent company operations. Has its own production facilities. All distribution is contracted out to a dozen dedicated distributors.
Customer characteristics	Beyond general age demographics, company has limited visibility into customers beyond first line of distributors.
Current financial services	Manages accounts through multinational commercial bank offering a variety of account and treasury management capabilities.
Business challenges	Distributors have difficulty and delays collecting payments from retailers. Brewery forced to extend goods on credit, often with payables extending beyond agreed terms of 30, 60, or 90 days. Distributor supply chain management (SCM) methods are either manual or rudimentary, not tied to anchor institution systems, making it difficult to gather market data to predict demands and preferences. Missing integration with company systems also makes quality control difficult and can result in losses due to leakage and fraud.
Finance challenges	Reducing book of extended payables; reducing the number of bank accounts and relationships for both distributors and input sellers.

Figure 17: Example of distributor archetype: Independent distributor of fast-moving consumer goods (FMCG)

Size	Small firm, formal
Key business characteristics	Operates a warehouse and one truck. Most retailers visit the warehouse weekly, sometimes multiple visits to acquire small amounts of stock due to limited cash flow. Deliveries are organized for larger independent retailers.
Customer characteristics	Most customers are small family owned shops. Some medium sized customers may manage two or three locations or manage a medium size grocery market.
Current financial services	Distributor maintains a current account with a bank, may have a line of credit. Reference financial institution is (reluctantly) lenient on payables but may charge interest for overly extended terms.
Business challenges	Distributor wants to stay on top of latest trends and offer popular goods, but: i) doesn't have clear visibility into market demands outside of customer inquiries (that may not come to the distributor if known as a source for only limited variety of goods); and ii) is restricted to working only with financial institutions that are willing to extend goods on open account. Some anchor agreements also prohibit selling competitor goods.
Finance challenges	Constraint driven more by limited cash flow of retailers who buy piecemeal. Unwillingness to extend goods on credit as retailers will max out permitted stock and seek out competing sources of goods, only repaying when only option for new stock replenishment. May offer open account for known retailers, serving as a line of revenue for the distributor.

The Distributor

Sales and distribution in emerging markets are typically fragmented, with distributors mixed in with wholesalers and resellers. An anchor distributor could be a medium-to-large-sized corporate anchor, and possibly the same company as the anchor buyer (discussed above), or a distribution company responsible for a wider range of brands and products. Depending on the industry, such distributors may manage a direct retail distribution or manage relationships with several smaller sub-distributors (tier 2 or tier 3 companies).

The Supplier

Suppliers in emerging markets constitute a diverse range of business types. This group may be deconstructed based on firm size, maturity, and whether they are:

- **Producing for domestic or international clients**
- **Raw input producers or undertaking some form of processing or fabrication**
- **A sole source provider or have a sole buyer client**
- **Working independently or in some form of loose collaboration with other suppliers**

In a standard supply chain workflow, suppliers fulfill a buyer's request based on a purchase order and, if not paid at-sight upon delivery, will issue an invoice to the buyer, customarily paid within a 30- to 90-day window, depending on the terms negotiated. As we have cited earlier, smaller suppliers may have limited bargaining position and few alternative customers. This restricts the flow of capital used to acquire more inputs to sell more volume.

In a supply chain, we commonly refer to tier 1 suppliers as those businesses that have a direct relationship with an anchor buyer and are responsible for fulfilling their order. Tier 2 or 3 suppliers provide inputs or services to tier 1 suppliers, e.g., a farmer to a food processing plant or chemical inputs provider for garment factory.

The following examples of supplier archetypes focus on underserved SMEs. These provide the perspective of common business situations and a method to characterize market prospects.

The Retailer

Retailers represent businesses that sell directly to end-customers. They typically buy inventory in bulk from distributors and wholesalers, stock items in their store and gradually sell items to consumers and businesses visiting their shop. Retailers may be independent, informal, or part of larger franchises or retail chains. E-commerce platforms like Flipkart (now Walmart) in India, Alibaba in many Asian markets, and Jumia in Africa facilitate access to a broader digital market for their businesses.

Interviews with informal retailers reveal inefficiencies in buying, selling, and moving goods. For example, a small shop might close more than once a day to take limited cash collected to restock shelves. Despite the challenges, these shops are expected to remain a mainstay of retail in emerging markets.

Figure 18: Example of supplier archetype: The plastic mold maker [or parts producer] for international toy company

Size	Small to medium-sized firm.
Key business characteristics	Located in a major Asian manufacturing center with several competitors and buyers nearby. Firm operates as a supplier of original equipment manufacturer (OEM) components for major manufacturer. Also offers production via online commerce sites for 'knock-off' products or ad hoc production.
Customer characteristics	Has some ongoing customer contracts; other opportunities arise on an ad-hoc basis. May have multiple outstanding receivables at any time.
Current financial services	Depends upon anchor financial institution advances to procure inputs for production runs and maintains open account effectively as a line of credit.
Business challenges	Market demand can be fickle. Needs to diversify and, in doing so, must increase production capacity. Difficulty in taking risk to expand before new orders are submitted, or risk not having capacity to undertake new orders. Cash that is available needs to be held for anticipated delays in collecting receivables.
Finance challenges	Expanding to support new business requires seeking financing from informal sources, holding open accounts with input sellers for extended periods, or requiring upfront payment from new customers not likely to trust an unknown producer.

Figure 19: Retailer archetype: Family owned small market for FMCG

Size	Microenterprise
Key business characteristics	Small shop located in a concentration of shops in an area of heavy foot traffic such as a public bus depot.
Customer characteristics	More than half of customers are regular customers who buy in piecemeal based on limited cash flow. Shop may extend goods on credit, but often only to someone personally known by the shopkeeper.
Current financial services	Likely to only maintain a [*] cash till and bleed shop finances with household budget. Relies on expensive informal sources for credit and in some cases may maintain an open account with the distributor.
Business challenges	Due to limited cash flow, must make frequent small stock purchases throughout the week. May have to acquire stock from larger retail firms resulting in large double mark-ups and be limited in stock offerings to opportunistic options.
Finance challenges	Only 12% of unorganized retail has access to institutional credit and 37% had unmet demand for commercial bank credit.19 Because acquiring stock is an ad hoc and opportunistic process, there may not be clear purchase histories to build a risk profile.

[*] Effect of Organized Retail on Unorganized Retail in Indian Retail Market. Elk Asia Pacific Journal of Marketing and Retail Management, 2012. (https://www.elkjournals.com/MasterAdmin/UploadFolder/7-EFFECT-OF-OR-GENISED-RETAIL/7-EFFECT-OF-ORGENISED-RETAIL.pdf)

Working Capital Needs and Challenges

Figure 20 below illustrates typical working capital needs by role in a supply chain, and presents key challenges facing these actors in obtaining financing.

Figure 20: Illustrative Working Capital Needs of Supply Chain Actors

	Suppliers	Buyers	Distributors	Retailers
Supply chain role	Supplier for an anchor buyer (tier 1) or for other suppliers in the supply-chain (tier 2, 3).	Purchases goods/services from a range of upstream suppliers for transformation or resale. Could be an intermediate in a long supply chain, or a supply-chain's 'anchor', i.e. the larger company that makes and sells the key products of this supply chain and determines the structure of the supply chain.	Anchor institution heading the downstream supply chain distributing goods or services through a retail network. Could be an intermediate, smaller distributor (tier 1) or a wholesaler (tier 2) for an anchor distributor or a producer.	End-customer outlet buys goods from anchor distributor (tier 1) or sub-distributors (tier 2, 3).
Need to release working capital	Seek pre-shipment financing to acquire materials and pay for production resources (including labor) and earlier receipt of financing against outstanding receivables	Seek to optimize cash flow by extending payables as long as possible while also ensuring suppliers and buyers are adequately financed	In lieu of receiving goods on credit from producers, seek financing for acquiring goods in advance of payment from retailers. Anchor distributors may seek to support retail network by extending receivables or providing credit to retailers.	Seek working capital to finance inventory, which usually must be paid for in advance of final sale to customers. Sufficient working capital enables stocking shelves and volume purchases from distributors, which may afford better pricing.
Challenge getting working capital	May be dependent upon anchor buyer willingness to participate in receivable-backed financing from funder	Want a single solution to handle all payables, regardless of whether financing is involved	May be reluctant to take on financing if anchor distributor is already pressed to provide goods on credit. Anchor distributor may not have the capacity or ability to offer financing to its sub distributors / retailers.	May have limited credit history when distributors are paid in cash
Additional SME considerations	Limited leverage with buyer. Joining required buyer billing systems may be cost prohibitive. Significant levels of informality.	Have poor visibility into lower tiers of supply networks	Distrustful of extending goods on credit to other distributors or retailers who lack predictability	Smaller retailers are invisible to anchors with limited means of acquiring working capital. Significant levels of informality.

Formal and Informal SMEs

Emerging market supply chains are comparatively unstructured. This is partly due to the smaller size of corporate anchors, and the larger share of informal businesses. IFC estimates there to be 315 million SMEs in emerging markets that are formally registered, and approximately 200 million more informal businesses.[17] In low-income countries, SMEs account for slightly over 60% of GDP, with an estimated 75% of those SMEs believed to be informal. Conversely, in high-income economies, the percentage of GDP derived from SMEs is comparable, yet less than 20% of firms are informal.[18] While in most cases both formal and informal businesses may face similar obstacles, informal SMEs face added challenges that derive from lack of identification credentials and visibility in markets. This leads to further challenges in securing access to finance for these businesses. It is this distinction, perhaps more than industrial sector or location, that creates disparities and challenges in delivering supply chain finance to SMEs.

Figure 21: Differentiation between Formal and Fnformal MSMEs

	Formal MSMEs	Informal MSMEs
Identification	To be registered likely to have the identification necessary to access financial services	May resort to reputational identification and social networks for business opportunity
Network size	Potential for larger networks through 3rd party assurances	Must depend on limited first and second degree networks for business, resulting in limited negotiating position and options for supply chains
Collateral	Registered property might serve as collateral	May depend on expensive pawning models or guarantees, losing access to assets
Financial services	Likely to have only rudimentary financial services such as a current account	45-55% of MSMEs do not even have a loan overdraft, 40% are completely underserved and 10% unserved
Sources of credit	Traditional channels Extended terms with anchor institutions	Informal lending Goods on credit from distributors/suppliers
Record keeping and budget management	Record keeping more organized for tax purposes but may not be digitally available	May jeopardize clear accounting by blending household and firm finances
Credit history	May be isolated to a few or single source for more established firms	History scattered among informal sources and not tracked for scoring purposes. History more dependent on relationships and personal reputation

[17] SME Finance Gap. IFC, 2017. (https://www.smefinanceforum.org/data-sites/SME-finance-gap)

[18] The Future of FinTech: A Paradigm Shift in Small Business Finance. World Economic Forum (WEF), 2015. (http://www3.weforum.org/docs/IP/2015/FS/GAC15_The_Future_of_FinTech_Paradigm_Shift_Small_Business_Finance_report_2015.pdf)

The aforementioned supply chain actors are common enough to map to the many conditions that financial institutions may encounter in any supply chain ecosystem. Targeting such actors may help ensure a product/market fit in an initial market entry.

A firm may have multiple potential targets, thus penetration strategies must consider firm capability and market opportunity. Firms must first assess the relevant actors in the market and their needs, in order to determine the following:

- **What market relationships can be leveraged or built upon?**
- **What market growth developments are occurring with unmet financing needs?**
- **Which sectors are underserved?**
- **Which experience the greatest delays in payment?**

Note: Tool 2: Assessing Market Conditions in Annex 3 provides a framework for mapping insights in response to these questions. It is designed to provide a structure for analyzing prevailing market conditions, assessing the main actors, and identifying existing clients in a supply chain finance provider portfolio who may be useful.

Figure 22: Mapping Sectors for Supply Chain Finance

NWC days and ROCE
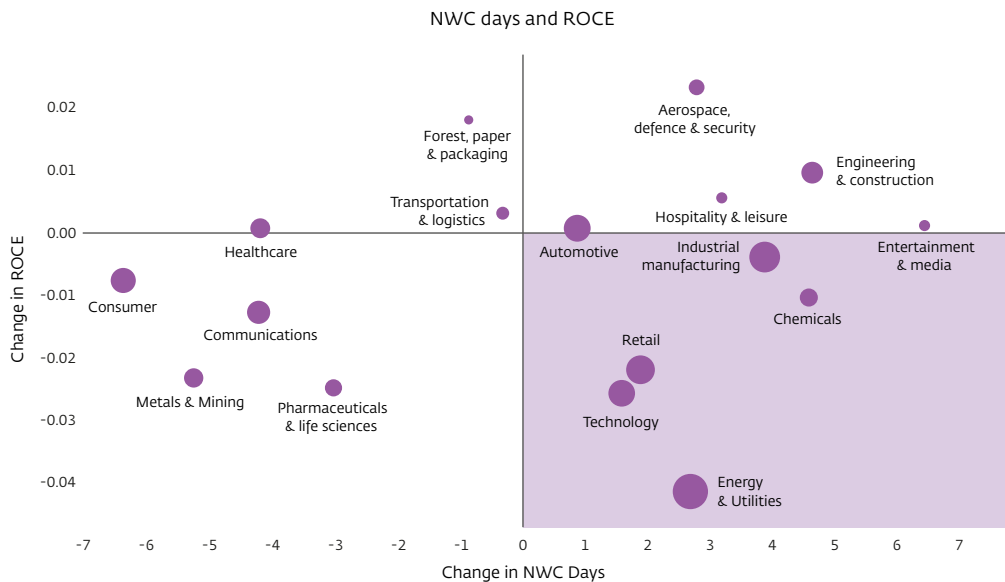
Notes

Section 3
Technology and Business Model Innovations
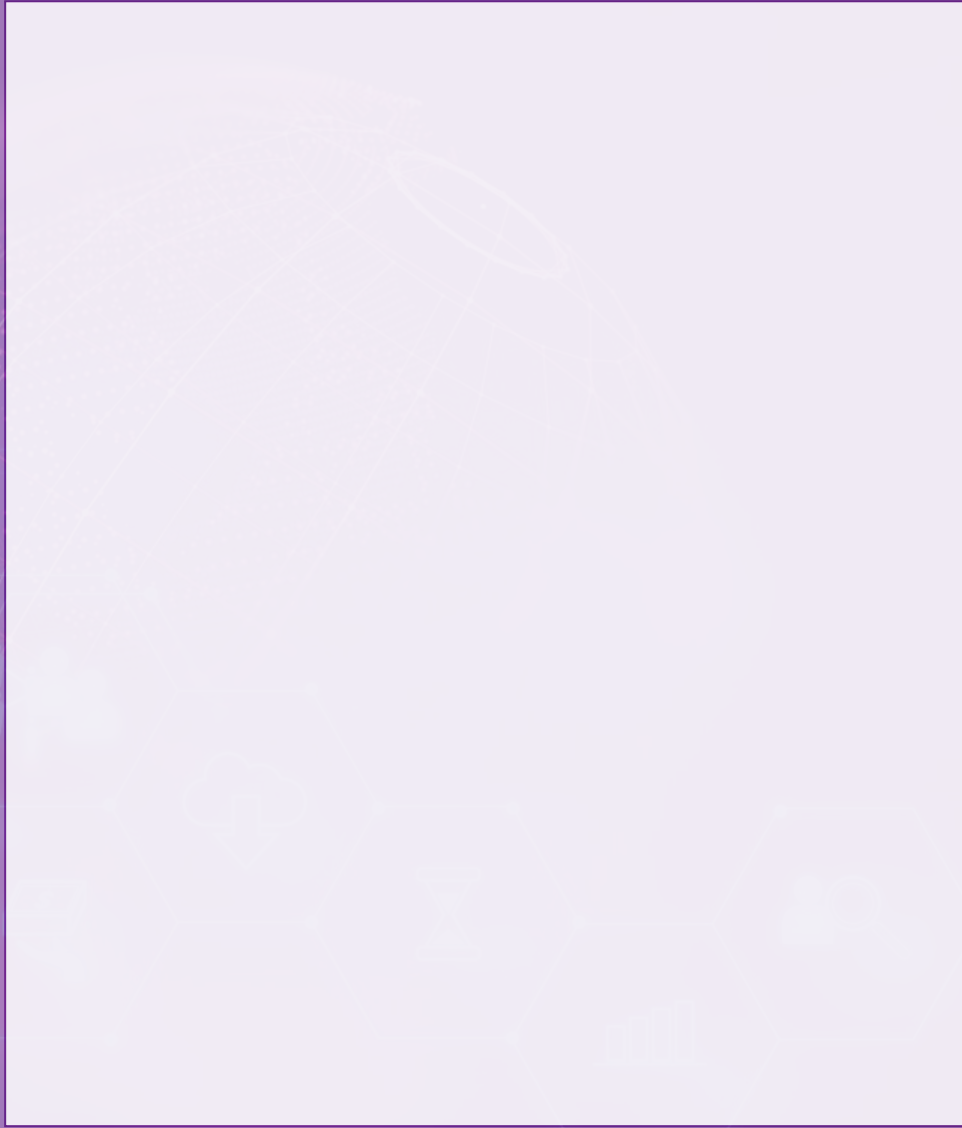
The past decade has seen a rapid evolution of technology, from basic infrastructure (e.g., mobile telephony) through quantum computing. This section dives deeper into the different technology innovations and explores implications for supply chain finance and how different technologies have enabled new business models, with a particular focus on new market entrants (e.g., platforms).

Today, 68% of the global population has a mobile phone subscription, and 60% of all connections use a smartphone. By 2025, these figures are expected to grow to 71% and 79%, respectively[19].

While there are novel approaches that enable logistics operators and supply chain actors to conduct data capture or access offline, these solutions still require regular internet access for synchronizing data with supply chain operations systems, or accessing data for value-added services. Internet penetration continues to expand[20], and innovations in internet connectivity and increased bandwidth are making it possible for emerging markets to engage in digitized supply chains.

Access to the internet has important implications for the storage and management of information for businesses and SCF lenders. The continued growth of cloud computing in emerging markets can lead to the digitization of supply chain processes and payments, and reduce barriers to specialized services for sellers, buyers, and anchors in a value chain. Businesses are making cloud data storage and application hosting central to their IT spend strategies and a core of their business models. According to Cisco, as of 2016, 88% of data center traffic has transitioned from traditional data centers to cloud-based centers, with expectations for penetration rates to reach 95% by 2021[21].

As a result of the availability of real time data, visibility (order process, inventory, delivery, and potential supply chain disruptions) has increased. The resulting advanced insights improve customer service, reduce costs, help with regulatory directives, and mitigate disruptions which could affect supplier inventory levels and product delivery.

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[19] The Mobile Economy 2019. GSMA, 2019 (https://www.gsma.com/mobileeconomy/#techmigration)

[20] 2018 Global and Regional ICT Estimates. ITU, 2018. (https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx)

[21] Ranger, Steve. Cloud Computing will Virtually Replace Traditional Data Centers within Three Years. Zdnet, 2018. (https://www.zdnet.com/article/cloud-computing-will-virtually-replace-traditional-data-centers-within-three-years/) from Cisco Global Cloud Index: Forecast and Methodology, 2016-2021 White Paper. Cisco, 2018. from https://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.html

For more than a decade, mobile payments have been regarded as a harbinger for digital financial services in emerging markets. Mobile financial services provide the basic infrastructure for low cost, mass-payment transactions at scale at a fraction of the cost of a traditional branch network..

Digital Infrastructure

Innovations that convert smartphones into point-of-sale terminals and stock scanners are past the pilot and early-adopter phases and now are poised on the threshold of much wider adoption in emerging markets. Embedded applications (i.e., services within already widely used applications) are reducing adoption barriers and opening doors to a trove of information not previously applied to finance. One growing application is the use of messaging Apps led by WeChat and WhatsApp that allow specialized app providers to embed services for conducting business. Since users are already familiar with the messaging apps, using them for specialized purposes will not be a big leap. But the information communicated, combined with machine learning techniques, will be a significant development in the evolution of finance provisioning.

Payments

A byproduct of smartphones and point-of-sale devices is the digitization of payment flows and data generated by businesses and their customers. All actors in the supply chain (including funders) can access a growing volume of data on orders, payments, and transactions that can be analyzed to enhance processes and management. In terms of financing, this translates into lower delivery costs and, in conjunction with artificial intelligence, improved credit scoring methods, allowing lenders to lower non-performing loans (NPLs) and offer more tailored services.

For more than a decade, mobile payments have been regarded as a harbinger for digital financial services in emerging markets. Mobile financial services provide the basic infrastructure for low cost, mass-payment transactions at scale at a fraction of the cost of a traditional branch network. This enables transparent payments even to businesses in remote locations.

That said, beyond dedicated use cases of mobile airtime top-up and domestic transfers, usage levels have remained relatively low compared to cash transactions. While promising innovations may be accelerating as mobile operators better understand the potential (e.g., low threshold instant credit offers), greater acceleration is emanating from FinTechs, who are gaining access to mobile operators and financial institution customers.

For supply chain finance, innovation has a two-fold promise. A simple mobile wallet can be the first step for SMEs to gain entry to an easily accessible account that can receive payments immediately from buyers, whether

at the production or the sales and distribution ends of the supply chain. Some banks (e.g., FNB in South Africa) have created a higher balance threshold wallet targeting small merchants with greater liquidity fluctuations. These wallet accounts can result in additional KYC burdens, but the adoption curve

Yoco in South Africa provides general working capital lines for merchants and automatically deducts a percentage of each sale completed electronically to repay the advance. The limitation of this approach so far has been the limited penetration of merchant payments conducted electronically.

can be easier than a traditional account, as the business owner has already been exposed to the value proposition and may be incentivized with further promise of working capital credit through its use. Once transactions begin to flow digitally, they serve to replace inefficient paper trails that financial institutions have historically depended upon to determine credit levels for small business applicants. While customer-to-merchant payment models have been difficult to penetrate (due to merchant aversion of processing fees in thin margin markets), the ordering and prepayment of goods from distributors, potentially at discount, offers a data

Figure 23: Technology Applications in SCM

	Irrelevant	Interesting, but unclear usefulness	Disruptive and important
Big data analytics	2%	17%	81%
Digital supply chain	6%	27%	67%
Internet of things	6%	30%	64%
Cloud computing	6%	36%	58%
Advanced robotics	13%	34%	53%
Machine learning	11%	43%	46%
3D printing	19%	41%	40%
Drones/self-guided vehicles	23%	42%	35%
Sharing economy	28%	45%	27%
Other	49%	37%	14%
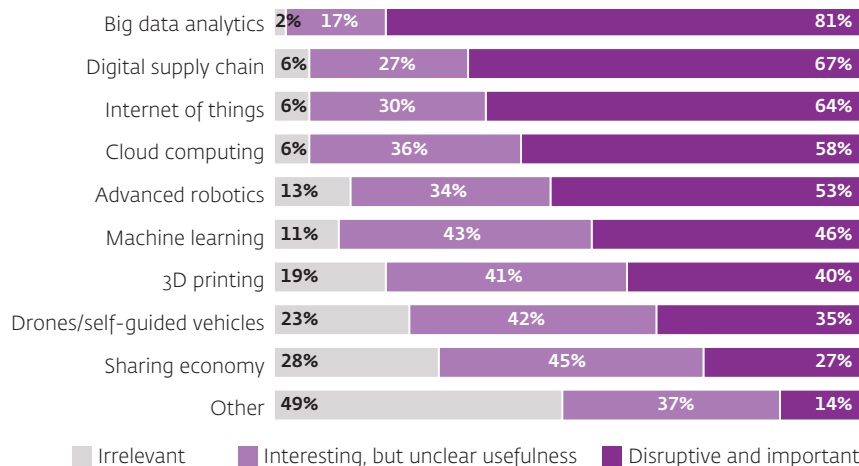
n = 1,416

Source: SCM World Future of Supply Chain Survey, 2016

stream for banks to understand the volume of activity a shop is supporting.

Reduced Collection Costs for Lenders

Electronic invoicing can cover a broad range of possible solutions. Typically, e-invoicing refers to much more robust and automated methods that have evolved from, and integrated with, accounting software packages used by larger firms (though technically, E-involving could also refer to a simple email with invoice attachment, or even a text message (i.e., SMS). E-invoicing allows for faster execution and the prompt triggering of a request for finance. At the same time, e-invoicing facilitates storing and retrieving of data to analyze sales behavior and anticipate future needs.

Solution Models

Seller-led solutions are those managed by the seller to generate, store, and transmit invoices. These transmit an email or text link that may include a web portal that buyers log into to view and pay bills. These are more common for non-supply chain consumer facing services (e.g., utility bills).

Buyer-led solutions are more common in supply chains with large anchor institutions. Sellers may submit invoice data via a web-based form or utilize EDI or XML data transfer schemes to digitally transfer invoice data from their own systems directly into the buyer system database to enter a review and approval workflow.

Figure 24: Global E-Invoicing Progress

Leaders
Average
Developing
Laggards
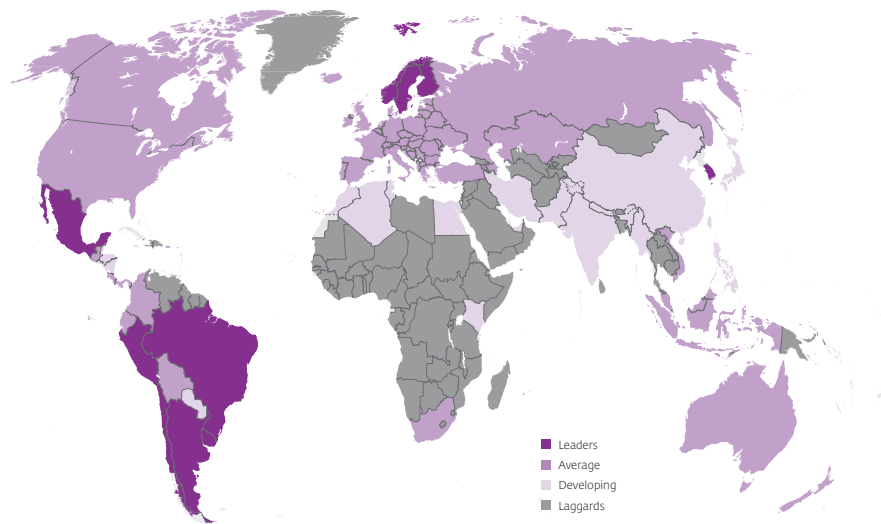
Source: Koch, Bruno. The e-invoicing journey 2019-2025. Billentis, 2019. (https://www.billentis.com/e-invoicing_ebilling_market_report_EN.htm)

A third model is where an intermediary plays the role of a 'hub', accepting invoices from sellers in various formats and then retransmitting them to buyers in their native formats. In this model, the hub eliminates the interoperability issue and offers value-add services such as tax management. These hubs can leverage the digital trend of cloud hosted managed solutions, benefiting supply chains that need to manage workflow and chains of custody across multiple actors relevant to the transaction (whether through direct interaction of seller and buyer sharing invoice and acknowledgment, or financiers needing to monitor progress and links to accounts).

Several factors inhibit the adoption of electronic invoicing solutions:

•   **Lack of basic awareness and understanding of solutions and associated benefits**

•   **Tendency to avoid tax obligations that may result from transparency of receivables**

•   **Incompatible invoicing systems between sellers and buyers**

•   **Unclear rules governing invoicing practices**

•   **Upfront costs of adopting new systems**

•   **Preference for or comfort with existing business practices (i.e., paper-based invoices)**

•   **Fear of disrupting business or cash flow**

•   **Lack of skilled internal IT staff to implement or maintain electronic systems**

To alleviate many of these challenges, some governments have instituted mandatory e-invoicing practices and introduced their own managed service platforms to be used by all sellers and buyers for submitting and receiving invoices. Brazil and Mexico undertook these measures for tax collection purposes and have experienced notable success.

Electronic invoicing systems must connect each invoice stakeholder in order to facilitate the tracing of invoice sources, authenticity, and reimbursement information. They must address a number of issues that plague existing e-invoicing processes (including false declaration) and prevent an invoice being used against multiple loans. The ability to monitor the invoice's life cycle in real time makes it possible to establish intelligent tax management, and the tax can be guaranteed to be paid in full and on time. *Note: An example of the Turkish e-invoicing platform is provided in Annex 1.*

Standardization and Interfaces

4. Analytics
Big Data & Artificial Intelligence

3. Managed Services and Platforms
Software & Infrastructure
Platforms

2. Standardization and Interfaces
APIs
Distributed data management
Identity management & verification

1. Digital Infrastructure
Connectivity
Payments
Electronic invoicing

Together with advances in internet access, cloud computing, and managed services, the adoption of standard methods of system interoperation is disrupting traditional financial institution business models. These methods are enabling businesses to utilize multiple third-party services in conjunction with their own systems, without requiring them to invest in full customization. The combination of multiple third-party systems and limited customization has cost-reduction ramifications and therefore great scaling potential. It also has security implications, as tried and tested integration methods minimize exposure to new access vulnerabilities.

Application program interfaces (APIs) enable third-party solutions to connect and operate across a wide range of pre-existing management systems and services. APIs can serve to:

API MODELS

APIs are commonly divided into three categories:

PUBLIC APIs: These might be provided as a public service (e.g., to verify identification against a national database) or as subscription or transaction models by firms that are hosting services available to other businesses as a value-add or outsourced service. This is common for FinTech service providers who provide specialized services to financial institutions or others with direct customer access.

PRIVATE OR PARTNER APIs: These share integration instructions in closed models on a case-by-case basis, dictated by terms of a particular agreement. This may be the preferred method in cases where the data being shared is sensitive and under strict regulations or other reasons sensitive to the business model.

INTERNAL OR MICRO-SERVICE APIs: Notable within businesses established after APIs matured, in these firms, architectures are modular in nature, functions are clearly defined and isolated from one another, and exchanging data or performing services for one another via APIs is utilized only within the firm. The benefit is that discreet pieces of functionality can be improved without the complexity or dependency of redesigning other elements of the business.

- **Access data (e.g., acquiring a postal mail code for a supplied address)**
- **Conduct a calculation or service (e.g., calculating a sales tax inserted in an online purchase based on information shared about items purchased)**
- **Manage a full service (e.g., provide a customer's balance information and account access to an online bill payment service provider at the customer's request)**

APIs are changing the way actors across a value chain work together and interact. Through easier third-party integration, supply chain finance partners can interact automatically, thereby reducing costs.

Standardization and interfaces allow service providers to focus on specific challenges by aggregating demand and linking into existing operations through modular services. Financial institutions and supply chain corporate anchors are increasingly looking to outside vendors to access new service modules to integrate into their own platforms.

One ramification of the adoption of these practices is that firms can focus on maintaining core systems and look to specialized software or business

partners to undertake specialized services. For financial institutions, one implication is the need to install a strong middleware to connect core legacy systems to the outside world of specialized service providers.

Open banking is emerging as a new reality in a number of jurisdictions, following the European Union's adoption of the Payment Services Directive 2 (PSD2). Open banking regimes enable financial service providers and users to access data across a network of financial institutions using APIs. This has the potential to open the door to new entrants in the SCF market, enabling them to link with existing accounts of the businesses they seek to finance, both to acquire data to aid with risk evaluation and KYC, and also to leverage means of easily provisioning financing and collecting repayment.

Distributed Ledger Technology (DLT) Applications

DLT systems are in the early stages of development. DLT combines digital storage and hosting, connection advances, and standardization to support a database where data and executable code co-exist in multiple locations in a secured way, with content immutable and non-reputable. Activities (e.g., transactions) are stored, encrypted, and further codify previous transactions by using a model of consensus to verify transactions. Blockchain is the dominant method of conducting these practices, with notable implementations of Bitcoin and Ethereum.

DLT characteristics are particularly apt to transferring asset ownership. The certainty that the original information from suppliers remains irrevocable and immutable avoids future complaints from rejected suppliers. Once created, the purchase order can be time-stamped to become a valid (and legally binding – a DLT feature available in the near future) document.

The ability to uniquely prove the ownership of goods in inventory flows is crucial. All activities may be made visible to external viewers, but sensitive data remains strictly confidential to authorized parties. The use of third-party logistics service providers, shipping carriers, and freight forwarders is fully regulated and automatically controlled by irrevocable and immutable smart contract execution.

For financial services, the notion of a shared but distributed ledger circumvents the necessity of financial institutions managing their own isolated ledgers. This can potentially reduce transaction friction and associated costs.

Smart contracts are one of the crowning applications of DLT. In a smart contract, terms and conditions are embedded within a ledger structure. This permits parties to "lock in" contract details for subsequent ledger entries, creating binding conditions by non-involved third parties, and enabling parties to set contracts with automatic triggers based upon prescribed conditions.

The flagship use case of blockchain DLT in trade finance is *TradeLens*, a joint collaboration between Maersk, the Danish container shipping company, and IBM.

As an immutable, secure, rich, and transparent shared network, the blockchain provides each participant with end-to-end visibility based on their level of permission. Each participant in the supply chain ecosystem can view the progress of goods through the supply chain, understanding where a container is in transit.

Each participant can also view the status of customs documents or bills of lading and other data. Detailed visibility of the container's progress through the supply chain is enhanced with the real time exchange of original supply chain events and documents. No one party can modify, delete, or append any record without consensus from others on the network.

Specific advantages of DLT to supply chain finance are:

System integration: Integrating firm systems along a supply chain is an arduous undertaking. A combination of blockchain and API techniques permits firms to enter into collaborations at different paces, making solutions increasingly robust as usage grows. While a centralized managed service model with an open API framework can achieve a comparable outcome, DLT is superior in matters of trust and information sharing, especially if elements in the supply chain serve competing interests (e.g., Coke/Pepsi) but share merchants and therefore benefit from visibility at the merchant level.

Identification and reputation: Without a universal identification or credit bureau, information needs to be available, accessible, and aggregated to get a fuller picture of firm history. Such information is often protected. Decentralized models offer flexibility for data owners to share on a discretionary basis with reduced risk of intermediaries exposing data for unintended purposes. Zero-proof methods are forming to alleviate this risk further by creating means of sharing data for a firm or transaction without necessitating more identifiable information be shared.

Codifying transactions: Invoice fraud and double invoicing are challenges to supply chain financing. By logging and verifying receivables/payables into a secured ledger, data can serve as an authoritative source for lenders who can "attach" agreements as security. This provides a high degree of risk mitigation (as long as use of the ledger mechanism is broadly understood). While a centralized model such as a national e-invoice hub is comparable, a decentralized ledger model affords other innovations, such as the bundling and securitization of codified agreements (i.e., smart contracts).

Tracking goods: Combined with the ability to integrate across systems, tracking/monitoring SCM aligned to chain of custody of stock can greatly reduce delays and paperwork expenses that ultimately account for 7% of the value of the global value of trade alone[22]. United Parcel Service (UPS) illustrates the value blockchain can have, for example, in the shipment of flowers from Mozambique to Europe, where chain of custody along the journey changes 33 times and where each day of delay can have notable consequences for perishable flowers.

Data aggregation: Accumulating sufficient data to assess risk is the greatest barrier for supply chain finance for SMEs. Competitive and proprietary pressures that block data access from financiers may be alleviated through distributed ledger techniques.

Smart contracts have applications to both upstream and downstream practices with the potential to reduce administrative and governance burdens, as well as the costs of authentication. Smart contracts can also provide a platform for shared contribution, granting access to third parties (e.g., financial institutions) to selective information on receivables/payables.

For established institutions to integrate these solutions into legacy operations, middleware concepts are emerging that link legacy and disparate systems into these distributed ledgers.

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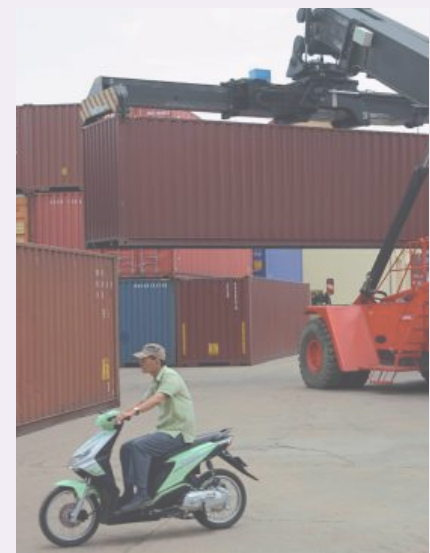
[22] Blockchain: Opportunities for Private Enterprises in Emerging Markets. IFC, 2017. (https://www.ifc.org/wps/wcm/connect/publications_ext_content/ifc_external_publication_site/publications_listing_page/blockchain+report)

SUCCESS RATE OF RELATIONSHIP CHECK

SOURCE: INNOVATION AND THE FIGHT AGAINST FINANCIAL CRIME 2019 REPORT

Check	Which checks do you undertake when onboarding?	How successfully conducted is this check?
KYC on the identity of clients	53%	46%
KYC verification of client data	46%	35%
Screening against sanctions	38%	25%
Their suppliers or relationships	37%	23%
Enhanced due diligence	35%	23%

REFINITIV
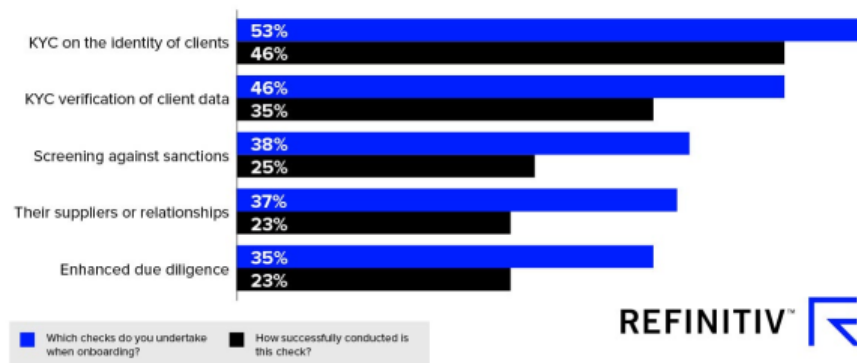
Identity Management and Verification

Reliable identity verification is perhaps the greatest barrier to accessing financial services[23]. A core identification capability alleviates risks of fraud by verifying the sellers behind receivables and gaining assurances of valid payables from verified buyers. For anchor enterprises new to a market, this information can ease buyers into the market and accelerate new local sourcing.

Compliance around Anti-Money Laundering and KYC regulations is a challenge for many financial institutions when it comes to onboarding new clients. According to a study by Thompson Reuters[24], the average time to onboard a new client currently sits at 26 days (the longest reported time was in Australia, at 63 days). Thorough identity verification (KYC) is associated with high costs, as regulators put the onus on financial institutions to not only verify the identity of the account holder, but also the origin of the fund. The financial institution must be in a position to verify that funds were not illegally acquired or utilized for illegal businesses. If they fail to conduct proper KYC, banks are at risk of receiving significant fines from regulators. Complying with KYC/AML and CFT regulations comes at a significant cost, which can be a barrier of entry. Likewise, financial institutions who have made these investments are unwilling to share customer information with competing financial institutions.

Technology can partially reduce the cost associated with AML/KYC/CFT. In addition, open banking policies mandating financial institutions transfer power to consumers for their accounts and associated information are breaking down these barriers. They are also making it possible for third parties to appeal directly to consumers with new financial services that augment data possessed by financial institutions with complimentary information, in order to offer supply chain finance in tandem (or in competition) with the financial institution.

The Aadahaar model in India, a massive national centralized effort to gather and manage identification information to be provided as a public good, is removing this commonly shared barrier to entry and differentiator for financial service firms. This sort of capacity has also been a primary driver of China's success in accelerating financial service adoption. For those markets without a strong centralized mandate, there are equally interesting efforts to introduce models to decentralize the management of identification information. These models are enabled by the wave of blockchain shared database models that permit all parties (or in some cases designated parties), to contribute information pertinent to participating individuals and firms that is secured against manipulation. Efforts such as the open source Sovrin, championed

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[23] Gustin, David. Why Supplier Acceptance Rates Still Struggle with Traditional Bank Funded Supply Chain Finance. Spend Matters, 2018. (http://spendmatters.com/tfmatters/supplier-acceptance-rates-still-struggle-traditional-bank-funded-supply-chain-finance/)

[24] https://www.refinitiv.com/perspectives/

by service provider Evernym[25], and Cambridge Blockchain[26] are two of a multitude of efforts seeking to build the selective transparency necessary for individuals and firms to establish the credibility needed to attract new partners and financing.

In addition, digital verification is increasingly popular. Based on research conducted by IFC in early 2019, some 250 RegTechs provide solutions across the globe. For example, the World-Check Customer Risk Screener app provides an easy and intuitive way to connect customer data within the sales force customer relationship management platform (CRM), using trusted World-Check Risk Intelligence. Digital identity verification and screening is available and used by financial institutions. The benefits of digital identity solutions include:

- **Faster turnaround times, meaning FIs can onboard and serve more customers more efficiently.**
- **High levels of accuracy and better compliance, as manual keying errors are reduced.**
- **Enhanced security, as dated security features such as passwords and knowledge-based authentication are removed.**
- **Lower operational costs as a result of the efficient deployment of resources.**
- **A better customer experience as a result of faster turnaround times and fewer touch points.**

With supply chain financing, such efforts can satisfy incremental growth in the provision of finance solutions.

At early stages, financing may be of smaller amounts and shorter durations that are proportional to the degree of risk presented by information limitations. As more transactions are conducted across various partners and finance providers, information can be included by participants, building in-effect a decentralized credit bureau, leading to greater amounts of financing with riskier terms as borrowers are then more greatly incentivized to maintain the reputational standing they have built

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[25] The Sovrin Network is a decentralized identity network allowing people and organizations to create portable, self-sovereign digital identities.

[26] Cambridge Blockchain puts control of personal identity data back in the hands of end users. (www.cambridge-blockchain.com)

Managed Services and Platforms

4. Analytics
Big Data & Artificial Intelligence

3. Managed Services and Platforms
Software & Infrastructure
Platforms

2. Standardization and Interfaces
APIs
Distributed data management
Identity management & verification

1. Digital Infrastructure
Connectivity
Payments
Electronic invoicing

Supply chains employ intermediaries acting as brokers of freight and transportation assets, resellers, and other middlemen. This creates a situation where no single person or firm has visibility of the entire supply chain, which can result in price markups and redirecting inventories. In one example cited by Maersk, commodities traveling from East Africa to Europe can pass through the hands of 30 different people, requiring approvals and more than 200 separate actions[27].

Cloud solutions, DLT, artificial intelligence, internet of things, and automation are all among the digital innovations playing roles to reduce the costs of inefficiencies and leakage in logistics management (cargo theft alone can add an additional 20% to the cost of goods for consumers[28].) These can enable supply chain finance managers to monitor commitments and identify any deviation from the agreed plan. Such solutions mitigate costs and provide a rich set of data for future financing decisions; they also increase transparencies in previously informal activities, open access to more businesses, and help customize finance solutions to fit specific needs.

A financial institution looking to enter the SCF space has the opportunity to tap a full range of technology options including, for example, actively participating in independently managed supply chain finance platforms, outsourcing specific programs (e.g., supplier onboarding, credit scoring, or identity verification), or investing in Software as a Service (SaaS) managed service solutions.

Cloud solutions

Cloud data centers offer increased performance, higher capacity, and greater ease of management than traditional data centers. Virtualization serves as a catalyst for hardware and software consolidation, opening the door to opportunities to leverage APIs connect internal processes with cloud-based managed services platforms.

A managed service platform typically offers a financial institution the ability to outsource specific processes or functions to a third-party technology provider, instead of developing those services in-house. The decision to outsource services to a specialized third party is often driven by efficiency considerations, taking into account the investments that would be required to obtain the expertise needed to build such capabilities in-house, and the costs in maintaining up-to-date technology.

The development of customized SCF solutions as part of the ERP systems of leading corporate anchors is a typical example of a managed service application. Connectivity and the growth of cloud services in particular, has been instrumental in opening the door for such services to smaller corporate anchors in emerging markets, who have been shut out from ERP systems due to high upfront investment required and maintenance costs. As services become less complex and more user friendly, these firms no longer need specialized staff to manage complicated technology platforms.

For businesses of all sizes, movement to the cloud facilitates three types of outsourced managed services. The most common of these is SaaS, which outsources a specific function or functions to a third party, who then

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27 Moon, Mariella. Shipping Giants Test IBM's Blockchain Tech to Track Cargo. Engadget, 2017. (https://www.engadget.com/2017/03/07/maersk-shipping-ibm-blockchain/)

28 Patel, Deep. UPS Bets on Blockchain as the Future of the Trillion-dollar Shipping Industry. Techcrunch, 2017. (https://techcrunch.com/2017/12/15/ups-bets-on-blockchain-as-the-future-of-the-trillion-dollar-shipping-industry/)

Figure 25: Cloud Solutions

Software as a Service (SaaS)	Platform as a Service (PaaS)	Infrastructure as a Service (IaaS)
■ Applications	▫ Applications	▫ Applications
■ Data	▫ Data	▫ Data
■ Middleware	■ Middleware	▫ Middleware
■ Operating System	■ Operating System	▫ Operating System
■ Virtualization	■ Virtualization	■ Virtualization
■ Servers	■ Servers	■ Servers
■ Storage	■ Storage	■ Storage
■ Networking	■ Networking	■ Networking

▫ Cloud customer manages   ■ Cloud provider manages

Source: *Cisco Global Cloud Index, 2016–2021*

provides and maintains the software and the services necessary to support users/customers. For businesses that have more embedded and interdependent software functions, the Platform as a Service (PaaS) model may be preferred. PaaS only outsources the technological aspects required to host the solution and manage the supporting infrastructure — and not the management of the functional applications and data. Finally, for firms preferring to manage their systems and software internally while also having those capabilities hosted in the cloud, the model of Infrastructure as Service (IaaS) leaves only the management of capacity and the most foundational layers of software to a cloud provider.

All three models are designed to hand to an external service provider the management of, respectively, a financial institution's/company's software applications, platform, or IT infrastructure. The choice to adopt either model depends on the propensity of the financial institution/company to retain control or confidence to hand it to an external service provider. The optimal business model depends on individual factors of need, firm capability, and strategic direction – and may ultimately employ a mix of these models.

Supply Chain Finance Platforms

SCF platforms typically are a tool to facilitate the interaction of multiple anchors, suppliers and/or distributors as possibly funders, under one common user interface. Platforms can be designed to include several features, but the primary aspect of one such platform would be the tracking of invoices and payment flows. Functions such as onboarding and customer identification, transaction and payment record-keeping, verification and analytics, are common platform features.

These platforms hold promise for SCF cases where traditional software solutions are tailored and sold to large anchor or financial institutions. Emerging models, developed by FinTechs as well as traditional ERP vendors, engage a broader ecosystem of supply chain participants without depending on the acquisition of corporate anchors typically at the center of SCF programs[29]. The example below stylizes the relationships managed by a SCF platform establishing a marketplace for invoice financing across one or more banks. GT Nexus is an IFC Partner and provider of the cloud-based collaboration platform that IFC clients use to automate their supply chain processes on a global scale, and resolve short-term financing needs.

Acceptance of third-party technology solutions by a financial institutions' clients allows the finance sector to rely on the technical expertise of institution-independent (but potentially institution-operated) financial intermediaries (a.k.a. SCF platforms) and refocus efforts and resources on evaluating risk and providing funding to clients. At the same time, non-bank intermediaries can offer more flexibility where client onboarding is concerned, which means they are well placed to play a role in closing the funding gap.

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[29] Sources: Supply Chain Finance Payable and Receivable - Global Business Intelligence Corp.

Figure 26: GT Nexus

Buyer confirms acceptance (Payment Authorization Document (PAD))

2

Buyer

6

Buyer pays invoice through GT Nexus at maturity

GT Nexus

Platform Settlement Service (PSS) at JP Morgan Chase

GT Nexus sends payment to the supplier

5

1

Supplier

Supplier creates e-invoice on GTNexus and selects financing for the invoice (in case of auto setup, all invoices are selected for financing).

IFC receives funds at maturity from GT Nexus

7

4

3

IFC

GT Nexus sends the supplier's funding request to IFC

IFC reviews funding request and upon approval sends payment to PSS

Bank-independent platform providers have solved pain points surrounding usability, process automation, technical integration and international expansion. The Software-as-a-service (SaaS) applications remove hardware or expensive software licenses, so buyers can focus on the evaluation of the operating expenditures. By using demo-platforms, buyers can test and verify if the web-based SaaS application does in fact meet their requirements. Buyers, for instance, can perform proof-of-concept projects and can use these real-life results as the basis for their vendor selection process, instead of relying on second-hand information provided by vendors during the old 'request-for-information' evaluation process.

Technology has also led new entrants into the financial service space, where multinational organizations, BigTechs, FinTechs, and payment service providers are establishing a presence in the financial services value chain and redefining the customer experience. As a result, a growing share of financial institutions are adopting digital solutions or partnering with technology firms to improve efficiency and make better, faster lending decisions. Such innovation is enabling financial institutions to make credit decisions on first time customers (via data analytics) and providing SMEs with tools to improve business and payment performance.

While these innovations are enabling more SMEs to access financial services and integrate into domestic and international supply chains, further integration of funders requires a sufficient regulatory environment. This would include, among others, laws and regulations around invoicing and factoring, as well as the use of movable assets and collateral registries.).

In all cases, digital innovations tend to be a continual improvement in the robustness of previously designed solutions. A financial institution may seek a plan to develop its SCF practice by diagnosing current technology capabilities and ascertain the priorities to fulfill customer needs.

Figure 27: Orbian Financial Services

> Platform that enables buyers to set up financing programs for their suppliers. The buyer selects lenders to participate in the program. Suppliers are then able to sell their receivables (for that buyer) and obtain accelerated discounted payment. Recognized as 'The Best Payables Supplier-Financing Solution Provider 2013 by Global Finance Magazine.

Key Differentials	SCF Solution

Key Differentials

- Funded by networks of banks and investors, Orbian provides both a proprietary platform with 6-sigma operating performance and a universal funding model that provides suppliers with continuous access to the lowest cost funding for all their confirmed receivables.

- Orbian finances its purchases of suppliers' receivables by issuing notes in the market, which are generally bought by foreign banks and investors.

- One of the key differentiators of Orbian's platform is that suppliers do not engage directly with funders. This can take some of the complexity out of the equation for suppliers with Orbian sitting in the middle, buying the receivables and selling notes to potential investors.

SCF Solution

Supplier

Buyer

Supplier

Supplier

Orbian Financial Services

SCF Investor #1 — SCF Investor #2 — SCF Investor #3

The Model at Work

- The Orbian program allows the exchange of banks without impacting the supplier.
- Almost every bank or any other investor can join, increasing the available funding and increasing the competition between liquidity providers.
- Never any dependency by suppliers on individual funders.

Analytics

4. Analytics
Big Data & Artificial Intelligence

3. Managed Services and Platforms
Software & Infrastructure
Platforms

2. Standardization and Interfaces
APIs
Distributed data management
Identity management & verification

1. Digital Infrastructure
Connectivity
Payments
Electronic invoicing

Data Analytics

Access to data is a competitive asset. However, it is meaningless without the ability to interpret it and use it to improve customer centrality, drive market insights and extract economic value. Data science has been defined as 'an encompassing and multidimensional field that uses mathematics, statistics, and other advanced techniques to find meaningful patterns and knowledge in recorded data'. Traditional business intelligence (BI) tools have been descriptive in nature, while advanced analytics use existing data to predict future customer behavior.

The increasing complexity and variety of data has led to the development of new analytical tools and methods able to process the data for insights. The intersection of data and their relevant analytic tool set falls broadly under the emerging field of data science[30].

Credit ratings have historically been the key for financial providers to assess risk. In many cases, it is the buyer's credit rating that counts most, though it depends on more factors than how reliable a supplier is in delivering goods or how reliable a buyer is in paying on time. Proven transaction history is what lenders prefer to base their decisions and rates upon. With data analytics they now can, like Seabury TFX, create a program that offers suppliers financing based on their performance data on a cloud platform from GT Nexus, a managed services provider[31]. Seabury leverages the cloud-based network detailed transaction history and can set terms based completely on how a supplier or buyer performed historically, without resorting to credit rating. Metrics like on-time payments, order performance, late shipments, canceled orders and chargebacks determine a reliable dataset to construct a supply chain counterpart's risk profile.

Financial institutions need data to segment all supply chain finance constituents (i.e., buyers, suppliers, distributors, retailers, logistics operators) in order to know who to approach and how to approach them. Financial institutions acknowledge they must use data that go beyond spend data (e.g., payment term benchmarking; supplier's cost of debt). With more data available, a financial institution can operate as a reliable supply chain finance partner by adopting a working capital analytic tool to help companies assess their receivables, payables, and inventory flows – and the likelihood for an intervention. By integrating approved invoice data onto platforms, financial institutions can take a step further and predict fraud and detect supply chain threats.

The world of data analytics is exploding. No longer limited to reports specific to proprietary systems, new correlations can be discovered across new and increasingly sophisticated datasets. This has, for example, enabled distribution companies to take geo-location data from truck drivers' mobile phones and combine with order demands in order to optimize delivery routes and monitor employee performance. Financial institutions can access inventory data and monitor turnover to ascertain merchant performance and growth for determining working capital terms. In the world of credit risk assessment, developments are underway, starting with lower risk, low value consumer credit, to build risk models from datasets as novel as, for example, using phone-charging habits as an indicator of payback dependability.

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[30] Source: IFC Handbook Data Analytics

[31] GT Nexus Redefines Supply Chain Finance With Big Data, accessed July 2019, https://www.seaburycapital.com/gt-nexus-redefines-supply-chain-finance-with-big-data/

Advances in machine learning and artificial intelligence are accelerating these trends. Combined with cloud computing, managed services, and API trends, this level of capability is now accessible to services designed to meet even the smallest firms. Complex capabilities, such as face and image recognition, are now independent services that can be 'plugged into', with pricing models based on usage, instead of the exorbitant upfront capital expenditure models that historically limited widespread adoption.

Thanks to the digital trend of standardized system interfacing through APIs, disparate sets of data can be more readily accessed and combined to derive new insights on risk. New machine learning methods can also find correlations to risk, using data not previously considered useful for the purpose. Financial institutions capture and analyze events in the physical supply chain to generate a more profound and realistic representation of a company's risk profile. This goes well beyond the set of performance indicators that a bank's credit scoring office currently uses to analyze that same company's financial statements. The risk will be distributed across the group and will be transferred from the anchor to all participating trading companies. Data capture and analysis of the operational performance of the supply chain network's constituents will represent the collateral for a supply chain bank.

Data Analytics and Methods

BIG DATA is typically the umbrella term used to describe the vast scale and unprecedented nature of the data that are being produced. Big data has five characteristics:

1. VOLUME: The sheer quantity of data currently produced is mindboggling. The maturity of these data are also increasingly young, meaning that the amount of data less than a minute old is rising consistently. It is expected that the amount of data in the world will increase 44 times between 2009 and 2020.

2. VELOCITY: A large proportion of the data available are produced and made available on a real-time basis. Every minute, 204 million emails are sent. As a consequence, these data are processed and stored at very high speeds.

3. VARIETY: The digital age has diversified the kinds of data available. Today, 80% of the data that are generated are unstructured, in the form of images, documents and videos.

4. VERACITY: Veracity refers to the credibility of the data. Business managers need to know that the data they use in the decision-making process are representative of their customers' needs and desires. It is therefore important to ensure a rigorous and ongoing data cleaning process.

5. COMPLEXITY: Combining the four attributes above requires complex and advanced analytical processes. Advanced analytical processes have emerged to deal with these large datasets.

For more details refer to IFC Handbook on Data Analytics

Figure 28: Data Analytics and Methods

	Descriptive	Diagnostic	Predictive	Prescriptive
Techniques	Alerts, querying, searches, reporting, static visualizations, dashboards, tables, charts, narratives, correlations, simple statistical analysis	Regression analysis, A/B testing, pattern matching, data mining, forecasting, segmentation	Machine learning, SNA, geospatial pattern recognition, interactive visualizations	Graph analysis, neural networks, machine and deep learning, AI

Descriptive Analytics
- What happened?
- What is happening now?

Reports

Diagnostic Analytics
- Why did it happen?

Traditional BI

Modeling

Predictive Analytics
- What will happen in the future?

Integrated systems

Prescriptive Analytics
- How can we make it happen?

Competitive Advantage

Information — Optimization

Complexity of Analytics

Source: *IFC Handbook Data Analytics*

Box 3
E-Commerce and Supply Chain Finance

E-commerce is only beginning to tap its potential. China, the world leader in e-commerce, still only sees 23% of its retail sales conducted via e-commerce; the US is at a meager 13% (75% of which is controlled by Amazon)[32].

In India, from 2014 through 2016, the number of online buyers rose seven-fold, to between 80 million and 90 million. Digitally influenced spending, currently $45 billion to $50 billion a year, is projected to increase more than ten-fold, to between $500 billion and $550 billion – and to account for 30% to 35% of all retail sales – by 2025[33]. In countries with poor distribution and unorganized retail, e-commerce has provided a platform to spawn business model disruptions leapfrogging traditional models of sales and distribution. Early examples like the first days of Alibaba in China and Flipkart in India created a marketplace where independent practitioners, ranging from distribution firms to an individual with a bicycle could bid for work to deliver orders[34]. These commerce platforms have since evolved and invested heavily in their own distribution networks, moving in a reverse progression to offline retail networks through acquisition to support both sales and distribution.

This means that in countries like China and India, where efficient retail networks were absent, platforms exist that can more readily bring together buyers, sellers and financiers, tackling multiple challenges to SCF efficiency, transparency for management, and new sources of data for assessing risk. Further, these platform providers are in position to introduce a broader set of managed services to aid even the smallest businesses with their management practices and supply chain involvement, ultimately driving better qualified demand for supply chain finance[35].

An interesting way of how financial technology is making its way into supply chain finance is shown by China's e-commerce platform Alibaba. Traditional e-commerce platforms in developing economies allowed for transfer of cash, which is not the most common payment method for most large buyers and business-to-business operators. A bills pool service was created to solve this problem, utilizing bank acceptance bills as a form of payment.

Financial institution acceptance bills—also known as acceptance drafts—can be kept by the receiver until maturity, functioning much like a post-dated cheque. These drafts can also be traded prior to maturity at a discounted rate by receivers looking for extra liquidity. By uploading the acceptance drafts on Alibaba, platform member companies have two options: they can make and receive payments using China Merchant Bank's digital bank acceptance bills, or they can choose to make cash transfers by Alipay. This is the first time Alibaba has been involved in a supply chain finance solution with the bank.

Following this initiative, Alibaba has further expanded the model to other countries in Asia, partnering with more than 25 banks and credit rating agencies globally to provide cross-border trade financing for SMEs as well as a new credit reporting service[36].

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[32] Meeker, Mary. Internet Trends 2018. Kleiner Perkins, 2018. (https://www.kleinerperkins.com/perspectives/internet-trends-report-2018)

[33] Mendonca, Jochelle. 50% of India's internet users will be rural & 40% will be women by 2020: BCG. ET, 2017. (https://economictimes.indiatimes.com/small-biz/sme-sector/50-of-indias-internet-users-rural-40-will-be-women-by-2020-bcg/articleshow/59802340.cms)
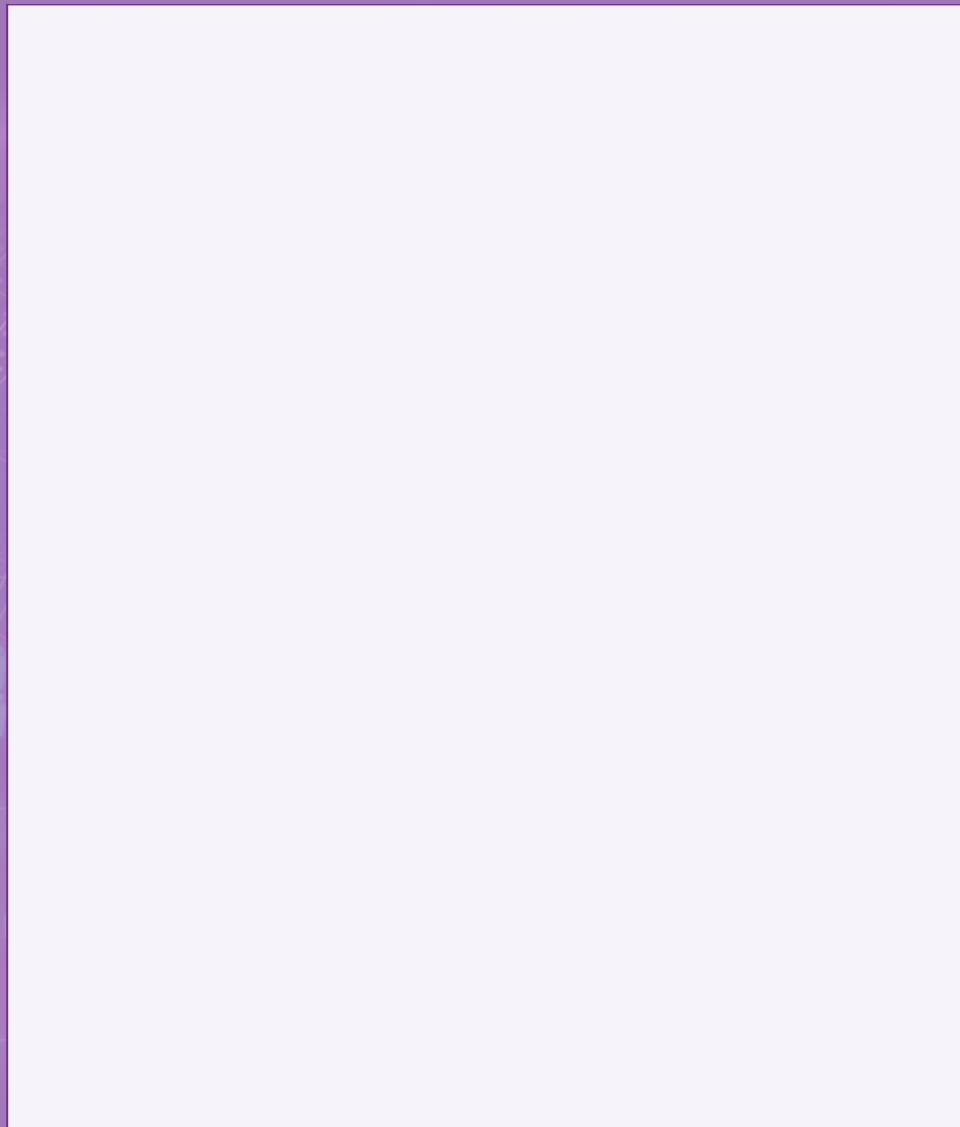
and Singhi, Abheek and Parul Bajaj. Decoding Digital Consumers in India. BCG, 2017. (http://image-src.bcg.com/Images/BCG-Decoding-Digital-Consumers-in-India-July-2017_tcm20-166292.pdf)

[34] Gogovan and Lalamove are examples of crowd-sourced distribution models that have emerged.

[35] Alibaba and SAP Deepen Global Partnership to Accelerate Intelligent Enterprises in China. SAP, 2018. (https://news.sap.com/2018/09/alibaba-and-sap-deepen-global-partnership-to-accelerate-intelligent-enterprises-in-china/)

[36] China's Alibaba partners with banks, agencies to introduce B2B financing and rating services, accessed July 2019, https://www.scmp.com/tech/e-commerce/article/1900654/chinas-alibaba-partners-banks-agencies-introduce-b2b-financing

Notes

SECTION 4

Leveraging Technology in Supply Chain Finance Instruments

This section discusses the different financial instruments commonly used in supply chain finance. It maps out the risks and challenges related to the different instruments, as well as how each instrument is affected by technology. The section provides practical examples of applying technology solutions to instruments for different stages of the supply chain finance cycle, for both the buyer and the supplier side.

Defining the Nature Supply Chain Finance Instruments and Technology Application

Supply Chain Finance structures are interrelated. They are designed to bind together the actors along the physical supply chain as well as to trigger underlying contracts/purchase orders, invoices, sales and distribution agreements. Each SCF product variant targets different stages, such as procurement or sales, pre-shipment or post-shipment actions, and types of customers (i.e., buyers or sellers, risk profiles, and size of enterprise).

The automotive sector is a good example to exhibit relationship and dependency of supply chain partners. These include suppliers of parts and raw materials (e.g., steel or plastic components) auto distributors, and part shops, all selling to the end consumer.

Due to the specialized nature of the auto industry, original equipment manufacturers (OEMS) continuously track their suppliers to assess their capabilities to support changing specifications and new car models. Similarly, dealerships and service centers have a critical role in sales, customer experience, and post-sales services. The mutually beneficial relationships of the OEM across the supply chain are essential to ensure that every participant performs effectively and fulfills its obligations.

There is significant value in reviewing a company's physical and financial supply chain. Technology helps automate the process of exchanging this information and other related interactions. It also helps financial institutions reduce cost of processing, improve visibility, efficiency, and manage risk in SCF instruments.
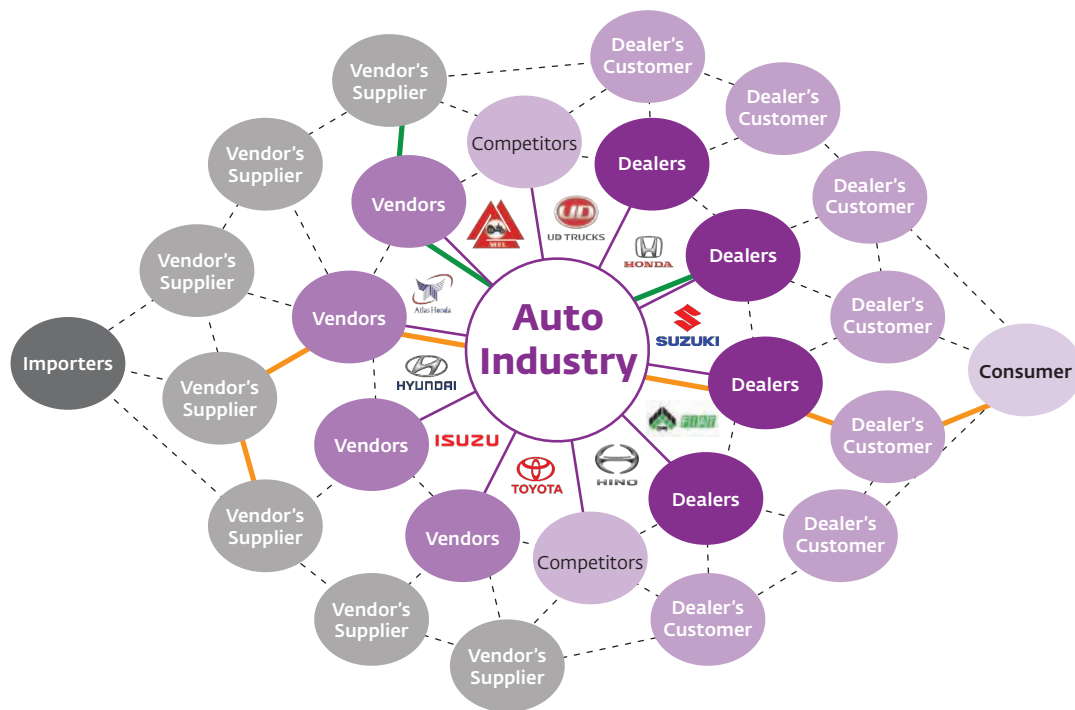
Suppliers and distributors require stable resources and capital to cope with growing and changing business dynamics. If a supplier's or distributor's cash is locked up in inventories and receivables, they cannot do more business. By easing the working capital burden of the suppliers and distributors, companies can continue operations and accelerate growth and stability. The most appropriate SCF instrument should address the needs of a given actor with a clear value proposition in mind. Figure 29 shows the broad objectives of supply chain areas and their corresponding solutions provided through SCF instruments.

Figure 29: Objectives of Supply Chain Finance Instruments

	Business Objective	Example SCF solution	SCF "Customer" within Anchor
Sales	Increase Sales	Corporate offers inventory finance to distributors (Distributor Finance)	Sales or Distribution
COGS	Reduce unit costs Ensure continuity of supply	Corporate offers purchase order finance to supplier	Procurement
Accounts Receivable	Improve cash conversion/liquidity	Reverse Factoring	Finance & Procurement
Accounts Payable	Extend payment terms	Corporate offers payable finance to suppliers	Finance & Procurement
Inventory	Manage inventory levels and holding cost	Warehouse finance Inventory finance	Procurement Inventory Manager

Source: IFC research and analysis

CFOs and treasury departments have challenging working capital targets to reduce Days Sales Outstanding and/or increase Days Payable Outstanding to lower Cost of Goods Sold/Purchased, or to negotiate longer supplier credit terms. In order to achieve a company's growth targets, supply chain finance should ideally support procurement efficiencies and/or sales/distribution. The impact of strategic decisions in the physical supply chain on working capital can also be understood via a transaction flow between buyer and seller, as illustrated in Figure 30. This is a simple representation of physical flow of goods, an information flow of processes, and financial flows that occur throughout a supply chain process. The transaction flow starts from the suppliers moving purchase orders to the distributors who are selling the products to end consumers. The mapping highlights trigger points where each physical flow creates or requires working capital to perform the obligations by respective parties.

Pre-shipment finance requirements are established upon issuance of a purchase order (PO). Financial institutions lend a certain percentage of the PO so that supplier working capital requirements can be met. Similarly, events like verification, quality assurance of shipments, invoice issuance, and approvals trigger post-shipment solutions, such as receivable discounting, and approved payable finance.

Fundamentally, SCF structures are transaction-based, where actual sales and purchases of goods and/or services are involved. A corporate Original Equipment Manufacturer (OEM) buys from its suppliers and financing is provided to suppliers as a source of early payment. It finances only that part of the transaction, which has been accepted for payment at a future date. The network of a supply chain consists of a large number of SMEs who may have weak capital structures and limited access to financing. During liquidity pressures, SMEs sometimes demand advance payments or support from corporates to manage their working capital. On the other hand, SCF programs are sometimes initiated by the corporate entity in order to support their supplier's working capital, their sustainability, and ultimately their performance.

Figure 30: Flow of Goods, Information and Capital
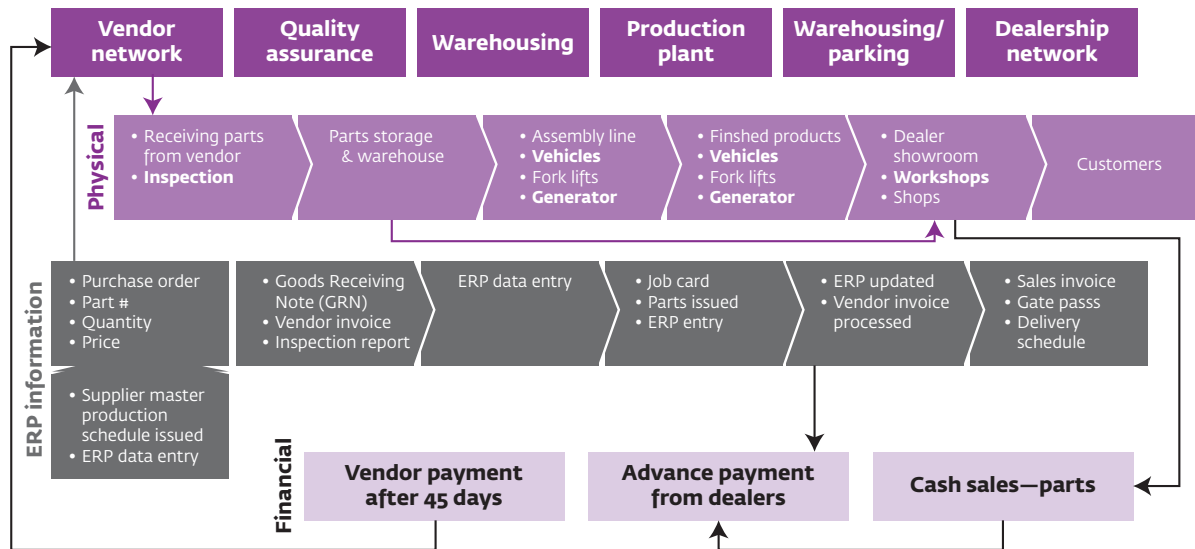
In a typical example of meeting working capital targets using a payable finance structure, the objective of an anchor buyer is to extend account payable (AP) as much as possible in order to optimize their working capital. However, in the extended payment terms scenario, suppliers may have financial difficulties (i.e., limited access to short-term financing and a higher cost of funds). Longer payment terms to suppliers, coupled with high costs and limited availability of finance, could result in a financially unstable and higher-risk supply base. Therefore, extending Days Payable Outstanding (DPO) may become unsustainable for suppliers over a longer period.

A supplier's financial performance would improve by receiving early payments. Lower DPO/early payment terms are considered to provide a stable supply base to the respective industry. The Anchor Buyer is often faced with trade-offs between maintaining a healthy supply chain and liquidity. Production may be constrained if suppliers lack working capital, and sales may be constrained if buyers lacks working capital. To mitigate this scenario, anchors will often extend early payment options programs or loans to their suppliers.

On the distribution side, the aim is to meet working capital needs as well as increase the purchasing capacity of distributors, wholesalers and retailers. The anchor, who is a large supplier/manufacturer/processor, aims to reduce days sales outstanding (DSO), to strengthen relationships with distributors and buyers to achieve higher sales and to maintain network liquidity. These objectives are achieved either through selling/discounting receivables to financial institutions, or by implementing a programmatic approach with financial institutions to directly finance the distributors. Financial institutions typically run lending programs based on the commercial and financial strengths of the anchor. The anchor shares information regarding its buyers and distributors, such as sales history, payment behavior, delayed payments history, seasonality impacts, etc. with the financial institution. This helps the institution define risk acceptance criteria and maintain counterparty limits.

Figure 31: Criteria for technology selection

Automation	Simplicity	Scalability
Key Features		
• Speed of transactional flow • Data collection from physical supply chain flows • Reporting functionality • Integration with the core banking system	• Intuitive interface • Structured workflow, easy accessibility by all parties • Flexible connectivity to various core systems	• Ability to scale up transactional volume • Efficient problem solving with integration and operationalization • Ability to extend offering to more than one product
Key Benefits		
• Increased productivity • Timeliness of invoice delivery • Multi-party transaction visibility • Efficiency	• Ease of use for ultimate user • Minimum level of training required for staff and trade counterparts.	• Reduced number of errors • Unconstraint business growth

There is significant value in reviewing a company's physical and financial supply chain. Technology (e.g., the use of multiple channels including portals, ERP, mobile devices, etc.) helps automate the process of exchanging this information and other related interactions. It also helps financial institutions reduce cost of processing, improve visibility, efficiency, and manage risk in SCF instruments. Figure 30 draws automation opportunities along the flow of transactions.

Automated processing and integration speeds up transactional flows and data collection and provides multiple channels for interaction between parties, including mobile use for SMEs, host-to-host connectivity for larger companies, and integration with the core banking system's straight through processing environment.

Apart from achieving process efficiency, technology and digital connectivity support client acquisition, onboarding of spokes, risk management, and monitoring activities. Technology-driven SCF solutions greatly enhance management of SCF programs to help achieve the scale and efficiency needed to run a scalable and profitable business. There are three broad KPIs for an effective SCF technology application, as noted in Figure 31 above.

The following matrix divides applicable instruments into two categories: those useful for suppliers, and those for buyers, and shows the technological innovations that can be applied to almost any instrument or actor. The matrix also maps out the instruments and notes the associated risks and challenges, as well as applicable technology solutions.

Figure 32: Categorization of Supply Chain Finance Instruments

	SCF Financial Instruments	Challenges to Deploy Instruments and Risk Mitigants	
Supplier	**Receivables Discounting**	*Challenges:* • Seasonality of cash flow payments • Weather related risks *Risk Mitigants:* • Buyer history; crop/weather insurance	
	Pre-shipment finance/ PO Financing	*Challenges:* • For pre-shipment finance: banks are risk averse to take performance risk • Financing farmers: banks worry about limited access to markets, crop price volatility, low crop diversification, and lack of costs and revenue records. *Risk Mitigants:* • Lower credit risk by taking into account trading history (performance & track record); engaging anchor to provide guarantee, or structure risk share mechanisms • Technology to have accurate data on location of goods and shipping status including shipment, arrival at destination, inspection at destination, delivery to buyer and/or acceptance of goods by the Buyer (approvals of invoice), and returns (i.e. monitoring of dilution levels)	
	• **Pre-shipment finance (Purchase order (PO) Financing)** • **Receivables Discounting** • **Factoring** • **Payable Finance (Reverse Factoring)** • **Forfaiting**	*Challenges:* • For pre-shipment finance: banks are risk averse to take performance risk *Risk Mitigants:* • For pre-shipment finance: lower credit risk by taking into account trading history; engaging anchor to provide guarantee, or structure risk share mechanisms • For Factoring: direct contact with the buyer and active follow up on collections • For Payable Finance: sale of approved invoice only; irrevocable undertaking from Corporate • For Receivable Discounting: diversification, recourse, first loss • Technology to have accurate data on location of goods and shipping status including shipment, arrival at destination, inspection at destination, delivery to buyer and/or acceptance of goods by the Buyer (approvals of invoice), and returns (i.e. monitoring of dilution levels)	
Anchor	**May be dependent upon anchor buyer willingness to participate in receivable-backed financing from funder**	*Challenges:* • Tradeoff of enabling suppliers and maintaining healthy supply chain vs maximizing own working capital. Production may be constrained if upstream lacks working capital, and sales may be constrained if downstream lacks working capital. May be willing to help strategic partners obtain working capital, for pre-sale finance (suppliers) or for purchases (distributors) *Risk Mitigants:* • Everyone need to maintain the relationship so will go the extra mile to avoid being cut off; large enough to have access to finance; able to push risk onto others even if sharing liquidity"	

Technology Solution
1. Mobile financial services: transaction data digitized; building history for risk assessment; means for rapid payments.   2. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs   3. Data Analytics: to assess risk of buyers based on performance history, crop types, farm size and location, weather conditions etc
1. Mobile financial services: transaction data digitized; building history for risk assessment; means for rapid payments   2. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs   3. E-Commerce: platform for invoicing, data capture/analytics, access to financial institutions   4. Identity management and KYC: Relational analysis for risk assessment using social network platforms; reduced double financing; ease new account opening "
1. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs   2. Application Program Interfaces (APIs): eases interaction with SCF partners, reduce overhead costs for adaptation of systems, enables third-party application development and low-cost integration   3. Managed Services (SaaS), Platforms (PaaS) and Infrastructure (IaaS): platform communication protocol standards facilitate the exchange of data and documents that trigger SCF services and instruments   4. Data Analytics: categorize risk level of counterparty to tailor best-fit SCF proposition; determine key drivers (e.g., revenue, geographical location, industry sector) of supply chain trading parties to establish thresholds for successful SCF delivery; review SCF performance to identify instruments and services profitability
1. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs   2. Application Program Interfaces (APIs): eases interaction with SCF partners, reduce overhead costs for adaptation of systems, enables third-party application development and low-cost integration   3. Managed Services (SaaS), Platforms (PaaS) and Infrastructure (IaaS): platform communication protocol standards facilitate the exchange of data and documents that trigger SCF services and instruments   4. Data Analytics: categorize risk level of counterparty to tailor best-fit SCF proposition; determine key drivers (e.g., revenue, geographical location, industry sector) of supply chain trading parties to establish thresholds for successful SCF delivery; review SCF performance to identify instruments and services profitability

	SCF Financial Instruments	Challenges to Deploy Instruments and Risk Mitigants	
Buyer	• **Loan or Advance against Receivables** • **Distributor Finance** • **Loan or Advance against Inventory**	*Challenges:* • Bank risk appetite to take 'distributor' credit risk *Risk Mitigants:* • For Distributor Finance: diversification, Corporate 'Stop Supply' agreements, first loss mechanisms, credit insurance • Technology to have accurate data on unutilized credit limits by distributors engaged in the program, location of goods and shipping status including shipment, arrival at destination, inspection at destination, delivery to distributor and/or acceptance of goods by the distributor, and returns (i.e. monitoring of dilution levels)	
	• **Open account purchasing terms** • **Merchant cash advance** • **Loan or Advance against Inventory**	*Challenges:* • Bank risk/distributor appetite to finance the small merchant/retailer is traditionally low • Many of the transactions of small merchant/retailer are made in cash and in some countries there is high levels of informality in the business practices • For loan advance against inventory, banks usually have limited appetite and capacity to accept movable assets as collateral given high costs to monitor inventory levels, lack of knowledge to value inventory in a standard format, and problematic mechanisms for collecting & reselling inventory in case of default *Risk Mitigants:* • Technology to have accurate data on shipments and acceptance of delivery, inventory stock turnover, and merchant transactions • In countries with modern secured transaction laws and movable collateral registries, ability to use legal infrastructure to pledge movable assets "	

	Technology Solution
	1. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs
	2. Application Program Interfaces (APIs): eases interaction with SCF partners, reduce overhead costs for adaptation of systems, enables third-party application development and low-cost integration
	3. Managed Services (SaaS), Platforms (PaaS) and Infrastructure (IaaS): platform communication protocol standards facilitate the exchange of data and documents that trigger SCF services and instruments
	4. Data Analytics: categorize risk level of counterparty to tailor best-fit SCF proposition; determine key drivers (e.g., revenue, geographical location, industry sector) of supply chain trading parties to establish thresholds for successful SCF delivery; review SCF performance to identify instruments and services profitability
	5. Analytics and credit scoring innovations: deriving risk assessment from inventory data; applying alternative source data to risk assessment; big data handling and business intelligence/ predictive features
	1. Mobile financial services: transaction data digitized; building history for risk assessment; means for rapid payments
	2. Electronic invoicing softwares: speeds processing, enables prompt triggers for acceptance/financing, stores and retrieves data to analyze sales behavior and anticipate future needs
	3. E-Commerce: platform for invoicing, data capture/analytics, access to financial institutions
	4. Identity management and KYC: Relational analysis for risk assessment using social network platforms; reduced double financing; ease new account opening
	5. Analytics and credit scoring innovations: deriving risk assessment from inventory data; applying alternative source data to risk assessment; big data handling and business intelligence/ predictive features
	6. Order/Inventory/Sales Management Systems: can provide visibility to inventory and to cash flows, enabling a lender to apply data analytics to form a credit view

In developing supply chain finance around one or several anchors, a financial institution needs to define the following for each anchor, irrespective of the application of technology in the provisioning of supply chain finance:

Target Market	Determine what accessible target market what financing problems or challenges need to be solved
Value Proposition	Describe the primary and secondary sources of value aligned to customer pains and gains
Customer Segments	Characteristics and defined pains and perceived gains for each customer segment; e.g. the primary supplier of an anchor and/or the supplier of the supplier
Key Activities	Define the fundamental tasks necessary to undertake to deliver and maintain the offered value proposition(s)
Key Resources	Determine the physical, intellectual, human and financial inputs required to deliver the value proposition(s)
Key Partners	Identify entities that are dependent for producing, delivering or maintaining the value proposition
Delivery Model	Determine how supply chain finance will be provided
Customer Relationship	The model of interaction with targeted customers (e.g. self-service, personal assistance, co-created)
Channels	Methods for how customer will be reached, acquired and served
Cost Structure	Fixed and variable costs of doing business as well as any regulatory capital required to be held
Revenue Streams	Priced products and serviced, for which a pricing strategy, and method of payment should be aligned with the offered value proposition(s)

Note: Tools provided in Annex 3 can be used to assess the appropriate instruments for different actors in the supply chain.

Leveraging technology in the receivable purchase category of supply chain finance

There are different types of products and solutions offered to suppliers with respect to receivable discounting, factoring and forfaiting, which enable discounted payments of account receivables. Receivable discounting also provides early payment options to buyers of their account payable that also help their suppliers (e.g., approved payable finance or reverse factoring).

Receivable purchase products are also used to support a company's risk mitigation and balance sheet management objectives. Unlike other traditional financial instruments (e.g., loans and advances), these products are generally structured on "true sales" of receivables, resulting in extinguishing receivables from the supplier's balance sheet and recognizing them as a sale. Simultaneously, buyers continue to treat their obligations as commercial payables under the normal course of business.

Most product techniques are entitled to leverage on a buyer's credit quality, which is better than its suppliers. This allows suppliers to receive more favorable financing terms than they could receive through an ordinary working capital credit line. Moreover, in buyer-led solutions, the anchor initiates the early payment program in favor of its suppliers to achieve its own working capital objectives by extending the payment terms. Other companies might obtain benefits that lower their cost of purchases through providing better cost of funds to their supplier base. These solutions enable suppliers and buyers to de-risk the balance sheet, obtain competitive funding, and improve their debt and gearing ratios. The strongest and best-implemented SCF programs create a win-win-wins for the buyer, supplier, and financial institution; If one party does not see the benefits, it will slow the program's adoption.

Due to the transactional nature of the products, an extensive exchange of information between the parties is required (invoices, credit notes, purchase/sale offers, notifications and approvals). These must be supported with a minimum amount of process automation that offers customer interactions using multiple channels including electronic portals, ERP H2H, mobile devices, and so on.

Figure 33: Supply Chain Finance Transaction Flow

1A: Goods shipped from supplier through Contract of Sale

Supplier — 1 2 6 → **Buyer**

B 3 — A → 4 5

1B: invoice submitted to buyer

3. Bank either purchases the invoice or transfers money at maturity

2. Invoice accepted and payment made at maturity

D E **Bank** ← C

Technology and Digitization Solution
A. E-invoicing —3, 4
B. Mobile banking — 1, 2
C. SCF platforms — 4, 5, 6
D. AI and digital scorecard — 5, 6
E. Blockchain solution — 2, 3, 4

Challenges
1. Outreach challenges
2. KYC challenges
3. Fraud challenges
4. Efficiency challenges
5. Credit risk challenges
6. Performance risk challenges

The typical flow of a transaction in receivable purchase products is shown in Figure 33. In the case of an environment fully integrated with a company's ERP, financial institutions can perform a straight-through process of financing and payment generation, while simultaneously handling a transactions threshold. Alongside mitigating the intrinsic credit risk present in counterparties, banks use technology to onboard smaller parties, and minimize fraud as well as KYC risk. Digitally connected programs play an important role in setting up lending eligibility criteria, and rules of transaction detect unusual behavior in transactions.

Figure 34: Mapping Solutions to Supply Chain Actors (Buyers)

	← Digital Channel Capacity →				
Segment	**Tier 2–3 Supplier Micro & Small**	**Tier 1 Supplier Medium**	**Tier 1 Processor**	**Domestic Anchor Buyers**	**Multinational Anchor Buyer**
Instrument	Receivable finance and factoring			Receivable finance and reverse factoring	
	Pre shipment finance				
Channel	Digitally extended network	Physical presence and personalized network			
				Account managers	
Customer relationship	Indirect through partners or digital services	Standardized direct			
				Personalized direct	
Key resources	Strong market knowledge and presence	Stronger analytics as value and length of financing increases			
				Strong commercial banking capacity	

Key considerations

A checklist list of key actions required to deliver supplier finance instruments, together with a comparison of the strengths and weaknesses of a financial institution's market position, can help highlight logical roles and/or gaps where digital solutions may play a role. The following are sample bank market position scenarios:

Figure 35: Market Review Checklist

Supplier supply chain finance instrument	Bank with limited market presence and key corporate relationships	Bank with good market presence and a many corporate relationships	Bank with deep market presence in select areas and no corporate relationships
Payables Finance	(+) Strongest connections to major buyers (-) Dependent upon buyers' knowledge of sellers	(+) May benefit from local relationships and knowledge (+) Potential to serve in partner capacity to established anchor banks or build relationship with anchor by purchasing payables	(-) Difficulty gaining traction with anchor institutions without comprehensive portfolio of service (-) Limited applicability as Payable finance requires strong anchor relationship (-) Limited SCF knowledge (+) Potential to serve in partner capacity to established anchor banks or build relationship with anchor by purchasing payables
Receivables Discounting	(-) Limited access to and awareness of emerging market sellers beyond the largest	(+) Well positioned to serve domestic sellers (+) Strong potential footprint to reach MSMEs if utilizing a branchless banking model extension.	(+) In depth knowledge of customers in regions served (-) Limitations to leverage anchor institution for SCF growth
Forfaiting	(+) Widely accepted promissory notes (+) Scale to bundle (+) Access to broader markets	(-) Limited and more homogenous receivable stock	(-) Less fungible instruments (-) Limited and more homogenous receivable stock No pre-existing SCF business to build credibility
Factoring	(-) Limitation in-market presence may impact ability to collect (-) Limited in- knowledge of MSMEs in market	(-) Collections obligations may be costly without market knowledge (+) Strong local knowledge (+) May be suitable	(+) Strong local knowledge

Leveraging technology in loans and advance based category of supply chain finance

This category of SCF products involves financing and advances to a buyer or seller involved in a supply chain for carrying or warehousing of goods or against receivables. The underlying assets are collateralized in shape of pledge, hypothecation, transfer of title, and possession to banks. These products include Distributor Finance, Loans/Advances against Inventory, and Pre-shipment Finance.

These facilities are typically used for funding inventory and receivables on a short-term basis. The underlying need of financing arises at various stages of conversion and the sales cycle. A typical network includes buyers such as distributors, wholesalers, and retailers. Financing is provided to buyers to meet their purchases or inventory holding period, especially if they have limited access to other sources of funding.

The technique is based on strong Interdependency between larger manufacturer (anchor) and its buyers. While the dependency of small and medium buyers on the anchor is for their livelihood and business continuity, the anchor's market share and growth is dependent on the health of the distribution channel. This interdependency, coupled with the "Partnership Approach" with the large manufacturer, is a key risk mitigant in these products.

The fast-growing e-commerce, m-commerce, and B2B models complement SCF instruments, with companies requiring financial institutions to support their SCF proposition with technology-led sales collection channels, mobile wallets, virtual cards, distributor cards, order management portals, and so on. The transaction flows resulting from SCF solutions should be supported by real time information flows that can be integrated within existing processes and systems, achieving straight-though-processing and digitization of transactions.

Figure 36 illustrates a typical flow of a loan category of the SCF solution for distributor finance. Digitization creates processing efficiencies and enables financial institutions to optimize their controls and measures in countering non-credit risk (e.g., with e-invoicing, which helps minimize fraud and money laundering risks, or mobile banking wallets, which are possible solutions for loan payments to counterparties that solve the outreach challenges of supply chain partners located far from branches).

Figure 36: Financial Flows in Distributor Finance

Technology and Digitization Solution
A. E-invoicing —3, 4
B. Mobile banking — 1, 2
C. SCF platforms — 4, 5, 6
D. AI and digital scorecard — 5, 6
E. Blockchain solution — 2, 3, 4

Challenges
1. Outreach challenges
2. KYC challenges
3. Fraud challenges
4. Efficiency challenges
5. Credit risk challenges
6. Performance risk challenges
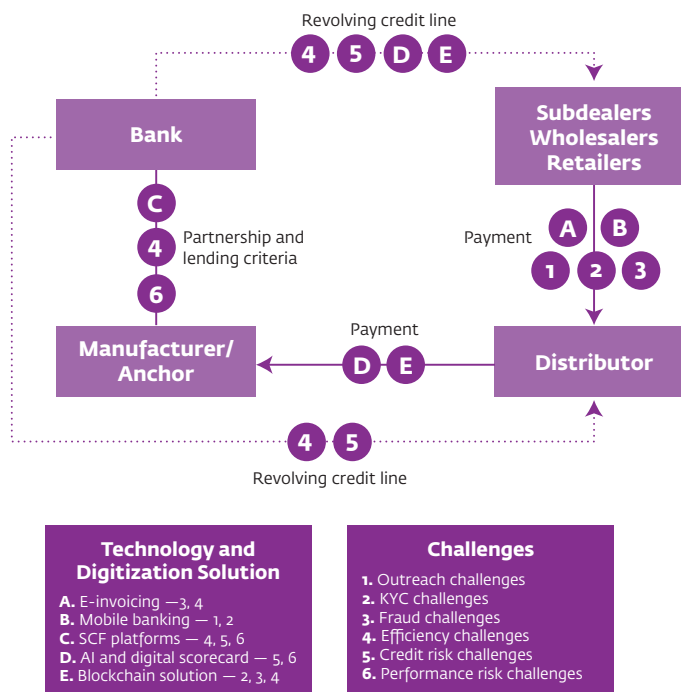
Technology also plays an important role for scalability and risk management. It can manage and streamline an entire transaction life cycle between the parties. It also supports monitoring and data management, which helps track key risks pertaining to fraud, credit, and the performance of the counterparty.

A financial institution's physical expansion can be an opportunity to support, and be supported by, SCF services, because institutions need to build accessible networks that increase account activity and encourage maintaining balances (e.g., by making it easier to withdraw and deposit cash as needed in cash-dependent economies through branchless/mobile banking). While some institutions may operate dedicated branchless networks (i.e., shops that only provide a certain institution's services and no other services), others may work with businesses that also provide agent services in addition to their ongoing concern. Dedicated networks are mainly feasible in urban or peri-urban locations where there is sufficient transaction volume and deposit taking to sustain a network. When population concentrations thin and/or income levels decline, branchless operations tend to piggyback on existing firm activities, providing supplemental income and increased foot traffic to the core business while acting as an agent for a financial institution as a side business.

Financial service providers have data on transactions, income, and turnover for businesses in the financial services sector. As it stands, all businesses supporting branchless or mobile banking need liquidity (as noted, a lack of working capital is one of the most common factors cited for holding back growth). Leveraging businesses to act as financial institution agents results in increased access to data, which can be further leveraged to facilitate credit decisions akin to distribution/buyer finance. In addition, when financial services to these firms utilize a digital channel, the increased usage of this channel by proprietors tends to influence consumers to also adopt digital services. One of the highest correlating factors influencing a consumer's decision to utilize digital financial services is knowing someone already using that service, thereby leveraging that interpersonal trust.

Thus far, digital financial services that have targeted the consumer by offering merchant-located digital payment services instead of supporting the needs of the merchant have not shown the desired uptake. For some financial institutions seeking to enter supply chain finance, targeting merchant networks can serve to create strategic early adopters. This is where the institution uses its greater knowledge and relationships with players that can help monitor, give feedback, and suggest ideas on service offerings. *For details, please refer to IFC's Handbook on Digitization of Merchant Finance.*

The core value propositions (e.g., increased liquidity leading to greater turnover, greater stability leading to increased loyalty, and lower cost of capital accelerating growth) for experienced buyers applies to seller entities as well. For anchor firms, improved supply chains and financing can lead to:

- **Better targeting of finance to grow in desired market segments**
- **Better and optimal allocation of goods to achieve market goals**
- **Reduced banking costs by reducing accounts in arrears**
- **Gains in network and transparency for continual market insights**

For buyers (wholesalers and distributors), advances combining SCM and SCF solutions made possible through digitalization also aid in:

- **The ability to increase orders and reduce stock-outs**
- **Reduced accounts in arrears due to delays in collections**
- **Elimination of cash collection headaches**
- **Increased potential to expand the portfolio of goods**
- **Optimized delivery logistics**
- **Better demand predictability to make capital investments and strengthen merchant relationships**
- **Improved stock tracking and labor to manage fraud**

MSME merchants/retailers/producers are perhaps the greatest beneficiaries of innovative supply chain finance products. Due to their small revenue sizes, high perceived credit risk, and low value financing requests, these actors are the most neglected by financial institutions. Better integration into supply chains and subsequent access to supply chain finance can mean:

- **Less time lost dealing with excessive, small re-stockings, due to limited cash flow and inability to acquire stock in advance (often multiple trips each week)**

- **Increased volume to mitigate stock-outs**

- **Greater ability to influence product portfolio to satisfy customer demands and expand business**

- **Lower credit cost than the typical informal or consumer finance options**

- **Potential mitigation of usurious terms due to effect of limited supplier options of being invisible/difficult to serve**

- **Increased customer loyalty due to improved reliability of product availability**

Data on Latin American MSMEs using online financing solutions showed that 51% see an increase in turnover (with 22% experiencing turnover by 10% or more), while 62% realized net profit growth (31% seeing 5% profit growth, the remainder seeing 10-50% growth)[37].

For those banks involved in downstream supply chain finance, opening up a line to new financing customers among MSME merchants can also result in:

- **A strengthened network of merchant points of presence to better reach out to consumer markets**

- **Leveraging interpersonal trust of local merchants and consumers to build brand trust**

- **A lower risk method of expanding credit business that can derive data for later extending more financial services**

- **A potential to also acquire business along other points of the supply chain such as distributors and wholesalers**

The prerequisites for the sales and distribution side of the supply chain equations are similar to those noted for buyer supply chain finance. While serving financing to wholesale and distribution tiers of the supply chain may not necessitate wide-spread operational support, a financial institution must nevertheless demonstrate ability to verify downstream retailers or to acquire merchant level customers.

Depending on the nature of the envisioned SCF proposition, the financial institution will want to benefit from leveraging the influence and knowledge its current customers may have on other supply chain entities. Technology enables access to and the processing of large quantities of data, such as quantities

and frequency of goods delivered by a wholesaler to a retailer, which can be used to assess turnover of the retailer and in turn establish the retailers credit worthiness. *Note: The case study on Tienda Pago in Annex 1 provides an example.* In a virtuous cycle, this data enables a financial services provider to leverage these data points for working capital finance, which for the retailer can mean more stock, and for the wholesaler and the manufacturer can mean sales increases.

It therefore follows that leveraging distributor knowledge of the most reliable merchants or an anchor institution's knowledge and data of distributors is an important starting point. If the institution has no such relationships, it may be advantageous to seek partnerships with entities that have this market knowledge and/or relationships.

Across all markets, a rising middle class is driving new demands for consumer goods. For manufacturers, there is little visibility beyond the first line of distribution with respect to where their product is moving and who is buying it. Lack of transparent sales and distribution networks creates barriers to understanding nuanced demands and how to tailor products to meet such demands. Digitization of buyer supply chains is valuable for manufacturers because of the market information it can provide. At the same time, this data can be leveraged to understand the purchasing patterns, inventories, sales, and ultimately cash flows of the downstream entities, and consequently enable supply chain finance.

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37   Ziegler, Tania, H. Blume, T. Paula. Business Access to Alternative Finance: A Deep-Dive into Mexico & Chile. Cambridge Centre for Alternative Finance, 2018. (https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2018-business-access-to-alternative-finance.pdf)

Figure 37: Mapping of Instruments to Financial Institution Types

Buyer Finance	Bank with limited market presence and key corporate relationships	Bank with good market presence and many corporate relationships	Bank with deep market presence in select areas and no corporate relationships
Loan against receivables	(-) Limited access to and awareness of sellers beyond the largest (+) ability to depend on anchor	(+) Ability to depend on anchor institutions (-) Limited physical presence to reach mid and smaller sized firms. (+) Footprint to reach MSMEs if utilizing a branchless banking model extension. (+) Potential to work with anchor or its distributors to map and serve merchants (-) Concentration on primary financial services to anchor, no SCF	(+) In depth knowledge of customers in regions served (-) Downstream receivables require anchor or key distributor relationships (-) Lacks experience with SCF offering ye
Distributor financing	(+) Can leverage anchors for introduction to distributors. Start by undertaking accounts in arrears for anchor while using distributors to map merchant networks for later services (-) intensive upfront time investment	(+) Can leverage anchors for introduction to distributors. Start by undertaking accounts in arrears for anchor while using distributors to map merchant networks for later services (+) Potential to map and rate merchants and use information to pursue engagements with desired anchor institutions and their distributors	(+) Potential to map and rate merchants and use information to pursue engagements with desired anchor institutions and their distributors (-) intensive upfront time investment (-) may be difficult to engage distributors without anchor institution influence
Loan against inventory	(-) Limited in-market presence to manage collections (-) Limited in-market risk knowledge	(-) Collections obligations and inventory monitoring may be costly without market knowledge	(+) Strong local knowledge (-) Difficult to validate and track inventory without anchor or key distributor relationships (-) Limited scale (-) Limited knowledge of SCF
Payables Finance	(+) Strongest connections to major buyers (-) Dependent upon buyers' knowledge of sellers	(+) May benefit from local relationships and knowledge (+) Potential to serve in partner capacity to established anchor banks or build relationship with anchor by purchasing payables	(-) Difficulty gaining traction with anchor institutions without comprehensive portfolio of service (-) Limited applicability as Payable finance requires strong anchor relationship (-) Limited SCF knowledge (+) Potential to serve in partner capacity to established anchor banks or build relationship with anchor by purchasing payables

The delivery of a new supply chain finance instrument requires a combination of solutions which address customer engagement and service, the financial service itself, and enhancing the firm's supporting infrastructure. *(Note: Tool 3: Instrument Assessment in Annex 3 is designed to help a financial institution map out its capacities related to client acquisition, credit decisioning, collection, and processing.)* As a result of this assessment, an institution should have an idea of its strengths and weaknesses in each of these areas, enabling it to develop a course of action.

The digital aspect is just one facet of the combination of inputs a financial institution needs to introduce and effectively execute on its vision together with staffing, enhanced operations, infrastructure, and potentially partnerships. At this stage, it is necessary to articulate the solutions envisioned to fulfill the identified activities, and draw upon digital options where desirable for cost and scale advantages.

For each solution envisioned, a worksheet approach should be used to assess the underpinning support needed to deliver the solution and determine the upfront and ongoing costs of support. The worksheet should be reproduced for as many instruments as necessary. *Note: A sample worksheet is provided in Annex 3 (Tool 4: Solution Option Modeling).*

Another good practice is to use a table to conduct side-by-side assessments of multiple solution options that address the same activity. This is intended as an aid to narrow down on the most viable supply chain finance solutions based on relative costs and feasibility.

This analysis should go hand-in-hand with a review of delivery models (discussed in the following section). Different delivery models (in-source, outsource, partnership) can be applied to different stages of the credit life cycle (pre-transaction and customer acquisition, transaction processing, post transaction).

Figure 38: **Aligning Business Strategy with Supply Chain Finance**

Business strategy example	Alignment to SCF
Mass market consumer retail banking, characterized by extensive branch network and/or branchless channels, simple entry products, mobile tech extension, mass branding efforts.	Presents network for building market knowledge to serve both suppliers and buyers. Potential to build out merchant services starting with members of bank's branchless network and its merchants.
Commercial bank targeting specific market segments (e.g. Agri, Trade).	Potential linkages to corporate clients as anchor institutions providing the opportunity to leverage such a corporate and its relationships to assess risk of suppliers or buyers and the potential to extend to MSMEs via larger distributor relationships*.

* Digital Financial Services for Agriculture. https://www.ifc.org/wps/wcm/connect/region__ext_content/ifc_external_corporate_site/sub-saharan+africa/resources/dfs-agriculture

Business strategy considerations

A bank's business strategy and capabilities affect how it can engage in supply chain finance and digital innovation. Factors such as national coverage in terms of branches and other points of service, relationships with key anchor institutions, or a focus on a given set of industries will influence what market segments a bank chooses to target, the appropriate supply chain finance instruments, and the potential to use technology to drive supply chain finance business growth.

Decisions to offer a specific service related to supply chain finance are not done in isolation of the overall business strategy and model. It is therefore useful to consider different business strategies and how they align to SCF options. A financial institution's overall business strategy may influence its supply chain finance ambitions. For example:

Market size considerations

As a financial institution enters or expands its supply chain finance practice, it should consider the following:

Business environment conditions:

- What types of financing do regulators within the target market permit?
- Are there public or shared models to accommodate supply chain finance and mitigate risks, such as a registry of receivables?
- Is the sale of receivables permitted?
- Is a common database of receivables available?
- Are there creditworthy buyers in the market to vouch for sellers?

Infrastructure conditions:

- What network infrastructure has the institution already built (e.g., branches and branchless network)?
- What investments in technology have already been made that can be leveraged?

Relational conditions:

- Is the market conducive for collaboration to deliver services? (i.e., does the regulatory environment permit banks to work with outside vendors for supply chain finance purposes? Is there an ecosystem of service providers to meet supporting needs?)
- Does the financial institution have legacy client relationships that may help it gain entry into supply chain networks? (if so, what kind?)

Operational conditions:

- Is the financial institution versed in working with buyers or sellers, or both?
- Does the institution have the capacity to operate the risk assessment and administrative services (e.g., collections) in order to undertake various supply chain finance options? Supply chain finance instruments often look to additional information, documentation, or collateral (order and payments records, inventory, purchase orders, invoices) that need to be tracked and analyzed. Capacity to do this may not have been developed in the normal course of business operations covering traditional loans and advances.

It is important to understand the market size and competitive landscape in order to determine the appropriate product and service. In the same vein, experience with the legal and financial infrastructure landscape will help identify the most desired and scalable supply chain finance products. A detailed product design with sound credit policies and a well thought-out product implementation plan are key. *Note: Tool 2: Assessing Market Conditions in Annex 3 is designed help a financial institution map out the market opportunity.*

Technology considerations

Increased connectivity results in greater availability of data and the ability of different actors to access this data; cloud computing facilitates agile data storage and transmission. Applied to supply chain finance, these developments, in combination with open APIs, enable integration of biller systems with banks, or the connection of the ordering system of a company with a financial

institutions. This translates to providing an institution data on orders of the FMCG's distribution network. By analyzing transaction histories, this data can be used by financial services providers to:
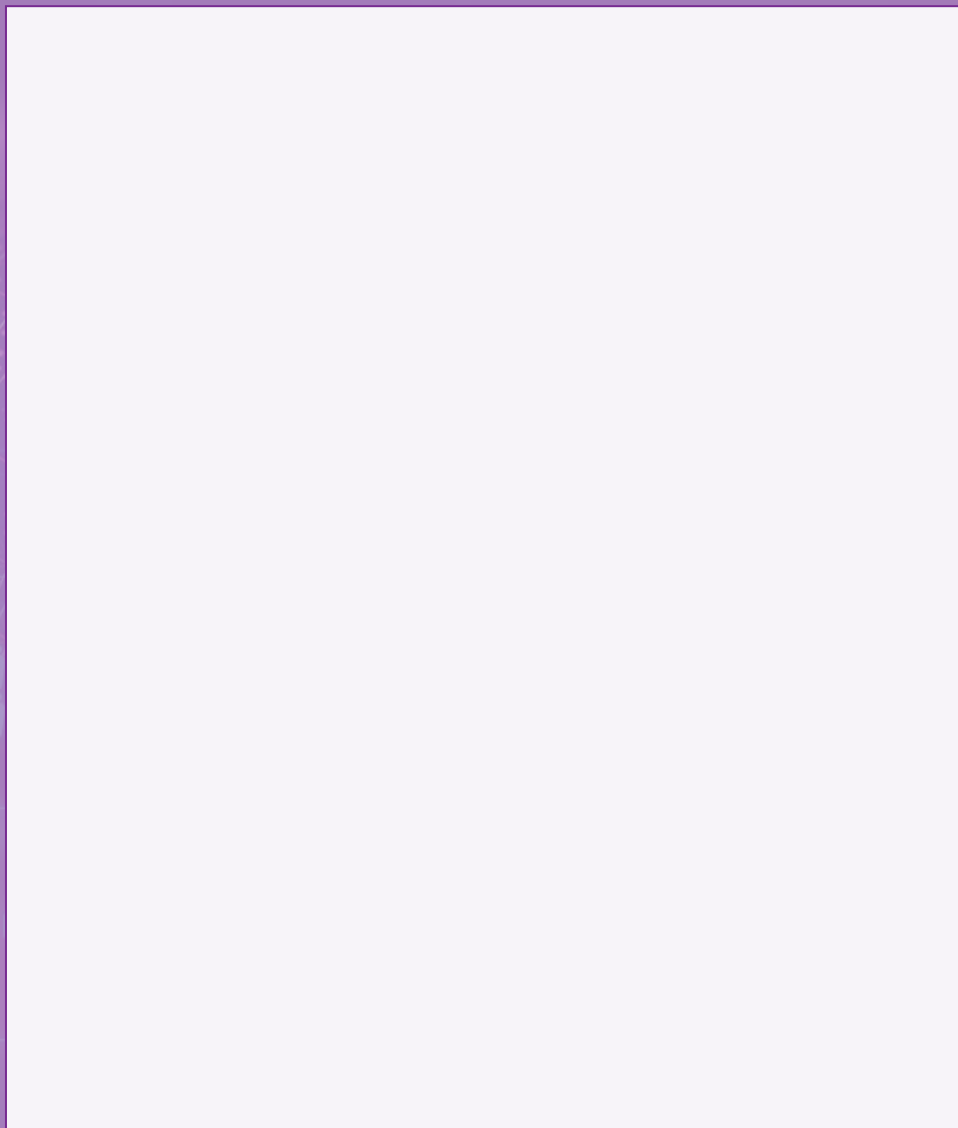
1. **Anticipate creditor needs and establish a more reliable profit analysis**
2. **Build reliable history of debtor payment habits**
3. **Better determine counterparty performance and credit risk**

Similarly, electronic invoice and movable asset registries increase the transparency of stocks or invoices and number of transactions. If analyzed correctly, this cannot only provide information on reliability, but also on the financial strength of an enterprise[38]. It also prevents multiple MSMEs from seeking financing against the same goods (movable assets) or invoices with multiple financial institutions.

Real time access to a large number of data points can shorten transaction time from days or weeks to a few hours, significantly impacting transaction costs. Early experiments with distributed ledger technology indicate that it has the potential to integrate all the necessary information into one digital document. The authenticity of a transaction and stage of fulfillment can be monitored by all parties at any given time. Blockchains maintain secure digital records, improve the traceability along the supply chain, trace of ownership changes, and unlock payments.

Notes

SECTION 5
Delivery of Supply Chain Finance

This section focuses on different delivery models for supply chain finance. It offers a number of alternatives to financial institutions to leverage technology in SCF delivery — including building in-house solutions, purchasing off-the-shelf, and partnerships. This section also reviews the pros and cons and lays out key divers for decision making on any of the models.

The business models that have emerged for financial institutions vary in determining which aforementioned activities are handled directly by the institution and which are delegated to partners or vendors. Depending on the institution's strengths and ambitions, identifying the correct action areas and identifying any existing gaps will greatly contribute to determining the optimal digital business model.

To expand or improve the supply chain finance product offering, a financial institution may pursue a partnership with a specialized service provider and/or FinTechs. Deciding on an appropriate solution to address needs (i.e., which instruments for which actors) is only the first part of the digital equation. The second step is to identify the model for delivery. In essence there are two major models:

1. Develop an in-house delivery mechanism (in-source)
2. Partnerships with multiple banks or platforms.

Note: The Tool 5: Business Model Assessment in Annex 3 is designed to help banks think through business model selection.

Financial institutions that have been diligent in maintaining and upgrading systems will be better positioned to leverage legacy infrastructure, as modern systems will have standard interfacing capabilities to introduce additional software components or securely bridge to an outside service provider.

Digital extension of capabilities (End-to-end provider, legacy back end)

This is the traditional model that banks have followed when incrementally expanding their digital capabilities and offerings. In this model, financial institutions wait for the vendor of their core financial infrastructure to introduce platform upgrades, custom-develop proprietary extension capabilities, or license specialized software to integrate into their existing IT stack. This model is losing favor on account of recent gains and developments in web services, internet penetration, and protocol standardization for system interfacing. The challenge for financial institutions looking to embrace newer models is when to retire or ring-fence sunken investments (including maintenance) and commit to the cost of upgrading/expanding.

Financial institutions that have been diligent in maintaining and upgrading systems will be better positioned to leverage legacy infrastructure, as modern systems will have standard interfacing capabilities to introduce additional software components or securely bridge to an outside service provider.

As the following chart indicates, there are a number of vendors offering various solutions to interested financial institutions.

Figure 39: Examples of Technology Platforms for Banks*

Multiple trade lending systems are sold to support specific areas of a bank such as Commercial Finance, Asset Based Lending, Factoring, Trade, etc.

Lending Area	Informal MSMEs
Factoring	Surecomp's allFAC, Codix
Invoice Discounting EIPP programs	GT Nexus, Ariba, Bottomline, Fundtech, OB10
Trade Finance Letter of Credit based	CGI, Misys Banks own Proprietary
Supply Chain Finance Buyer approved payables programs	Fundtech, Kyriba, Orbian, PrimeRevenue, SipplierCard, GSCF, Banks' own proprietary systems
Buyer approved Invoice Platforms	CGI, Demica, Fundtech, Orbian, PrimeRevenue, S1 through ACI
Receivables management	I-flex, part of Oracle, with Flexcube Temenos, with Globus SAP's lending system, CML, Fundtech, Premium technologies, GSCF
Purchase Order to Pay Financing	Fundtech, TradeCard, SAPs ERP Financials

*This is not an exhaustive list. We have case studies on Mintifi, Nomanini, Flowcast and Trefi all of which are some form of platform which could be reflected in this table.

Parallel digital operations

Some financial institutions are attempting to eliminate the constraints and costs of building upon the limited capabilities of their legacy systems by introducing a parallel digital operation. The acquisition of Simple by Orange Bank and BBVA is an example of a solution where the institutions have invested into end-to-end providers. These "full stack"[39] solutions utilize the pre-existing account and treasury management capabilities while looking to new systems to serve as the conduits for digital access and introducing a portfolio of digital offerings. While it is possible to install and manage locally, a more common approach is to utilize cloud-based hosting models (either a private cloud model or hosted securely within a public cloud).

The benefit of in-sourcing for the financial institution is full control of the user and product experience. This control also makes it possible to better customize and integrate operations and products. However, the institution needs to be proficient in all aspects of the business and IT management while simultaneously able to keep up with the demands of a fast-moving sector.

Financial institution-led platforms

Proprietary platforms, especially those developed internally, provide a high level of flexibility and enable easy integration of treasury, procurement, and IT work streams. This option is attractive for those financial institutions that do not want to share first-comer advantage with peers. Developing such a platform from scratch, however, can be highly complex and require substantial financial investment. Smaller financial institutions may choose to partner with another bank to use their technology platform.

Partnerships

Teaming up with MNOs, FinTechs, or other technology providers can help with the implementation of new supply chain finance offerings, which can be rolled out to customers easily and in a comparatively short time. Such partnerships can be made 'above the line', by making them public and highlighting the cooperation between the various players; they can also be done 'below-the-line' by simply adopting an existing technology and basically 'outsourcing' the partner's offerings. APIs will contribute immensely to the level of simplicity in how these partnerships are implemented

Figure 40 below highlights various engagement models which can be pursued. Generally speaking, there are three key objectives to achieve from such engagements:

- **Expand or improve the product offering**
- **Extend reach**
- **Access data**

By partnering with agent networks or providers of mobile financial services, financial institutions can expand their reach without expanding their costly branch infrastructure. *For opportunities arising out of increased access to data and gaining access to data, please refer to IFC's Handbook: Data Analytics and Digital Financial Services.*

The partner-led model implies that a financial institution delegates the tasks of acquiring and managing the customer relationship to a market player (who may have a broader sales and distribution network and more recognized brand). In this case, the institution may limit its role to those activities required by regulations (e.g., validating identity, holding deposits), or

Figure 40: Possible partners

Strategic Partners	Engagement with global/regional/local finTechs dominating their markets
Revenue Generating	Smaller niche finTechs working with multiple clients, billers, bulk payment companies
Vendors	Smaller niche platforms that provide a platform for financial institutions to offer customer solutions/products
Channel Extension	Leveraging FinTech platform for value additions to customers

An institution may adopt multiple partnership engagement types at the same time. The choice will be dependent on objectives.

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[39] Dixon, C. Full Stack Startups. C Dixon blog, 2014. (http://cdixon.org/2014/03/15/full-stack-startups/)/

take a wider responsibility to also manage the products and services delivered through the partner. While a financial institution may depend on a partner for hosting and managing back-end platform infrastructure, this scenario would more commonly align to a bank-led model where the bank is still responsible for acquiring and managing the customer.

Aggregator of third- party services

Aggregating external FinTech solutions benefits financial institutions and consumers alike. At the core of this model is the ability for the institution to truncate the damage of old legacy systems and leverage an external FinTech to do the rest. For financial institutions, the lowered cost of entry enjoyed by FinTechs consequent to their adoption of cloud-based and modular solutions presents a significant and blatant reality: only the largest financial institutions can keep up with the rate of specialization and innovation that targeted FinTechs can. For customers, it can be overwhelming to face the flood of digital apps on the market and choose the most trustworthy and suitable combinations. Financial institutions can eliminate the guesswork by conducting due diligence and vendor management, and hosting a portfolio of vetted third-party FinTech solutions that have been cleared to operate under the institutions' own trusted brand. *Note: The case of Nomanini in Annex 1 is an illustration of this.*

Platforms

To a certain extent, providing supply chain finance through platforms represents an outsourcing delivery model. Outsourcing enables supply chain trading parties to concentrate on business relationships while leaving the management of services and technical operational details to trusted partners. Platform communication protocol standards facilitate the exchange of data that trigger SCF services and instruments.

Figure 40: Example of reverse factoring* through the technology platform
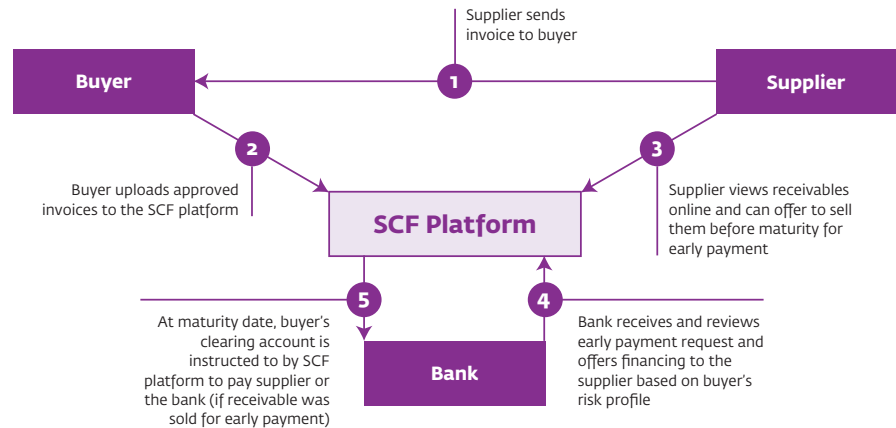
*Definition in Section 4

When deciding whether to outsource components to a managed service provider, or to establish a new or join an existing supply chain finance platform, a financial institution should consider three important aspects. These are automation, simplicity, and scalability, and their respective strengths are noted in the figure below.

Figure 41: Aspects of successful SCF technology solutions

	Automation	**Simplicity**	**Scalability**
Key features	• *Able to scale up transactional volume* • *Efficient problem solving with integration and operationalization* • *Able to extend offering to more than one product*	• *Intuitive interface* • *Structured workflow, easy accessibility by all parties* • *Flexible connectivity to various core systems*	• *Able to scale up transactional volume* • *Efficient problem solving with integration and operationalization* • *Able to extend offering to more than one product*
Key benefits	• *Reduced number of errors* • *Unconstrained business growth*	• *Ease of use for ultimate user* • *Minimal training required for staff and trade counterparts*	• *Fewer errors* • *Unconstrained business growth*

Multi-bank platforms

In multi-bank platforms, buyers, suppliers, and financial institutions are linked to a common network through the value chain platform provided by the third party. In such a model, each financial institution on the platform discloses its desired financing characteristics (e.g., minimum/desired price, location, industry, tenor, amount, and currency). *Note: The case study on Flowcast in Annex 1 is an illustration of such a platform.*

Figure 42: Considerations for participating in an SCF program versus controlling one's own

	Purchase SCF Assets (e.g., with a FinTech)	Build own SCF Business
Time to market	Very quick, due diligence involves signing legal agreements to participate and then due diligence work on any assets one wishes to purchase	Requires establishing a few key competencies in technology, operations, legal, client outreach and risk
IT Investment	Almost none—very simple to participate	Significant—technology necessary for easy scalability which typically involves using a 3rd party system that must be integrated
Ability to target bank clients	Low as platform and other lenders form much of the origination	High—can be used to specifically offer differentiated solutions to clients to solve their specific working capital problems
Main client service provided by bank	Commoditized capital as part of a group of lenders	Highly customized working capital solutions that are targeted to specific clients with high-switching costs
Profitability	Low as the offering is commoditized and open to lots of competition by participating with a panel of lenders. Bank is restricted in its ability to target its customers	High as offerings can be targeted and customized thus more likely solving greater customer needs. It provides sales/origination with a differentiated product to sell to clients. Process required to sell typically uncovers other lending/service opportunities. Some banks even use VCF as a loss leader for other value-added products.
Control	Very little control, you cannot directly negotiate the pricing, or even continuity of a program	Very high—you work directly with the client to negotiate pricing, volume as well as having the ability to consider special situations like seasonal peaks.

Third-party platforms have rapidly increased over a short period of time. Current options include:

- **Licensed:** Financial institutions can buy and license a readily available solution.
- **Software as a Service:** Financial institutions can use an external software company's services.
- **Marketplace:** Supply chain stakeholders can access a wide range of financial institutions and sell invoices directly to investors, including banks, hedge funds, and private equity firms. Suppliers and buyers can choose a funder among investors registered on the platform.

Figure 43: Possible partners

Contract & Governance	Kernel
	Content
	Applications
	Services
	Finance

Provider

Multi-Bank platform

- Flexibility with the bank platforms
- Enables utilization of banks with strengths in the region
- Ease of connection

Saas solution

- Access by all parties
- Minimized technical support from the bank's side
- Eliminated IT involvement
- Improves ability to distribute key information and reporting

Automation

- Helps to improve productivity
- Timeliness of the invoices delivery
- Visibility of the workflow to all parties in the VCF
- Straight through process (STP) including ERP integration
- Automation helps to scale up the program and improve efficiency of the transaction flow

Ease of use

- Encourages suppliers and buyers to participate in the program
- Intuitive interface
- Structured workflow
- Minimum training required

Management of the Platform

Banks need to allocate significant resources to create proper incentive and reward mechanisms to align their sales forces and achieve the growth and scale of the program. Training is often needed to equip the front-lie team with the necessary technical and operational skills to sell and fully service clients in the supply chains.

SCF platforms may combine different types of funding models for sellers or buyers. Platforms may combine balance sheet with off-balance sheet risk from partner financial institutions. Revenue models range from fee-based services, to profit sharing, to first loss models. Several models are emerging as structured finance products where the platform creates asset portfolios to match the needs of its funders on the platform, including financial institutions and institutional investors. *Note: The case study of Treffi in Annex 3 is an example of such platform.*

Box 5
Spotlight on IT

(Please note: There is a dedicated handbook published by IFC on best practice IT stacks and issues to be considered).

Digital readiness is far more than just IT. The key driver for any IT solution should be a demonstrated business need, rather than the IT solutions driving the business. Most financial institutions already have an IT infrastructure that can support standard online and mobile services. However, in many institutions, customers still need to visit a branch for more complex transactions. An agile IT architecture able to rapidly scale processes and launch new products and services is central to the digitization of banking operating models.

Traditionally, financial institutions considered their back-end to be their core banking system, open only for themselves. Products and services provided were similar for all customers. Segmentation and personalized services were difficult to cater for due to the closed nature of the institution's systems.

Figure 44: Model IT architecture
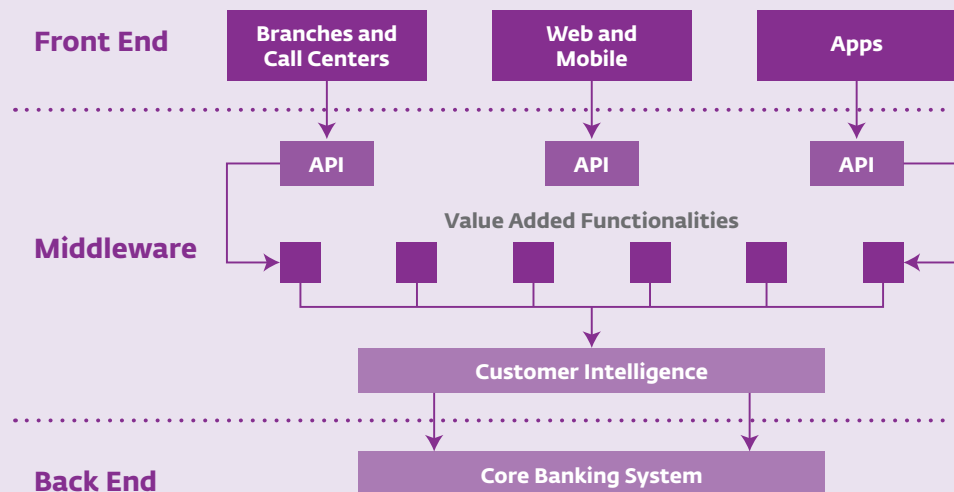
An Application Programming Interface (API) allows two systems to interact and complete a specific task (i.e. exchange data, exchange payments). It also enables access to data from third parties and non-traditional sources (e.g., social media) that can help firms develop more personalized and relevant offerings. Enhanced, improved, and single source offerings boost the customer experience. An API approach can help in several ways, including:

1. *Faster time to market:* Improve IT response time to threats and opportunities by building capabilities that can be leveraged across the organization. Also, APIs can reduce delivery time for solutions, enabling business IT teams to either build themselves or configure without the need for coding.

2. *Build reusable IP with a set of core assets:* Provide reusable assets that can be consumed by audiences outside of IT to allow businesses to self-serve technology projects.

3. *Scaling across partners consistently:* Reduce pressure on IT to deliver every technology project, freeing it to work on more strategic projects. APIs also enable a consistent and common approach across partners, not dictated by them.

In the world of digitization and "open banking" through API's, financial institutions are moving towards a co-innovation model. Financial institutions understand that they achieve revenue growth and scalability through cooperation with customers, third parties, and even competitors. A flexible IT infrastructure also incorporates the understanding that the back-end is no longer solely comprised of the core banking system, but rather includes the numerous, inter-related components that make up digital banking.

Basic IT infrastructure requirements

A core banking system fulfills accounting and prudential reporting standards. Trends in the core banking model show a shift towards a hub-and-spoke model that foregos the creation of digital business functions for each channel in favor of dispersing to all channels via a central hub. To achieve this, core banking must first become a flexible, omni-channel distribution platform in order to enable customer interactions across any touchpoint. Moving away from a "closed" core financial institution philosophy will help digital-minded MFIs better leverage the evolving financial ecosystem. With an open API architecture, a new core banking application linked to external partnerships will allow a financial institution to adapt and respond to changing market conditions. Modular architecture allows for financial institutions to transform and deliver quickly and efficiently. It also allows the institution to integrate third-party providers and outsource certain tasks (e.g., collections, regulatory reporting, fraud monitoring, cards personalization), while ensuring full compliance and adherence to security regulations.

Interaction with internal & external systems and service providers

Point-to-point interfaces will never be completely superfluous. However, Middleware, which enables the digital institution to connect to national and international switches and integrate with foreign payment channels and remittances providers like Western Union, is increasingly taking over internal and external banking connection applications., (e.g., SWIFT, Transferwise). Used properly, Middleware can facilitate an integration level that allows flexibility, reliability, and security to product and service delivery. Various Middleware products cater to the banking industry; all offer a flexibility beyond what was available in the core banking systems.

Traditional delivery channels such as Internet Banking, ATM, POS and Cards

In addition to traditional digital delivery channels, digital financial institutions must be willing to cooperate with third party operators, such as mobile operators. International card schemes are leading by example for aspiring digital financial institutions, as they move quickly into cooperating with and embracing new technologies. Integration with the right partner can, for instance, enhance the ATM experience to include various services, such as bill payments. New products like Virtual Cards and e-money provide significant growth opportunities for digital financial institutions. In order to capitalize on these opportunities, an institution must have the requisite flexibility already established in its IT infrastructure, and an organizational ability to grow alongside and in line with the products and services that digitization will bring.

Mentality changes towards internal processing within the bank

When introducing a quality technology/digital product or service to its customer base, a financial institution must first ensure that its own internal processing has also been brought up to date. Incomplete CRMs unable to provide a single view of the customer are unacceptable. The priority now for digital financial institutions is a complete integration of the CRM with various business segments (e.g., loan origination, loan management, scoring tooling and data warehouse). This enables front-end staff to have access to data that confers the entire customer relationship and better ensures a quality customer service interaction befitting institution guidelines, job descriptions, and customer expectations. Interaction can then be recorded into data warehousing for measuring and managing the overall awareness within the institution.

Business Continuity and Disaster Recovery

To ensure a quality delivery of products and services by any digital financial institution, it is imperative that the institution overhaul its existing business continuity and disaster recovery practices within the organization.

Previously, it was enough for an institution to have a cold standby solution for their processing capabilities. This is no longer acceptable, as the customer now expects a fully functional 24/7 customer experience. By introducing front-end facing applications as part of the spoke-and-cog model towards the consumer, an institution can reduce its down-time risk.

Flexible IT infrastructure must be able to expand customer access beyond the bank's traditional service points. Today's customer, whether they move all or a portion of their business into digital channels, expects a better level of service than what they have experienced previously. The new banking experience is defined by availability, reliability, and continuous delivery via the digital platform.

SECTION 6

Implications of Technology on Business Functions

Digital innovation has disruptive effects that create new opportunities and challenges for each financial institution's potential business model. Understanding where and how digital innovations can overcome these challenges will aid the institutions in prioritizing digital initiatives and building a comprehensive digital strategy for supply chain finance.

For financial institutions wanting to incorporate greater digital capabilities into their operations[40], business can be organized into three categories for digitization[41]:

Customer acquisition and engagement

Credit decisioning and instruments

Processing and collection

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[40] The model archetypes are derived and modified from analysis conducted by Oliver Wyman, The Digital Disruption Battlefield: Winning in a Time of Change, 2015 (https://www.oliverwyman.com/our-expertise/insights/2015/jun/the-digital-disruption-battlefield.html) and a follow up report from the same firm, The State of the Financial Services Industry 2017: Transforming for Future Value, 2017 (https://www.oliverwyman.com/our-expertise/insights/2017/jan/SOFS-2017.html).. Modifications make distinctions for two models of "End-to-End Provider", one that leverages the bank's existing digital infrastructure and one that "leapfrogs" to a parallel digital platform to avoid constraints of legacy systems.

[41] Source: Adapted from Oliver Wyman, The Digital Disruption Battlefield: Winning in a Time of Change, 2015 (https://www.oliverwyman.com/our-expertise/insights/2015/jun/the-digital-disruption-battlefield.html) The model archetypes are derived and modified from analysis conducted by Oliver Wyman, The Digital Disruption Battlefield: Winning in a Time of Change, 2015 (https://www.oliverwyman.com/our-expertise/insights/2015/jun/the-digital-disruption-battlefield.html) and a follow up report from the same firm, The State of the Financial Services Industry 2017: Transforming for Future Value, 2017 (https://www.oliverwyman.com/our-expertise/insights/2017/jan/SOFS-2017.html).. Modifications make distinctions for two models of "End-to-End Provider", one that leverages the

A good starting point is the automation and digitization of a number of repetitive, low value, and low risk front-end and back-end processes. This can help improve operational efficiency, reduce costs, and strengthen risk management practices .

Technology Application in the Transaction Life Cycle

A good starting point, and one that requires the lowest level of investment, is the automation and digitization of a number of repetitive, low value, and low risk front-end and back-end processes – including on-boarding of new clients, credit administration, and workflow management. This can help improve operational efficiency, reduce costs, and strengthen risk management practices by lowering error rates, investigations, and the need to re-work. It can also help re-orient staff and institutional culture towards digitalization and thus is seen as a foundational to further digitalization.

Processes can be divided into pre-transaction, transaction, and post-transaction. Pre-transaction processes are all those which touch the client (e.g., customer acquisition and on-boarding). Back-end processes relate to approvals, risk management, and general product administration. There are six distinguishable business functions whose processes lend themselves for automation, as outlined in Figure 45.

A detailed review of all business processes is an important first step towards realizing benefits from process automation. Such a review should recognize that digitization may eliminate certain steps required in manual processes.

Figure 45: Illustrative Common Digitized Business Functions

Business Function	Processes
Pre-Transaction	
Marketing and Onboarding	• *Lead generation* • *E-KYC* • *Facility application* • *IVR/ SMS response* • *Geo tagging*
Transaction	
Credit Appraisal and Analysis	• *Credit scoring* • *Database checks (credit bureau, suspicious transactions, AML and CFT)* • *Financial analysis* • *Loan utilization*
Transactions	• *Payment* • *Loan disbursement and repayment* • *Savings (in/out)* • *Facility renewals*
Workflow Management	• *Documentation and filing* • *Responsibility sharing* • *E-approvals* • *Schedules and reminders*
Post-Transaction	
Client Relationship Management	• *Lead management* • *Segmentation* • *Targeted customer services* • *Automated offers for loyal and valuable customers*
Controls and Risk Management	• *Early warning systems* • *Risk mapping (concentration, limits)* • *Control breech alerts*

Figure 46: Process Automation Planning

Goal	Establish objective (e.g. reduce cost, increase efficiency, improve customer experience)
Key questions	What is the business case? What are the resources and enablers required to achieve our goals?
Techniques	Financial modeling; Gap analysis; Risk assessment
Outputs	Written business plan with financial model; risk database

Figure 47: Technologies for customer acquiring and engagement

Technology	Solution	Application	Enabling
Internet cloud and mobile devices	Enables use of multi-channel touch points	Identity management and KYC	Shared systems for fraud prevention
Mobile financial services	Eases onboarding through wallets	Digital logistics management	Last mile tracking of deliveries and goods in transit
E-invoicing	Hub systems could ease engaging SMEs with buyers	Managed Services	Focus on business and onboarding strategies
Standardization and APIs	Single access regardless of underlying technology infrastructure	Digital Platforms	Verify identities
DLT applications	Embedded identity credentials and relevant reputational data can be selectively accessed in real-time	Analytics and credit scoring innovations	Customer targeting and product tailoring

Pre-Transaction

Automation of pre-transaction processes must first address any inefficiencies in branding and awareness, support network and staffing, and Know-Your-Customer (KYC). Supply chain finance offers possibilities to reduce some of these challenges by leveraging trade relationships that can vouch for targeted borrowers and potentially benefit the end MSMEs by first financing larger actors higher in the supply chain.

1. **Branding and awareness:** Supply chain finance may be new to some emerging markets, but even in those where it has a presence, exposure may be limited to corporate anchor institutions and their Tier 1 suppliers and buyers. Financial institutions will need to make concerted efforts to both raise awareness of supply chain finance and its benefits and use, as well as build linkages to their brand as a resource. Attempts to bring supply chain finance to MSMEs will require concerted efforts to build understanding and trust among target customers before notable adoption occurs. Data analytics can be leveraged to achieve this.

2. **Support network and staffing:** Financial institutions need to dedicate staff to a supply chain finance endeavor in order for it to flourish; it is too large and demanding to be considered a side-project for existing staff. Dedicated staff need to work strategically to build and sustain the necessary outreach network to acquire and serve MSMEs. Finding ways to piggyback on existing outreach networks can be an effective way to service supply chain finance to the MSMEs. *(Note: This is illustrated in the case study on Jaza Duka in Annex 1.)* While concerted, direct outreach investments at the outset are necessary, ongoing servicing may be done through partner channels. This is enabled by cloud solution and mobile wallets.

3. **Know-Your-Customer (KYC):** Perhaps the biggest onboarding challenge to serving any kind to MSMEs has been KYC obligations. With supply chain finance, there is the opportunity to accelerate the process by leveraging inter-firm knowledge to begin the process of identifying and gaining access to candidates (e.g., using distributor databases of retailers served). In some models, supply chain partners may be able to gather identification information on behalf of a financial institution, or at least make introductions that can ease the trust-building process (e.g., in the case of Trefi, e-invoicing is leveraged to support KYC). *Note: For details on TREFI, refer to the case study in Annex 1.* Shared systems can be accessed through APIs to reduce the risk of fraud.

Transaction Processing

The second functional area relates to risk assessment and credit decisions for SCF provisioning. These activities cover the processes necessary to originate loans. Technology can be leveraged in different ways to increase efficiency. There are four main activities:

1. **Establishing terms and conditions**
2. **Payables title management**
3. **Buyer and seller risk assessment**
4. **Application review and processing**

Establishing terms and conditions:

Rates and payment terms are determined by the type of financial instrument being introduced *(Note: Please refer to Annex 4 on Supply Chain Finance Services Offering)*, the actor in the supply chain receiving the financing, and the model of where recourse exists and who will bear the burden of collections, to name a few criteria. For MSMEs with less exposure to working with financial institutions, making terms and conditions transparent and simple to understand will aid in building target customer confidence and willingness to try something new. Designing solutions, in part with digital capabilities, to help shepherd or automate the borrower experience throughout the borrowing and repayment process can ease their adherence to terms and conditions, thereby reducing costs associated with delinquencies.

Payables title management:

This codifies which party maintains ownership of the evidence of payments due, which can also determine which party is responsible for collections. This may be constrained by regulatory conditions regarding how invoices are treated.

Where invoices can be treated as an asset to hold as collateral and tradable, greater opportunity exists to introduce supply chain finance instruments.

Buyer and seller risk assessment:

This is for supply chain finance benefits from access to trade flow data and knowledge of the work histories of the parties involved. Where supply chain finance typically relies upon the more established party in the transaction and their individual credit worthiness, extending finance down to MSMEs who may not have direct working relationships with the better-known tier 1 suppliers/buyers or their corporate anchors can prove difficult. Mapping the working relationships and discovering where trade history data exists, such as with lower tier distributors, is a key first step to getting supply chain financing into hands of MSMEs.

Application review and processing:

Legacy processes of assembling paper loan applications and supporting documentation and traditional review and approval workflows have not scaled to meet the needs of MSMEs. As regulations become more accommodating to innovations for digitally capturing signatures and sharing identification credentials, these challenges can be alleviated in a way to make reaching MSMEs more reasonable. Innovations gaining traction, such as Happy Loans in India, largely automate the process altogether to extend credit for explicit purposes based on data available from partner firms. Such a model can apply well to financing tied to trade flow data for specific purchases.

Post-Transaction

The third functional area refers to business operations related to processing and collection of supply chain finance. There are four main activities:

1. **Payment processing**
2. **Collections management**
3. **Oversight and governance**
4. **IT systems provisioning and management**

The constraints financial institutions are facing in post transaction processing stem from legacy brick-and-mortar business models where the institution may seek to do everything internally and the staff has been insufficiently exposed to the nuances of supply chain finance.

Business operations and infrastructural support

1. **Payment processing:** Payments processing is directly fundamental to supply chain finance in the distribution of funds and repayments. It is also indirectly important in digitizing the payments against invoices between the buyer and seller, whether it be directly between in the two parties or indirectly via a financial institution conduit. The indirect payment activity bears relevance for supply chain financing when the payments transaction history can help as a means to evaluate the business for lending.

2. **Collections management:** Determining who will be responsible for handling collections duties, and whether that responsibility will remain with the seller or be transferred to the financing institution, is an important element of terms and conditions. The collections process of small amounts from hard-to-locate buyers can be challenging in traditional working capital lines for MSMEs. In the case of supply chain finance, these costs can be alleviated in cases where the lending relationship is with either a corporate anchor or major distributor who may already have accounts with the financial institution from which overdue funds could be deducted. The constraints associated with the provisioning activities bear out more in legacy operational practices than financial institutions are re-imaging through their digital transformation efforts. Physical visits by lenders to acquire and evaluate MSME borrowers cannot satisfy the outsized demand. Relying upon traditional business records for lending fails when MSMEs lack the capacity for record keeping (even less so in digitized formats) and/or the understanding of how and why to keep accurate track of business activities. Digitizing workflows, seeking out credit risk knowledge from alternative sets of data,

and codifying transactions through the registry and validation of invoices are all ways these constraints are being overcome.

3. **Oversight and governance:** Aside from regulatory conditions defining allowances for invoice-backed financing and what is permitted in the access to data for evaluating credit risk, internal oversight and guidance assures financial institutions that receivable-or payable-backed financing is based upon verified transactions (and not double lending against those assets). Broader oversight and guidance of lending practices within the financing institution would be consistent with the measures a financial institution would take for its existing lending activities.

4. **IT systems provisioning and management**: Integrating and operating IT systems are critical for a scalable supply chain finance program – especially ones serving MSMEs. Determining whether systems and their operation will be managed internally or outsourced is discussed in Chapter IV. The core IT system elements a financial institution is likely to need to consider are:

1. **The means for customers to engage with the institution in the application, loan management, and repayment processes**
2. **The origination workflow and connections to core account management systems**
3. **The data analytics systems for evaluating borrower risk.**

Figure 48: Technologies for credit risk assessment and product design

Technology	Solution	Application	Enabling
Internet cloud and mobile devices	Remote access to SCF process approvals	Identity management and KYC	Relational analysis for risk assessment using social network platforms Reduced double financing
Mobile financial services	Transaction data digitized, building history for risk assessment Means for rapid payments	Digital logistics management	Inventory tracking for loans against inventory Methods for mapping out MSME retailers previously unreachable
E-invoicing	Validating invoices, reducing fraud Reduced processing time	Managed Services	Remove back-office technical complexities
Standardization and APIs	Standardized terminology and ability for users to compare offerings	Digital Platforms	Platform for invoicing, data capture/analytics, access to financial institutions
DLT applications	Provide access to disparate data sets in real-time to gauge risk, monitor delivery progress and custody	Analytics and credit scoring innovations	Deriving risk assessment from inventory data Applying alternative source data to risk assessment

Definition of Instruments

The contextual nature and inconsistency in supply chain finance definitions and language is challenging for buyers, sellers, finance providers, service providers and stakeholders alike. This has immediate implications for the accounting and regulatory treatment of supply chain finance structures, and impacts market uptake and the engagement of traditional as well as emerging providers of supply chain finance solutions. A lack of a common understanding and the variety of methodologies used by different stakeholders to size supply chain finance markets partially explains why there is no comprehensive data available to date.

The Global Supply Chain Finance Forum was established in 2014 to help remove uncertainty, ambiguity and lack of clarity in both technical industry discussions and in broader conversations. This initiative was supported by a number of industry associations and facilitated by the International Chamber of Commerce (ICC) Banking Commission, to address what has been recognized as a need to develop, publish, and champion a set of commonly agreed standard market definitions for supply chain finance and supply chain finance-related techniques[42].

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[42] The Global SCF Forum participating organizations are the International Chamber of Commerce (ICC) Banking Commission, BAFT, the Euro Banking Association (EBA), Factors Chain International (FCI), and the International Trade and Forfaiting Association (ITFA). The International Factors Group, one of the original sponsoring associations, is now part of FCI.

Supply chain finance components belong to a portfolio of financing and risk mitigation techniques and practices that support trade and financial flows along end-to-end domestic and international business supply and distribution chains. The expression 'supply chain finance' today covers a wide range of techniques, programs, and solutions in the financing of commerce (including international trade). It has been used to refer to a single technique or a comprehensive range of techniques and solutions that address the needs of buyers and sellers, (especially when trading on open account terms) in the increasingly complex supply chains in which they are involved. The following are attempts to elaborate, designate, and categorize supply chain finance techniques and instruments.

Receivable Based Instruments

Receivables purchase

Receivables purchase is both a description and convenient intermediate category for a variety of techniques in which sellers of goods and services obtain financing by selling all or part of their receivables to a finance provider. The receivables will be transferred to the ownership of the finance provider by means of the assignment of title rights appropriate to the jurisdiction in question. Upon such a change of ownership, the seller will receive an advance payment for the receivables, which may include a margin or deduction reflecting the quality of the receivables, and a finance charge based on the pricing agreed between the finance provider and the client. Receivables purchase is offered through the four distinctive techniques described below, together with a number of variations.

Receivables discounting

Receivables discounting is when sellers of goods and services sell individual or multiple receivables (represented by outstanding invoices) to a finance provider at a discount. The benefits of receivable discounting in emerging markets are evident throughout the ecosystem. For example, sellers enjoy a lower cost of working capital credit when a traditional bank credit may not be available and sellers must rely on informal and costly credit sources. Buyers enjoy more reliable suppliers and may be offered extended credit terms by sellers who now have an alternative for funding working capital expenses. Financial institutions that take on the role of financiers enjoy a new and less risky means of acquiring MSME customers, potentially creating a virtuous circle, whereby knowledge garnered through working with sellers and their buyers may be parlayed into building a deeper financial service relationship with these actors through more services.

Forfaiting

Forfaiting is a method of trade finance where a financial institution purchases, on a without recourse purchase basis, future payment obligations represented by financial instruments or payment obligations (normally in negotiable or transferable form), at a discount or at face value in return for a financing charge.

Challenges to forfaiting in emerging markets related to a lack of collateral are mitigated by the added guarantees of a promissory note (provided the entity/entities backing the note have sufficient market credibility for the buyer of the instrument). Additional challenges include a hospitable regulatory and governance environment to make forfait instruments enforceable. Greater communication/conformity surrounding the instrument between the buyer/seller/financier may also be required. Transaction procedures today remain sufficiently manual to make overhead onerous where communication, travel, and lack of transparency are prevalent.

Factoring

Factoring is when sellers of goods and services sell their receivables (represented by outstanding invoices) at a discount to a finance provider (commonly known as the 'factor'). A key differentiator of factoring is that typically the finance provider becomes responsible for managing the debtor portfolio and collecting the payment of the underlying receivables.

Payables finance

Payables finance is provided through a buyer-led program within which sellers in the buyer's supply chain are able to access finance by means of a receivables purchase. The technique provides a seller of goods or services with the option of receiving the discounted value of the receivables (represented by outstanding invoices) prior to their actual due date and typically at a financing cost aligned with the credit risk of the buyer. The payable continues to be due by the buyer until its due date.

A variant is 'Dynamic discounting', whereby the buyer may utilize their own funds to pay an invoice or account payable prior to the original due date. Early payment discounts on invoices awaiting payment are offered to sellers and funded by the buyer. The service is dynamic in the sense that the earlier the payment, the higher the discount.

Pre-shipment finance

A loan provided by a finance provider to a seller of goods and/or services for the sourcing, manufacturing, or conversion of raw materials or semi-finished goods into finished goods and/or services, which are then delivered to a buyer. A purchase order from an acceptable buyer, or a documentary or standby letter of credit or a Bank Payment Obligation, issued on behalf of the buyer in favor of the seller is often a key ingredient in securing the finance, in addition to the ability of the seller to perform under the contract with the buyer.

One challenge that can hinder seller efforts to obtain pre-shipment financing is if the lender also requires proof of the seller's ability to complete the agreed work. This is particularly the case with younger, unproven firms or for those operating informally without records that prove their capabilities. Any difficulties a financier has in monitoring progress of the seller in work progress and invoice tracking will hinder willingness of lenders to enter into these arrangements.

Loan/Advance-based instruments

Loan against receivables

A loan against receivables is financing made available to a party involved in a supply chain on the expectation of repayment from funds generated from current or future trade receivables. It is usually made against the security of such receivables but may be unsecured.

Distributor finance

Distributor finance is financing for a distributor of a large manufacturer to cover the holding of goods for re-sale and to bridge the liquidity gap until the receipt of funds from receivables following the sale of goods to a retailer or end-customer. Challenges faced in distributor financing in emerging markets may include limited involvement of anchor parties who have limited market knowledge, challenges tracking and coordinating stock and agreements, and means for ensuring repayment of financing rather than diversion of funds (i.e., accepting distributor financing but using funds from stock sold to purchase other goods from competing manufacturers rather than repay original financing).

Loan against inventory

Loan against inventory is financing provided to a buyer or seller involved in a supply chain for the holding or warehousing of goods (either pre-sold, unsold, or hedged) and over which the finance provider usually takes a security interest or assignment of rights and exercises a measure of control.

With poor market knowledge, selling inventory in a timely manner to meet loan terms can be a challenge. Logistics and effective inventory management can also pose a risk. Independent warehousing can help minimize risk by serving as verifier of inventory and providing controls for stock management. Lack of transparent record keeping can make it difficult for buyers or sellers to present a track record of sales that can be used to assess likelihood of inventory movement needed to secure a loan.

Other supply chain finance instruments

The techniques of traditional trade finance such as Documentary credits, Documentary collections, and Guarantees may be used in conjunction with the supply chain finance techniques.

Glossary

Account payable: a legally enforceable liability to a creditor recorded in the balance sheet, usually arising from purchases of goods and services on an open account basis and evidenced by a received invoice due to be paid within an agreed time frame.

Account receivable: the balance of money (i.e., the outstanding invoices) due to a firm for goods or services delivered or used but not yet paid for by customers. Accounts receivable, or 'receivables' are recorded on the balance sheet and represent a line of credit extended by a company and normally have legally enforceable terms that require payments due within a relatively short time period, ranging from a few days to a fiscal or calendar year.

Advance: an extension of credit by means of a loan. *Synonym: Loan.*

Advance payment: a payment made in advance of a prescribed event, such as a due date or a contact commencement.

Average collection period: the amount of time it takes for a business to receive payments owed by its clients in terms of accounts receivable (AR). Companies calculate the average collection period to make sure they have enough cash on hand to meet their financial obligations. The average collection period is calculated by dividing the average balance of accounts receivable by total net credit sales for the period and multiplying the quotient by the number of days in the period. *Source: Investopedia*

Bank: a regulated financial institution licensed to receive deposits and undertake a range of activities such as commercial, retail and investment banking.

Borrower: an entity that is lent money by a Finance Provider under an agreed basis that it be paid back over time.

Buyer: in the context of supply chain finance, a buyer is a corporate entity procuring goods and services, issuing orders, and making payments to the suppliers that form its supply chain.

Cash conversion cycle (CCC): a metric that expresses the length of time (in days) it takes for a company to convert its investments in inventory and other resources into cash flows from sales. Also called the Net Operating Cycle or simply Cash Cycle, CCC attempts to measure how long each net input dollar is tied up in the production and sales process before it gets converted into cash received. This metric takes into account how much time the company needs to sell its inventory, how much time it takes to collect receivables, and how much time it has to pay its bills without incurring penalties.

CCC is one of several quantitative measures that helps evaluate the efficiency of a company's operations and management. A trend of decreasing or steady CCC values over multiple periods is a good sign, while rising ones should lead to more investigation and analysis based on other factors. One should bear in mind that CCC applies only to select sectors dependent on inventory management and related operations

Client: a customer of a finance provider. In the context of the latter usage, the word client is used for the client of a finance provider. It may also refer to the user of a service offered by a professional. Synonym: Customer. Collateral: property or other assets that a borrower or a third party offers a lender to secure a loan or extension of credit. If the borrower stops making the promised repayments and/or interest and finance charges, the lender can take possession of the collateral to recoup its losses by means of sale. The legal perfection of collateral is jurisdictionally specific and takes many forms. Collateral is often subject to Collateral Management procedures, e.g., collateral in a warehouse. Synonyms: Security, Security interest.

Collection: the general function of a business to recover funds for all outstanding invoices before they become overdue, by means of electronic payments, cheques, cash, documentary credits and other means of payment. Invoices are always issued with terms of payment; unpaid invoices are considered outstanding.

Commodity: a raw material (e.g., foodstuff, metal ore or refined product, crude oil or oil product), for which there are normally liquid markets and which are deemed attractive collateral for the provision of finance.

Cost of goods sold (COGS): the direct costs attributable to the production of the goods sold. This includes the cost of the materials used in creating the good along with the direct labor costs used to produce the good. It excludes indirect expenses such as distribution costs and sales force costs.

Credit rating: an evaluation of the credit worthiness of a debtor, a business, or a government, but not individual consumers. The evaluation is made by a credit rating agency and is based on the debtor's ability to pay back the debt (both short term and long term) and the likelihood of default. A rating is usually reflected in a grading range such as AAA to C, with AAA the highest possible rating assigned.

Credit risk: the possibility that a borrower or obliger will default on any type of debt or contractual obligation by failing to make required payments.

Customer: a person or entity that buys goods and services, ranging from a buyer in a supply chain to a user of financial services offered by a finance provider. *For the sake of clarity and consistency, the latter is described herein as a **Client***.

Data matching: the effort to compare two sets of collected data in order to discard duplicate content, or for various kinds of data mining. Data matching is largely done to identify links between two data sets for marketing, security or other uses, and enables holders of large amounts of data to perform more precise searches that produce more efficient results.

Dataset: a collection of information usually from a common source and assembled for a particular business or other purpose. The term generally refers to information that could historically have been brought together in a document, but in an automated process is transmitted/stored electronically. Under the rules of the Business Process Outsourcing, datasets must be matched prior to a payment obligation becoming due.

Debtor: an entity that owes money under a commercial or financial transaction.

Days payable outstanding (DPO): a financial ratio that indicates the average time (in days) that a company takes to pay its bills and invoices to its trade creditors, which include suppliers, vendors or other companies. The ratio is calculated on a quarterly or on an annual basis, and it indicates how well the company's cash outflows are being managed. Source: Investopedia

Days sales outstanding (DSO): a measure of the average number of days that it takes a company to collect payment after a sale has been made. DSO is often determined on a monthly, quarterly or annual basis, and can be calculated by dividing the amount of accounts receivable during a given period by the total value of

credit sales during the same period, and multiplying the result by the number of days in the period measured. *Source: Investopedia*

Days inventory outstanding (DIO): indicates how many days a firm's current stock will last before replenishment is needed; also known as the Days Sales of Inventory (DSI).

Dilution(s): every situation that could reduce the value of an outstanding invoice, with the exception of default by the debtor. Typical causes are returns, credit notes, commercial dispute, etc.

Distributor: a person or entity that supplies goods on a wholesale basis to retail outlets or companies. This may include a manufacturing entity, an arm of a manufacturing entity, or an independent entity.

Distributor finance: a supply chain finance technique where a finance provider provides financing for a distributor of a large manufacturer to cover the holding of goods for re-sale and to bridge the liquidity gap until the receipt of funds from receivables following the sale of goods to a retailer or end-customer.

Documentary collection: the handling by banks of documents in accordance with instructions received in order to obtain payment and/or acceptance, or deliver documents against payment and/or against acceptance, or deliver documents on other terms and conditions, if subject to internationally recognized rules of practice issued by the International Chamber of Commerce (ICC).

Early payment: (with respect to receivables purchase), often used to portray the transaction as early payment of an invoice. *Synonym: Receivables discounting.*

Electronic invoicing (e-Invoicing): a form of electronic billing. E-invoicing methods are used by trading partners, such as customers and their suppliers, to present and monitor transactional documents between one another and ensure the terms of their trading agreements are being met. *Source: Wikipedia*

Face value: the principal or redemption worth of a financial instrument or claim.

Factoring: a supply chain finance technique as a form of Receivables Purchase, in which sellers of goods and services sell their receivables (represented by outstanding invoices) at a discount to a finance provider (commonly known as the 'factor'). A key characteristic is that usually the finance provider becomes responsible for managing the debtor portfolio and collecting the payment of the underlying receivables.

Factoring agreement: an establishment of terms (including scope, charge, operational procedures and security to be taken) concurred between a finance provider (Factor) and a client upon which a factoring arrangement is made available.

Finance provider: a bank, financial institution, or other regulated or non-regulated provider of finance and related services, specifically herein in the context of supply chain finance.

Financial institution: a provider of financial services in the broad sense, usually referring to banks and other regulated entities such as insurance companies, investment dealers and trust companies, and including, by definition, a range of non-bank financial institutions.

Financial instrument: a tradable asset of any kind; cash or evidence of an ownership interest in an entity; a contractual right to receive or deliver cash or another tradable asset.

Financial supply chain: the chain of financial processes, risk and liquidity management decisions, events, and activities that provide financial support to the physical supply chain.

Financier: a general expression for a person or entity that provides finance in various forms.

Invoice: a document or electronic version of a document addressed by a supplier of goods and services to a buyer for the purpose of recording and describing a transaction for the supply of goods and services, requesting payment by a specified due date, and setting out any applicable taxes to be collected and remitted to a tax authority.

Invoice discounting: a supply chain finance technique, used as a variation of factoring. The term is subject to context. *Synonym: Receivables Purchase.*

Know your customer (KYC): the process of a business verifying the identity of clients and assessing their suitability, along with the potential risks of illegal intentions towards the business relationship. The term is also used to refer to the bank regulations and anti-money laundering regulations that govern these activities.

Lender: an entity that provides loans under an agreed credit facility or another form of credit akin to a loan.

Loan: the act (verb) of making available money to another party in exchange for future repayment of the principal amount with interest or other finance charges. A loan (noun) may be for a specific, one-time amount or can be available as a variable credit line or overdraft up to a specified ceiling amount. It is also possible to make available actual real and financial assets.

Loan/Advance-based instruments (Downstream finance): lending or advancing of money by one or more individuals, organizations, or other entities to other individuals, organizations etc. The recipient (i.e. the borrower) incurs a debt, and is usually liable to pay interest on that debt until it is repaid, and also to repay the principal amount borrowed. These include loans and advances made against receivables, rather than by means of purchase, as in the previous cluster of techniques. Loan based instruments are distinguished by making loans or advances against receivables rather than the outright purchase of the receivables.

Loan against receivable: financing made available to a party involved in a supply chain on the expectation of repayment from funds generated from current or future trade receivables and is usually made against the security of such receivables but may be unsecured.

Loan against inventory: financing provided to a buyer or seller involved in a supply chain for the holding or warehousing of goods (either pre-sold, un-sold, or hedged) and over which the finance provider usually takes a security interest or assignment of rights and exercises a measure of control.

Low value: a lower monetary value relating to the individual items to be financed. For economic reasons, low-value items are likely to be processed as a large volume business.

Maturity date: the date on which the principal amount of a loan, bill of exchange, note, draft, acceptance, bond or other debt instrument becomes due to be paid or repaid to the creditor.

Open account: trade transactions between a seller and a buyer where transactions are not supported by any banking or documentary trade instrument issued on behalf of the buyer or seller. The buyer is directly responsible for meeting the payment obligation in relation to the underlying transaction. In instances where trading parties supply and buy goods and services on the basis of open account terms, an invoice is usually raised, and the buyer pays within an agreed time frame.

Party: any entity that becomes engaged in a financial or commercial transaction, be it a natural or legal person, a company, corporation, financial institution, unincorporated business or government organization or not-for-profit entity.

Payables finance: a supply chain finance technique provided through a buyer-led program within which sellers in the buyer's supply chain are able to access finance by means of Receivables Purchase. The

technique provides a seller of goods or services with the option of receiving the discounted value of receivables (represented by outstanding invoices) prior to their actual due date and typically at a financing cost aligned with the credit risk of the buyer. The payable continues to be due by the buyer until its due date. ***Synonym: Reverse Factoring.***

Payment: a means of settlement for a commercial or other obligation, such as an electronic credit transfer, direct debit, credit or debit card payment, wire transfer, automated clearing house payment (ACH), check or cash. The payment is completed when good funds are received by the creditor.

Performance risk: the potential associated with a party's ability to meet its obligations under a contract, in particular to procure, manufacture and ship goods, or provide services in a timely fashion according to quality standards.

Physical supply chain: the totality of the organizations, systems, people, activities, information, and resources involved in moving a product or service from supplier to a buyer.

Platform: a business processing capability embedded in an information technology system and its surrounding management.

Prepayment: the fulfillment of a loan or financial obligation before its maturity date, or an advanced purchase of goods or other contractual liability.

Pre-shipment finance: a supply chain finance technique that is a loan provided by a finance provider to a seller of goods and/or services for the sourcing, manufacture or conversion of raw materials or semi-finished goods into finished goods and/or services, which are then delivered to a buyer. A purchase order from an acceptable buyer, or a documentary or standby letter of credit or a Bank Payment Obligation, issued on behalf of the buyer, in favor of the seller is often a key ingredient in enabling the finance, in addition to the ability of the seller to perform under the contract with the buyer.

Promissory note: a financial instrument whereby one party (the maker or issuer) promises in writing to pay a determinate sum of money to the other (the payee), either at a fixed or determinable future time or on demand of the payee. Promissory notes are typically negotiable instruments.

Purchase order: a buyer-generated document or dataset that authorizes a purchase or procurement transaction sets out descriptions, quantities, prices, discounts, payment terms, date of performance or shipment, other associated terms and conditions, and identifies a specific seller. It is used to control the acquiring of products and services from external suppliers. When accepted by the seller, it forms the basis of a contract binding on both parties. ***Synonym: Order.***

Purchase order finance: a supply chain finance technique where reliance is placed on a Purchase Order issued by a reputable buyer. ***Synonym: Pre-shipment Finance.***

Receivable: the amount due from a debtor or obliger to a creditor. This includes, but is more extensive than, trade-related Account Receivables and covers, for example, the amount due under a negotiable Instrument.

Receivables discounting: a supply chain finance technique that is a form of a Receivables Purchase, flexibly applied, in which sellers of goods and services sell individual or multiple receivables (represented by outstanding invoices) to a finance provider at a discount.

Receivables purchase: a convenient intermediate category of supply chain finance techniques, which includes Receivables Discounting, Forfaiting, Factoring, and Payables Finance and includes a range of synonyms and variations.

Receivables purchase agreement: an arrangement between a finance provider and a client (supplier) to cover the purchase of individual or a portfolio of receivables.

Recourse (with/without): 'With recourse' is a legal agreement that provides protection to lenders, as they are assured of having some sort of repayment (either cash or liquid assets) in the event that the borrower is unable to satisfy the debt obligation. 'Without recourse' is a legal agreement where If the borrower defaults, the issuer can seize the collateral (usually property), but cannot seek out the borrower for any further compensation, even if the collateral does not cover the full value of the defaulted amount.

Reverse factoring: see: *Payables finance.*

Securitization: the process of taking an illiquid asset, or group of assets, such as a portfolio of receivables, and through financial intermediation, transforming them into a security or tradable financial obligation. Seller: a supplier of goods and services.

SME: a small or medium-sized business.

Spread: an amount that each bank decides to add to the base rate as its revenue. The bank buys the money at a price (exchange interbank rate) and resells it to its customers recharged with a profit margin (spread).

Supplier credit: financing arranged by a supplier with or without a finance provider to enable it to provide credit terms to a buyer of its goods or services.

Supplier: a party that provides goods and services to a buyer.

Supply chain finance: the use of financing and risk mitigation practices and techniques to optimize the management of the working capital and liquidity invested in supply chain processes and transactions. Supply chain finance is typically applied to open account trade and is triggered by supply chain events. The visibility of underlying trade flows by the finance provider(s), which can be enabled by a technology platform, is a necessary component of such financing arrangements.

Tenor: the amount of time left until the maturity date for the repayment of a loan or financial obligation, or the initial term length of same. Tenor can be expressed in years, months or days.

Trade finance: signifies financing for trade, and it concerns both domestic and international trade transactions. A trade transaction requires a seller of goods and services as well as a buyer. Various intermediaries such as banks and financial institutions can facilitate these transactions by financing the trade. *Source: Wikipedia.*

Trade finance makes it possible and easier for importers and exporters to transact business through trade. Trade finance is an umbrella term meaning it covers many financial products that banks and companies utilize to make trade transactions feasible. Trade Finance is usually used as a generic term for a range of traditional trade finance techniques and evolving SCF techniques. *Source: Investopedia.*

Working capital: the financial resources invested by a business in financing its current trading operations usually expressed as the difference between Current Assets (receivables, inventory and operating cash balances) and Current Liabilities (payables and short-term debt).

Annex 1: Case Studies

Mexico: Pioneers in Latin America

SAT
Servicio de Administración Tributaria

Year of implementation: 2004

Stage of maturity: Very mature

Regulatory entity: Service Tax Administration (SAT)

Context

Latin American countries are considered as pioneers in electronic invoicing[43]. Chile was the first to implement it in 2003. Mexico followed in 2004. Originally, the implementation of the electronic invoice registry was led by the government with the aim of reducing tax evasion. The Tax Administration Service (SAT), as the regulatory entity, published the first legal framework for e-invoicing named Digital Tax Receipt (CFD) which established a system under voluntary adoption.

In 2010, new rules were published by the government through the SAT. All companies with over 4 million pesos of annual income must send and store all invoices over 2,000 pesos electronically. More importantly, it officially approved the new invoicing format named Digital Tax Receipt via Internet (CFDI). The SAT realized that the adoption of the CFDI allowed for better control and, in 2011, began extending the mandatory use of e-invoices and live reporting to the

tax authorities. Between 2012 and 2013, companies were able to use both the CFD and the CFDI. On January 1, 2014 the CFD dissolved and it became mandatory for all taxpayers to issue an electronic invoice.

It is important to note that a CFDI can also be a receipt for honorary fees, a credit note, and/or debit memos. Since April 3, 2015, Mexico also requires the mandatory use of electronic accounting and a digital certificate for the signing of e-documents.

Implementation and Current Operation

The electronic invoice model is currently used for tax control, electronic payroll, and factoring. Parties involved are all taxpayers and include the invoice issuer, the receiver, vendors authorized by SAT to help in the certification of electronic invoices, and the SAT. The implementation of the model required a joint undertaking between the SAT and technology infrastructure firms to

ensure the effective operation of the electronic invoice model. This included a tax administration portal that all taxpayers could access for free with a password, an advance e-signature[44] and a digital certificate seal[45]. These security features guaranteed access and effective use of the SAT electronic services.

This technology incorporates all the requirements for an e-invoice and the fields to collect the necessary information, both regarding the fiscal aspect of the invoice as well as information regarding commerce and trade. To register the information, CFDIs technology is based on a standard XML format t hat can be read by humans and machines. Legally, the CFDI must be archived for ten years by the company issuing the document, and five years for accounting purposes.

To use the Mexican e-invoice system, taxpayers must register with SAT for a Federal Taxpayer Registration. They also need to obtain a unique e-signature key and a digital certificate seal from SAT. Finally, the company needs to appoint

[43] H. Fuentes Castro (2016) Impacto en la Evasión por la Introducción de la Factura Electrónica. Tecnológico de Monterrey. No. IA-006E00002-E37-2016.

[44] The advanced electronic signature is recognized as valid since 2004. It is not only used by SAT but, also by the federal public administration, and some municipal and state authorities. There is also a portable e-signature which can be used in a smartphone, tablets, etc. which can be accessed through a dynamic password.

[45] Digital certificate seals are available for persons and businesses. There are no private digital certification bodies.
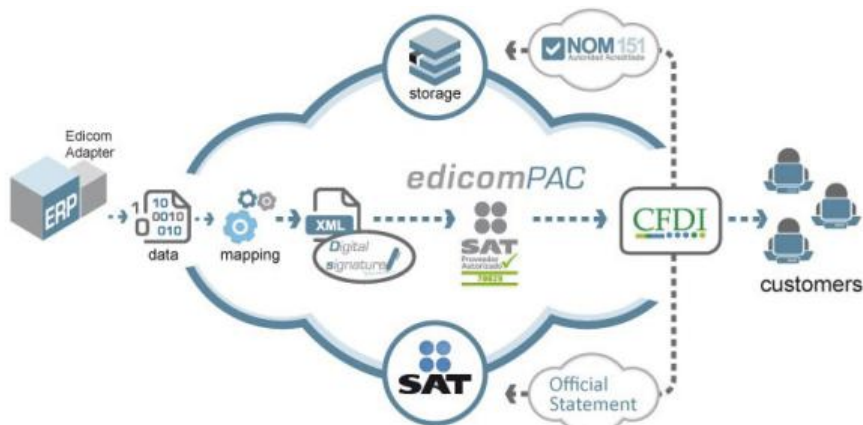
a government-approved e-invoicing company, also known as an Provider of Authorized Certification (PAC), to validate and stamp invoices as they are issued. The PAC is the biggest difference between Mexico's e-invoice and that of all other countries. It streamlines the process of validation of invoices, removing the reliance on the fiscal authority. The PAC also provides secure storage and retrievable for invoices.

Once a taxpayer has registered, issuing e-invoices requires the generation of a CFDI. In this case, the merchant produces an e-invoice with the customer and taxable service details. This must have a unique merchant invoice number. It then electronically sends this to the selected PAC which validates the e-invoice and returns it with the merchant's digital certificate seal. At the same time, the PAC sends the stamped CFDI to the SAT.

The XML version of a CFDI must include the issuer's e-signature. The merchant's accounting system will then produce a PDF version of the invoice.

It is important to note that CFDIs is constantly being reviewed and updated by the SAT. Since 2018, it incorporates new add-ons such as payment receipts, an export complement, and invoice cancellations.

Results and Market Opportunities

According to SAT, the volume of digital invoices issued between 2011 and 2018 increased from 1.7 billion to 6.9 billion. Furthermore, 96% of all the sealed e-invoices are processed by a PAC and there is a total of 73 million active taxpayers in the system[46].

Since all merchants are required to issue e-invoices using the same format, Supply Chain Financing opportunities can be offered to all of a merchant's suppliers, instead of just a small subset that choose to go through the on-boarding process. This process allows merchants and suppliers alike to better manage their cash flow through increased visibility into financial transactions. Merchants can automate payments once e-invoices are approved. Suppliers can check the status of their invoices online, in real time, and select the ones that they would like to be paid immediately, eliminating the need to inquire about payment status.

Despite this opportunity, Mexico's electronic invoice model needs to be improved and strengthen to increase the offering of Supply Chain Finance instruments. For example, specific regulation involving the use of e-invoicing for Supply Chain Finance operations should be drafted. This could contribute to improve current problems like the fact that not all factoring companies register their invoices or that large debtors may not accept notifications from the e-invoice system.

Lessons Learned

Define a standard format in XML to ensure the integration in any two systems can incentivize businesses to adopt this model. Using an electronic invoice system offers businesses a better control and storage of the information on products, services and clients. The XML used in Mexico can be interpreted by machines without human intervention. It also allows the

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46   For more information, see: http://www.amexipac.org/estad%c3%adsticas---padr%c3%b3n-fiscal.html

validation of each and every one of the mandatory, optional and conditional fields. Furthermore, Mexico's system is flexible given that it allows for the inclusion of an addenda with content not regulated by the SAT, enabling the format to be adapted to contain information required by each individual buyer. The use of certificates, obtained through an e-signature that the SAT gives for free to each taxpayer, secures the exchange scheme and avoids the rejection of documents because it records who issues it, which guarantees integrity and authenticity. Finally, a PAC allows for a third party to validate all invoices, streamlining the process and removing the reliance on the fiscal authority.

However, there are challenges in implementation. The constant updates in Mexico's CFDI system can be confusing and lead to mistakes. One example of this is CFDI 3.3, whose catalog of products and services in the system has more than 52,000 options and it does not save the most used options of every company. Selecting the right option for the invoice takes time and resources from a business. There are also times when an error can result in the cancellation of the invoice. If information needs to be corrected, the fiscal invoice needs to be identified, another CFDI needs to be generated. This means more time invested in repeating the process and connecting a document with another one.

Case Study 2

Mintifi: Innovating Supply Chain Financing across Long Tail Distribution Network

Country: India

SCF instrument: Loan or advance against receivables

Context

Mintifi is a tech-driven startup that provides loans and other simple lending solutions to MSMEs. Founded in 2017 in Mumbai, Mintifi's specializes in providing unsecured working capital to MSMEs through a unique distribution approach. The founders of Mintifi observed that traditional financing model had several issues for borrowers as well as lenders:

Lenders issues:

- Sourcing of MSME customers are prohibitively expensive, as traditional lenders rely on direct selling agents to on-board customers. This means a much higher borrowing cost.

- Lack of data to underwrite borrowers, given poor reporting standards of MSMEs. This leads to rejection of most borrowers or loans provided only with collateral.

Corporate Category	Annual Revenue Bracket	# of Anchors	Anchor Revenue Pool Estimate	Credit Line Opportunity
Category A	$750 million	427	$328 billion	US$85.7 billion
Category B	$150–750 million	1,015	$457 billion	$38.8 billion
Category C	$75–150 million	1,147	$132 billion	$11.2 billion
Category D	$40–75 million	1,723	$100 billion	$8.5 billion
TOTAL MARKET				**$85.7 billion**
UNSERVED MARKET				**$76 billion**

Example calculation for opportunity size, assuming 100% penetration (Category A): Average revenue × number of anchors / 365 days × 31 credit days = 750 × 427 / 365 × 31 = $27.28 revenue potential. Source: IFC analysis

Borrowers issues:

- India's financial institutions extend only secured loans to MSMEs. IFC estimates that MSMEs in India face a US$230 billion gap in accessing financing required to grow their businesses[47]. Access to credit in India tends to be costly and inefficient for both MSME distributors and retailers.

- Given overhead costs and legacy systems, lenders prefer to on-board higher ticket customers. Supply chain finance programs usually do not take the needs of MSMEs into consideration, as traditional financial institutions only focus on larger corporations and major distributors, leaving the entire long tail distribution with little or no financing options.

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[47]   IFC. MSME Finance Gap. 2017.

It has been estimated that there are approximately 8,000 corporate anchor institutions in India with revenues greater than US$ 15 million. Of this, only 150 have a formal supply chain finance program, and only 10% of their distributor partners are covered by bank supply chain finance programs. There is, therefore, a US$ 76 billion working capital financing opportunity to improve cash flow throughout the supply chain. The estimated US$ 10 billion of working capital financing provided today is split 40% to suppliers of corporate anchors and 60% to sales-side distributors.

The Mintifi Approach:

- Mintifi has partnered with more than 50 leading corporates in India who collectively are providing products and services to over 1 million distributors/dealers and retailers. Using a combination of leveraging the distribution network of these anchor partners and highly interactive tech processes, Mintifi reaches out to distributors/dealers (MSME business owners), thereby eliminating the need for Direct Selling Agents.

- Financial institutions can on-lend to MSMEs via the Mintifi platform.

- Mintifi also uses machine learning and data science to extract the underlying transaction data between corporate partners and MSMEs to analyze business profiles, credit histories, and cash flows, thereby eliminating issues that plague the traditional underwriting process.
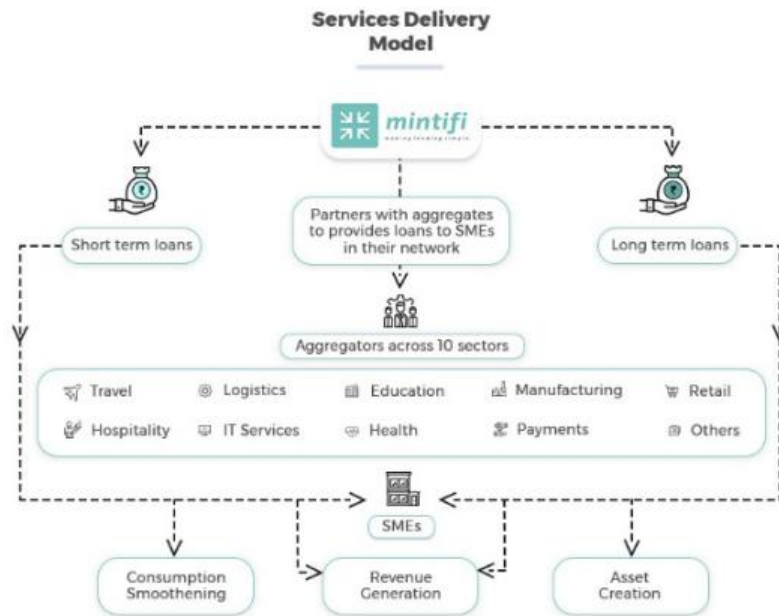
Source: *Lok Capital – Mintifi.*

Solution and the Supply Chain Finance Program

Mintifi uses an online lending platform to implement hi-tech, data-driven and new-age credit models to assess customer creditworthiness. The targeted audience are MSMEs that act as dealers or distributors for small and mid-size corporates that have been in business for more than a year. The platform provides a 24-hour online approval process – no collateral necessary. Mintifi also offers a bill discounting limit which operates as the simplest form of invoice financing (i.e., short-term business loans that use

unpaid bills as security and aim to help improve the beneficiaries' cash-flow).

Borrowers with credit limits with Mintifi can use the credit limit to make the payments to their corporate partners and avail several benefits including early payment cash discounts, incentives for higher sales, etc. At the same time, borrowers have the flexibility to make payments to Mintifi at any point in time and are only charged interest on the days it utilizes the credit limit. This significantly reduces the interest expenses for the distributors and leads to higher profitability for borrowers. Mintifi provides weekly plus 6/12

months-term loans through their bill discounting limit product. The sizes of these loans are of INR 50 thousand to INR 1 Cr (approximately US$ 660 and US$ 132,000).

Credit assessment is performed at three levels (applicant industry, applicant's anchor, and applicant) and Mintifi's anchor-driven model has greatly improved the efficiency and robustness of credit assessment. Mintifi receives operational and transactional data regarding applicants from their anchors that allows Mintifi to request minimal information from applicants, which can be shared digitally. This makes the credit application process easier and faster for MSMEs. Requested information includes:

- Tax authority identification number credential card (PAN card)
- Personal identification credential (Aadhaar Card)
- Six month bank e-Statement
- Proof of business and residence address
- Goods and service tax identification (GST).

Results[48]

After three years of operation, Mintifi has expanded beyond Mumbai and currently has 16 branches across India, serving corporate partners in 100 major cities across 16 states. According to IFC's 2019 Reach Survey[49],

Mintifi has an outstanding loan book of US$14 million and a total of 1,797 active MSME customers, 20% of which are women-owned MSMEs. Mintifi customers include MSMEs operating primarily in education, home furnishing, kitchenware, apparels, paints and travel segments, and 100% of its customers have adopted digital payments. On a cumulative basis, Mintifi has disbursed approximately 3,500 loans to around 2,400 MSMEs since its launch, and aims to grow the borrower base to over 40,000 MSMEs over the next five years.

Outlook

Given Mintifi's elimination of the collateral requirement and its simplification and digitalization of the loan application process, there has been a strong adoption of Mintifi's services, with nearly 27,000 MSMEs already applying for loans. In May 2019, the IFC invested US$7 million in Mintifi's online lending platform that will enable them to further grow and fund financing requirement of MSMEs through Mintfi's platform. This will enable Mintifi to reach out to MSMEs directly and fund them at highly attractive interest rates, given their elimination of the middleman and their ability to source data required for the MSME borrowers assessments.

Lessons Learned

- An anchor-driven approach could be effective in reaching and serving a large base of MSMEs.
- Digitalization and technological integration are key to enable MSME lending solutions at scale.

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[48] The results included in this section are not exclusive to the financial product of bill discounting limit, but to all financial products offered by Mintifi.

[49] Data as end of company fiscal year 2020, i.e. Mar 31, 2020.

Case Study 3

Flowcast: big data, smart credit

Country: USA

Context

Flowcast is a California-based FinTech company founded in 2015. Its mission is to make financing efficient and accessible at every stage of the supply chain cycle, optimizing a company's cash flow through the use of data science. Flowcast aims to revolutionize trade and supply chain finance by leveraging its patented machine learning methodologies that utilize an artificial intelligence (AI) platform to automate and power smart credit decisions.

When Flowcast entered the market, the founders wanted to help gain access to capital. Flowcast recognizes that as result of the lack of credit information formal lenders have a hard time assessing SMEs' creditworthiness which hinders the ability of financial institutions to predict a business risk. Also, traditional credit scoring methods are unsuitable for SMEs because they are static and center on a company's financial statements, not taking into consideration other valuable accounting and non-accounting data. Additionally, if an SME lacks information in one of the scoring fields, a financial institution does not rate it[50].

Solution and SCF Program

To address this problem, Flowcast uses its AI platform and machine learning methodologies to create high-performing predictive models that assess the risk of firms with limited information available for traditional risk scoring practices. To calculate these, Flowcast gathers existing fragmented financial data from SMEs and combines it with alternative information to produce what they call *smart data*. This includes information on transactions, industry data, and business information (see figure below). Even though the use of *smart data* does not replace traditional credit data, it does enhance credit assessment for financial institutions.

Supply chains contain a tremendous amount of the data needed to calculate this new credit scores that can reveal creditworthy insights of both buyers and suppliers. Some of the structured and unstructured information available are payment performance, order pipeline, product information, and end-user data. In such sense, supply chains could help Flowcast empower financial institutions and other formal lenders to achieve the scale that is needed to

Source: Flowcast. White Paper 2018

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[50] For more information, see: https://flowcast.ai/index.html#learn-more
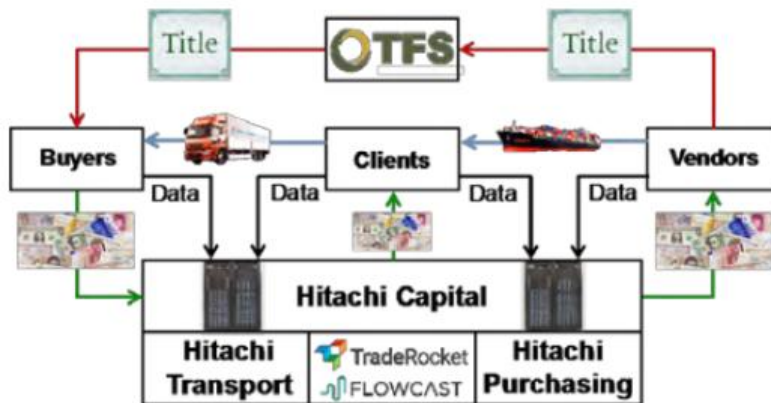
Source: thepaypers.com, interview with Tom Cross, General Manager of Hitachi Capital.

serve the SME segment which could result in greater financial inclusion.

With this in mind, Flowcast built "Smartcredit" to help SME distributors in emerging markets access working capital for the purchase of goods. Based on invoice-level data gathered through their platform from anchor companies, Flowcast's predictive model calculates with an 85% accuracy and a false negative error rate of <05%. It is important to note that, even though the innovation aims to help SMEs in emerging markets, the output of the models is ultimately used by financial institutions and other funders helping them to reduce risk.

Results

This is currently active in the United States, Europe and South East Asia. Standard Chartered Bank, ING and Nike are among their customers. In the case of one telecom client with an annual $20 billion procurement spend, substantial benefits accrued to the telecom as buyer, its suppliers, and the supporting lender. In this case, the purchasing order to payment duration can be as long as 250 days. Typical SCF covers only 45 days (i.e., one-sixth of the cycle). What the supplier really needs is the other 205 days, but lenders are generally uncomfortable because suppliers face performance risks including: cancellation of the purchasing order, delayed shipment, shipment of the wrong stock keeping unit (SKU), and so on. AI helped close these risk gaps:

Future of the Solution

As supply chains digitize down to the edges of their networks, this data availability will grant improved risk assessment for even the smallest shops. Flowcast is trying to prove that robust analytic capabilities can outperform traditional capabilities and cost models. These capabilities will only improve over time as machine learning techniques can continually refine models based on the positive feedback mechanisms of lending results and growing realizations of data correlations.

Lessons Learned

- **Ease of use and extensibility.** To ensure an uptake in the digital solution, the developers need to be able to explain the predictive outputs of the innovation to the parties involved in the financial instrument. The ability to explain the model is equally important to the accuracy of the prediction itself. The rise of complex machine learning models makes *explainability*[51] a key element in AI.

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[51] Explainability refers to the methods and techniques in the application of AI technology such that the results of the solution can be understood by others.

Turkey: Turkish Revenue Administration Leading Digital Transformation

Year of implementation: 2010

Stage of maturity: Mature/Developing

Regulatory entity: Turkish Revenue Administration (TRA)

Context

The Turkish Revenue Administration (TRA), a public institution that works through the Ministry of Finance, has been pushing to shift paper invoices to an electronic format through e-invoicing and e-bookkeeping. The TRA aims to ease their daily tasks by remotely monitoring and auditing tax data, while closing the gap from lost taxation. Electronic invoicing and bookkeeping systems were implemented in 2010 and made available to all companies between and 2010 and 2011. Their use was voluntary and only for companies and taxpayers that met certain criteria, although every issuer registered in the system automatically became a recipient and is required to accept invoices in electronic format when another issuer decides to submit them by this channel.

In 2012, amendments to the regulation of e-invoicing and e-bookkeeping made the system mandatory for certain groups. Nowadays, the use of e-invoicing is mandatory for companies operating in the hydrocarbon sector or with products subject to special taxes (tobacco, alcohol and soft drinks). Taxpayers who fall within this scope are required, as of September 2014, to deliver their legal books in electronic format (e-ledger). The Ministry of Finance estimates that the size of the Turkish market amounts to 2 billion annual invoices[52].

In 2019, the TRA declared that e-Delivery Note, and e-Archive were also mandatory for all registered e-invoice taxpayers. Furthermore, taxpayer's with gross sales revenue in 2018 greater than 5 million Turkish lira are required to register for e-Archive invoicing. This has also become obligatory for taxpayers posting ads on the internet, all internet advertisement service intermediaries, and e-Trade intermediary service providers.

Implementation and Current Operation

To have a secure circulation of e-invoices between issuer and receiver, the transaction of e-invoices must be conducted through the TRA. For this reason, the government established a state-owned e-invoicing platform which acts as the system hub. Issuers of e-invoicing in Turkey cannot send their documents directly to the recipient. Instead, e-invoices are required to be sent at all times through the TRA platform which receives all the documents from the issuers before forwarding them to the recipients via web services. The TRA platform is the center of the scheme that keeps an updated database of all registered users and has an e-archive scheme in place where invoices are transmitted to end-users via electronic mail.

This makes the exchange of invoices in Turkey unique, since there are two systems in place. On the one hand, the e-invoice system where the TRA acts like the hub that can access all invoices in real-time. However, only Turkish registered users can exchange e-invoices among themselves. As a result, companies are still expected to issue invoices in official serialized, pre-

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52   B. Koch. (2016). E-Invoicing/E-Billing. Digitization & Automation. Billentis. May 27.

• Authorize
• E-archiving

TRA

Registration

Registration

E-invoice cleared

• E-signing
• E-archiving

Service Provider

Supplier

E-invoice issued

Buyer

E-invoice agreement
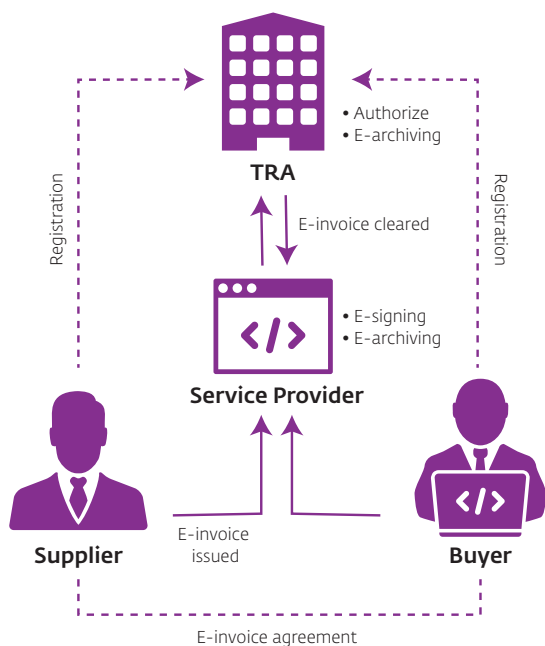
printed paper to the costumers and companies that are not registered[53].

It is important to note that it is required to register with the TRA to become an e-invoicing issuer. There are two ways to do it: the traditional paper-based form, and an online format. During registration, an e-invoicing method needs to be chosen which could be through the use of the TRA portal, direct integration to the portal or the use of a service provider. In the case where a service provider is chosen (e.g. FIT and TrustWeaver), another registration process is required. In this case, the supplier and buyer have to send a signed document to the TRA notifying of the final agreement between the three parties[54].

Companies must also obtain an official digital certificate to sign electronic bills. The use of an electronic signature is required to ensure the authenticity and integrity of the e-documents. The e-signature is based on certificates designated as Financial Seal Electronic Certificate issued by "The Scientific and Technological Research Council of Turkey" in coordination with the TRA. Once the digital certificate has been obtained in a smart card, the company will need to connect the smart card reader to a computer.

Once a Turkish company has completed all prerequisites, supplier and buyer can agree to engage in e-invoicing. First, they need to be registered with the e-Invoice Recording System of the TRA. The Turkish company willing to start e-invoicing must apply in writing to the TRA. After on-boarding, the supplier (or buyer) sends an e-invoice to their service provider for processing (e-signing, archiving, and routing). During the signature step, the e-invoice is signed with one of the certificates and keys issued to the applicable company. The e-invoice and attachments are archived by service providers and the TRA. Any other documents that are required in human readable format are also archived and converted into PDF format. Finally, the e-invoice is sent to the TRA for authorization. Once cleared, the invoice is sent to the service provider, which will send it to the buyer. Finally, it is mandatory for both the sender and the receiver of an e-invoice to keep their e-invoices for a minimum of a 10-year period.

E-invoices in Turkey are created in an UBL-TR XML format, which is an international standard that includes all the processes of XML based commercial life as an open source. There are two types of UBL-TR e-invoices: Basic and Commercial. The Basic UBL-TR does not require any response from the buyer, while the Commercial UBL-TR may or may not require a buyer's e-signature.

Results and Market Opportunities

As of January 2015, approximately 20,000 companies were registered in the e-invoicing system. This number increased to 67,000 companies by June

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[53] In this case, registered companies can use the application e-archive which allows them to issue e-invoices that are sent to the costumers via email.

[54] Most service providers have automated this process by distributing a registration program that must be executed on the company's desktop. This program generates the agreement, fills it in with the service provider details, uses the company's digital seal to sign this document, and automatically sends the needed signed document to the service provider. Once the application form has been approved by the service provider, an email with a link and instructions on how to use the registration program is sent to both the supplier or buyer. The service provider, in turn, sends it to the TRA, which completes the onboarding process.

2017 due to the efforts of the TRA to extend the scope of obligation[55]. Currently there are 7,700 registered users in e-invoicing, 63,000 registered for e-archive and 60,600 registered users for e-bookkeeping[56].

The electronic invoice system is not used only for registration or reporting purposes. In some cases, it completely replaces the paper invoice as the legal document and single source of truth. In Turkey, financial institutions and FinTechs have realized that paper work causes more expenses and consumes time in both financial and accounting processes. In such sense, they see e-invoicing as a solution to eliminate these problems, while gathering information on transactions and companies. Third party e-invoice platform like FIT Solutions saw a new opportunity through the use of TRAs electronic model to provide Supply Chain Finance products enabling business clients to view their outstanding invoice and the value that they are owed, and link companies through their portal to access capital by applying an earlier invoice payment date.

In 2016, the Minister of Finance announced that digital finance and procurement are important to combat the shadow banking and shadow economy. They recognized that e-invoicing, as well as other federal e-procurement practices can increase the transparency. Furthermore, in 2017, Turkey's Banking Regulation and Supervision Agency announced they were allowing electronic invoices and electronic archives to now be used for factoring transactions.

Lessons Learned

- Structured billing data can be automatically read and processed by the receiver. This provides lenders with a reliable source of actual invoices of a small business.
- Standardization of documents and content enables multiple systems connectivity and an easier review and validation process by a financial institution.
- The use of third-party technology platforms can be used as intermediaries for large corporations to help them access financial resources through banks.

Nevertheless, Turkey's electronic invoice system still has challenges. For example, companies need to invest in infrastructure. Since Turkey is still developing and expanding, there are new regulations that are constantly coming in the area or e-invoicing and its use in Supply Chain Finance. Because of all these changes, companies need to maintain their staff and systems up to date to ensure compliance to new regulations.

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[55] PwC Turkey (2017). Electronic Transformation in Turkey.

[56] For more information, see: https://ecosio.com/en/blog/further-digitisation-for-e-invoicing-in-turkey-the-journey-to-e-transformation/

TiendaPago

Tienda Pago: Distributor Data Empowering Neighborhood Stores

Country: Peru and Mexico

SCF instrument: Merchant cash advance

Context[57]

Tienda Pago is an alternative financial services provider specialized in supply chain lending. Tienda Pago first started operations in 2013 in Venezuela, in partnership with Nestle and Pepsi, expanded to Peru in 2014, with Coca Cola, Gloria and Abimbev, and began operations in Mexico in November 2016. As of December 2017, Tienda Pago had partnerships with eight distributors – six in Peru and two in Mexico.

Tienda Pago saw that SME merchants often had limited cash availability to pay distributors, which resulted in limited inventory, reduced sales, and smaller and more frequent orders. Moreover, SME merchants lack access to formal, short-term working capital from formal financial institutions. This can be partly explained by the speed and size of the transactions required by these companies which makes it challenging for banks to service this segment. In addressing the needs of their clients, some fast-moving consumer goods (FMCG) companies or distributors manage their own financing programs to merchants or small businesses. This entails developing lending and collection functions well beyond their core businesses, which could make the provision of credit less efficient and sustainable. Additionally, they would be assuming unnecessary risk by providing uncollateralized lending with limited capabilities to assess the respective merchant's credit risk.

Solution and the Supply Chain Finance Program

Tienda Pago emerged in the market as a FinTech lender that targets specifically small, traditional stores which are part of the FMCG's distributor chain. The core product is a 7-day credit line enabling small merchants to purchase inventory on credit at the time of delivery. It offers instant, uncollateralized working capital loans by integrating a mobile platform with the operations of FMCG distributors.

Tienda Pago's business model has four main components:

1. **Mobile interface and data analytics**
2. **A strategic partnership with FMCG distributors**
3. **A tailored approach to merchant onboarding**
4. **Digital loan disbursement and repayment**

Tienda Pago's operations in Latin America

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57   This case is excerpted from a more in-depth study conducted by IFC, "Digital Solutions for Merchants and Fast-Moving Consumer Goods Companies and Distributors: The Tienda Pago Experience", International Finance Corporation, 2019.

Operations are highly automated, with an approval process based on a proprietary scoring algorithm, remote KYC and account opening, as well as fully electronic disbursements and collections.

The first step of the model is establishing a strong relationship with FMCGs to optimize the costs of onboarding, processing and collecting loans. The company bases its credit decisions largely on the analysis of retailers' purchase histories within the distribution network, as well as alternative data (e.g., data from credit bureaus). Tienda Pago's proprietary credit scoring tool independently determines a credit profile. The scoring model monitors ongoing transactions with distributors to continuously develop the predictive capacity of its algorithm by adding data sources and developing behavioral scoring dimensions to improve merchants' ability and willingness to repay the loans, as well as to make decisions about whether to increase or decrease the credit limit of a particular merchant[58].

Tienda Pago carries out a business review and coordinates with each FMCG to synchronize access to transaction data and sets up a system for daily settlements. They train the FMCGs' distributor personnel (sales, delivery and call center teams) on benefits of and ways to encourage product usage. The training is especially important because

Source: Tienda Pago. Prepared by IFC

Process for Affiliating Merchants

Distributors' presales team approaches merchant during a regular visit: Offers any pre-approved merchant a credit line and urge the merchants to call Tienda Pago and sign up for the loan.

Merchants call Tienda Pago: Once the merchant calls Tienda Pago, the credit line is activated. This can be also done at the time of the presales visit.

Tienda Pago's sales force visit the merchant: Tienda Pago explains the terms and conditions in greater detail, complete a questionnaire which includes demographic information and sign the loan agreement.

Source: Prepared by IFC based on Tienda Pago information

sales and loan utilization depend on the capacity of distributor personnel to encourage active product use.

The starting credit line offer is equal to the merchant's weekly sales (calculated on a three-month average)[59]. Merchants can use their credit line to purchase goods from any of the nine

FMCG company affiliated with Tienda Pago. Credit lines are managed by the merchant's cell phone and the delivery truck driver. Payments for products purchased are made directly by Tienda Pago to the account of the FMCG, while merchants repay the lines on a weekly basis to Tienda Pago through either banks or agents[60]. As of December 2017,

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[58]   Currently, over 80 percent of merchants working with Tienda Pago distributors qualify for a loan.

[59]   Generally, merchants borrow between $150 and $1,000 dollars

[60]   Tienda Pago has accounts with 3 Mexican banks and 6 banks in Peru.

Tienda Pago offered a 7-day loan with a fixed fee of 1.5% - 2.5% of the loan value[61].

Results

As of December 2019, Tienda Pago had 17,142 affiliated merchants in Mexico and 27,101 in Peru, and an outstanding portfolio of 88.6 million Mexican Pesos (approximately US$3.7 million) and 31 million Peruvian Soles (approximately US$8.9 million). Client average loans are around US$332 in Peru and US$214 in Mexico, with an average interest rate of 2.5%, and an average frequency of use per client of 2.3 times per month. Around 35% of the affiliated costumers never use it.

Those merchants actively utilizing the Tienda Pago credit line are experiencing sales growth of up to 25%.

Tienda Pago's model is young and evolving. The business model does not accommodate serving loans smaller than $50. Tienda Pago observes that stores purchasing over $300 in stock weekly are more prone to utilize the working capital loan to increase their sales.

Distributors have reported that promoting the use of Tienda Pago's service is sometimes a distraction given their need to minimize time spent with each merchant in order to make all deliveries[62]. Building in incentives for the drivers themselves to encourage use of the credit product may result in further product adoption.

Future of the Solution

Tienda Pago has been looking to scale up operations. In February 2019, they welcomed US$1 million dollars in funding from Triodos Investment Management. Going forward, Tienda Pago is looking to fully digitize all operations, including all front and back end processes (e.g., currently actual signing of the contract is still done on paper). The IT systems (including the automated customer relationship management and digital sign up) are only now starting to be implemented in Mexico but are working in Peru.

Management understands that financial literacy is a key for Tienda Pago's success and therefore leveraging WhatsApp to drive activity and educate merchants as well as expanding current marketing efforts. 75% of all Tienda Pago clients own a smart phone and 60% of them have a Facebook account and log in on a regular basis. Tienda Pago is in the process of developing a strategy for this.

Lessons Learned

- **Distributor-merchant relations are key.** Tienda Pago relies on distributor pre-sales and delivery staff for processing day-to-day transactions. While this is efficient, the relationship between the distributor personnel and the merchants is vital for merchant acquisition and usage of Tienda Pago, therefore incentives need to align.

- **Staff must have strong knowledge of the financial product.** Trainings for both merchants and FMCG distributor staff can help strengthen the relationship with the customers and mitigate the impact of turnover. Training can also make the process more efficient, reducing time at the point of sale. In addition, merchants value a clear understanding of loan fees and conditions. If merchants do not fully understand the product, they will not use it.

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[61]   As of December 2017.

[62]   It has been estimated that distributor's truck drivers with an average portfolio of almost 300 stores will visit 30 each day to deliver stock.

Case Study 6

Jaza Duka: Technology and Partnerships for Greater Financial Inclusion

Country: Kenya (pilot)

SCF instrument: Distributor finance

Context[63]

In 2017, Unilever and Mastercard established a strategic partnership introducing a range of joint initiatives to empower micro, small and medium sized enterprises (MSMEs) across the globe. Unilever and Mastercard saw how liquidity constraints challenged MSMEs in their ability to grow their business. They identified how micro and small retailers and entrepreneurs operating on a cash basis usually lacked collateral and had no credit history or information on the financial system, which limited their ability to access capital from formal financial institutions. They also noted some that micro and small enterprises often borrowed money from informal lenders offering less favorable terms that could potentially trap them in debt.

Solution and the Supply Chain Finance Program

The initiative, Jaza Duka ("fill up your store"), was developed by Unilever's IT and CSO teams, Mastercard, and KCB.

Partnership Parties and Beneficiaries

Mastercard — Technology company in the global payments industry.

MSME retailers & entrepreneurs in Kenya

Unilever — One of the world's leading consumer goods company.

KCB — Bank with the largest banking network in Kenya.

Jazz Duka is a digital working capital platform that tracks how much Unilever product a merchant has purchased over a period of time and combines that information with a credit analysis performed by Mastercard. KCB then receives that analysis as a credit score and uses it to determine an interest-free credit line the merchant will receive to buy more Unilever products, available through a virtual credit card issued by Mastercard.

Unilever distributors i) explain the Jaza Duka credit offer to merchants, and ii) documented the necessary identification materials required by KCB to open virtual credit card accounts. After receiving KCB approval, the merchant received a text message notifying them of the approved credit limit and an invitation to activate their credit line via a USSD-based process[64].

Jaza Duka credit is interest-free within a short grace period of 17 days and can be paid back via MPESA mobile payments or at KCB branches. If the merchant fails to repay the minimum balance due within the guidance period, the account will temporarily be locked until the merchant makes repayments, with a monthly pro-rated interest fee of 3.5% starting once payment is overdue. Merchants are given the opportunity to continue purchasing stock using cash for a limited period, as an opportunity to repay outstanding debt to Jaza Duka.

Merchants have access to: i) training on financial management and merchandising that can support their
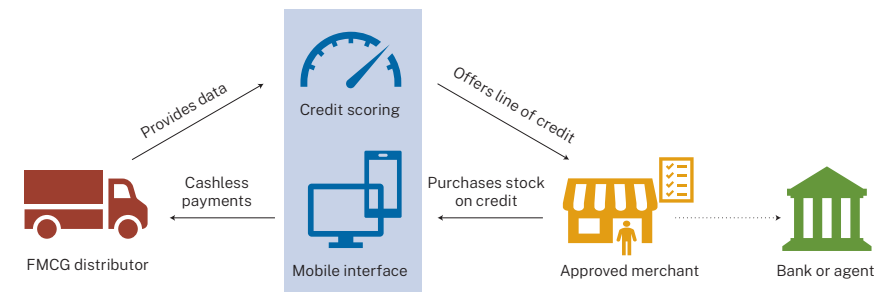
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[63] This case is excerpted from a more in-depth study conducted by IFC, "Digital Solutions for Merchants and Fast-Moving Consumer Goods Companies and Distributors: The Tienda Pago Experience", International Finance Corporation, 2019.

[64] USSD-based process stands for Unstructured Supplementary Service Data-based process which is a Global System for Mobile communications technology that is used to send a text between a mobile phone and an application program in the network.

Why Digitize the Supply Chain?

Kiosks: More sales
CPGs: Better sales and stock info
Distributors: More efficient working capital
Banks: New SME customers

business growth[65]; ii) access to a free text-based training program to help them understand the importance of proper credit management and financial skills; and (iii) onboarding support and ongoing training in the payment system for distributors.

Results

Within a year of implementation, the Jaza Duka initiative had signed up over 17,000 merchants through Unilever's distributors and the initiative grew sales by 20% in the first six months of accessing the digital working capital loans. Jaza Duka also experienced an 83% usage rate among activations, 70% of which are now regular repeat users of the credit product[66]. Furthermore, the information provided by Unilever through the digital platform improves the robustness of sales data, deepens the understanding of its supply chain, and helps create a credit history for SMEs in the financial system.

However, initial investigations of merchants who were delinquent in their repayments suggest more training and education would be welcomed to

ensure merchants understand the product's terms and conditions (90% of accounts locked due to payment delinquency are repaid within 2-3 weeks – suggesting the service is valued and accounts are not lapsing due to lack of interest).

Going Forward

Mastercard and Unilever are already working on scaling up the initiative and have invited other financial institutions to join the program. They aim to expand Jaza Duka to markets across Africa and Asia Pacific. Mastercard is testing trainings, digitally self-guided tools, and behavior mechanisms to drive even greater results. These trials are underway with findings to be incorporated into future iterations.

While the Jaza Duka process is innovative in leveraging the established presence of Unilever's distributors to engage merchants and capture digital versions of necessary identification material, there remains room for improvement. The current model offers a broader reach than KCB could achieve on its own for initial engagement and reduces a potential adoption barrier for those merchants not accustomed to working with KCB. However, the activation method introduced at launch utilizes the mobile USSD menu method for gathering merchant confirmation of account obligations. This means that the process is at risk of interruptions and delays, reducing activation conversion. Given that the activation process is a

one-time obligation, Jaza Duka can contemplate using the same Unilever distributors to potentially alleviate this process and active participation by KCB to conduct focused activation tours along with its partners.

Lessons Learned

- **Product representatives must be trained to be able to represent, promote, and inform customers on the product.** As mentioned in the previous section, distributors are key in engaging merchants and capturing information relevant for the process of credit approval. They are also Unilever's field agents trained to sell their products. But it was evident that not all distributors were able to explain in detail the financial services provided. Resources need to be allocated to train distributors and provide them with the right tools that can help them support the MSME retailers.

- **Find partners that can provide different strengths to the financial solution.** In addition to the common objective, the different participants in a digital financial innovation should bring individual business strengths that can contribute to the market innovation. In this case, Unilever provided access to the merchant network, Mastercard provided the analytics, facilitated digital payments, and managed the program, and KCB provided the credit line and financial assessments.

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[65]   Mastercard has partnered with TechnoServe to provide MSMEs with the aforementioned trainings.

[66]   The Better Than Cash Alliance. The Future of Supply Chains. Why Companies are Digitizing Payments. June 2018. https://btca-prod.s3.amazonaws.com/documents/360/english_attachments/Better_Than_Cash_Alliance-The_Future_of_Supply_Chains-Why_Companies_are_Digitizing_Payments.pdf?1537974289

Case Study 7

Trefi: Scalable SME Financial Solutions

Country: Peru, Netherlands & Kenya

SCF instrument: Integrated invoice financing

Context

The Receivable Finance Infrastructure Solution (Trefi) is a Netherlands-based non-profit foundation that improves access to finance and doing business for companies based on the quality of their products and services and their business behavior. Trefi also promotes the business development of financiers by creating investment opportunities in MSME finance with a much-reduced risk profile. To maximize impact, Trefi is operated by a partner network and is managed by a board that represents the companies and participating financiers.

Solution and Program

The Trefi platform works with underutilized trade transaction and dispute data to develop risk analytics and tools that can help determine an MSME's credit worthiness. The platform includes a unique secure web-based system with open access and is the first to effectively use supply chain information for MSME risk management; delivering a no cost credit score for MSMEs that do not yet have a formal credit record. Credit reports issued on MSMEs use information such

as payment behavior, order size, facility status, inventory amount, owner/director status, dispute resolution, etc.

The platform provides financial institutions with the infrastructure to perform invoice financing, invoice payment, invoice risk management, invoice collection, invoice insurance, invoice settlement, compliance and operational risk management. Financial Institutions can facilitate through the platform help large suppliers manage the credit they grant to MSME and increase the amount of finance they provide to the right MSME buyers of their products.

Daily operations on the platform are fully automatic.

MSMEs can subscribe, sign the financing contract, provide the required KYC information, request finance, choose and accept an offer of finance via the platform. MSMEs can use mobile and online facilities to present invoices, negotiate terms, resolve queries and disputes, collect invoices, and get paid effectively. Furthermore, MSMEs can access accountant services if necessary.

Large companies can also subscribe and provide receivable information, obtain a confidential valuation of their portfolio that details its financial ability and risk profile, sign the finance documentation, request finance, and choose and accept an offer of finance. Invoices have to be submitted through the platform's manual interface of the company's management system or they can be sent through the platform.

Finally, the platform is integrated with a multi-financier securitization structure, offering the ability to facilitate unlimited liquidity to the platform against collateral of the invoices purchased, and allowing multiple financiers to operate in parallel. Financiers are also offered tools for customer relationship management, risk management, back-office, collection and work-out functionality, and capital market access.

Results

At the end of 2015, the platform had lent approximately US$12 million to almost 2,000 SMEs. Furthermore, banks using the platform in their underwriting, reported in 2015 that the system had

Components for Receivable Finance

Company Tools	Financier Tools	Servicer Tools

Authentication Infrastructure

- Customer intelligence
- Independent risk quantification infrastructure
- Receivable Finance Core System — Registration
- Certificate Authority
- Legal infrastructure / Orperations protocols and procedures — Receivable Sale and Transfer Standard

Development: Tool, Process, Business Logic, Web Services

Servicers: Credit Information, Collection Service, Insurance, Integration, Back Office, Payments

reduced default by 35%[67]. By the end of 2019, the platform processes over half a billion dollars annually in invoice financing in Peru serving over 40,000 MSMEs.

Trefi pioneered the MSME-to-MSME invoice market in collaboration with a chain of micro finance institutions and a factoring company, which to date has not been developed in emerging markets. In 2016, a new law and regulation were introduced in Peru, which allows an invoice to be converted into a security without the consent of the buyer thus creating an efficient collateral registry for invoice finance. With these new regulations in place, invoice financing can deliver on its promise of offering working capital finance to MSMEs at lower cost and risk than traditional financing products.

Moreover, new legislation coming in Peru will allow for full digitalization of the financing process. This removes approximately 50% of the operational cost.

Future of the Solution

In Peru, Trefi is close to obtaining the first ever license for a Business Clearing House, a regulated entity designed to implement benefits of Peru's new legislation. Once this license is obtained, Trefi will be able to integrate a MSME-focused invoice and invoice finance clearing product.

Trefi is expanding into Kenya and various other countries. At the beginning of 2019, Trefi was awarded a grant to pilot the first model to increase access to finance to healthcare SMEs. This pilot allows pharmaceutical distributors to turn their invoices into collateral, unlocking long-term credit for their SME customers[68].

Lessons Learned

- **Laws and regulations can restrict the implementation and impact of the solution.** To make sure the financial solution can be implemented and scaled in a specific country, founders need to make sure it complies with local laws and regulations. Also, it is important for the company to keep up with any changes in laws, tax laws and regulations that may make the solution too expensive or impossible to operate.
- **Pilot studies could be a crucial element to adjust the innovation to a new reality.** In the process of expanding the financial innovation, pilots can be a crucial element to help the company understand the context and adjust the model and characteristics of the product. Conducting a pilot study does not guarantee success, but it does increase the likelihood of success and can help introduce a new financial product to the market.

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[67] LatinFinance. Innovation in SME Finance in Latin America and the Caribbean. December 2015.

[68] For more information, see: https://www.convergence.finance/news-and-events/news/6JZ3PVDeRyAdGHh6t7S8PI/view

nomanini

Standard Bank

Nomanini: Accessing Informal Retail Trade

Country: Zambia, Lesotho, Eswatini, Mozambique

SCF instrument: Supplier Credit for Retail MSMEs

Context

Nomanini, ('anytime' in siSwati), provides informal retailers with tools to improve business by the combining new digital financial services and existing distribution networks.

In Nomanini's target markets, 4-6 million informal retailers account for 86% of retail transactions. These retailers are typically sole proprietors who operate from a single, fixed location, employ one or two casual staff (usually a spouse or family member), and generate 80-85% of their revenue through the sale of fast moving consumer goods (FMCG). The remainder of their revenue is made up by over-the-counter (OTC) electronic payment transactions, such as prepaid mobile airtime top-ups and mobile money deposits and withdrawals. Nomanini's data shows that each retailer serves between 50 and 100 consumers per day.

Informal retailers scarce working capital has to be apportioned between a range of products that must always be in stock – as customers are lost whenever specific products are not available. As sole proprietors, retailers also need to

Challenges in the informal economy

Reliance on cash

Lack of working capital

Fragmented value chain

be present in their shops to operate. Leaving the shop for extended periods of time (e.g., to go to a bank branch) results in lost revenue.

Banks need to provide business-focused financial services to these enterprises. However, Banks' internal business banking systems are not designed to onboard large numbers of micro, small, and medium-sized enterprises at low cost, as the economics of customer acquisition through traditional bank channels is not viable.

In 2019, Nomanini partnered with Standard Bank, Africa's largest bank by assets, to implement an open-loop platform to provide business banking services to informal retailers in a format that is suitable to their businesses.

The partnership enables Standard Bank to onboard informal retail merchants as SME clients without requiring the bank to modify its existing SME processes or requiring informal retailers to open a traditional bank account, or even visit a bank branch.

Solution and the Supply Chain Finance Program

Nomanini's platform enables banks to offer financial services to informal retail merchants via an inter-operable wallet that caters for multiple financial products. These include a current account and Lines of Credit (LOCs). The current account is used for OTC electronic transactions with consumers such as mobile airtime, bill payments and cash in/cash out. LOCs provide access to safe credit which retail

THE PLATFORM

A **Retailer-facing application** connected to a **platform** with **management dashboards** for an array of stakeholders to operate.

Retailer-facing Application	Platform	Management Dashboards
Android smartphone users can download the app, use a terminal or use third-party trading applications.	Supports interoperable business banking wallets which integrates to local services, payments and banks.	Enables support teams, field representatives, loan officers, etc to monitor and manage a network of retailers.

merchants can use as working capital to maintain products that they stock and sell to consumers.

Using Nomanini's SaaS platform, Standard Bank is able to partner with third-party distribution channels to serve informal retail merchants at scale. Existing relationships between informal retailers and the FMCG value chain are leveraged to provide an end-to-end service to onboard and manage merchants as bank SME clients. FMCG value-chain partners benefit from secure last-mile supply chain financing or credit – which increase sales.

A fully-electronic know-your-customer (KYC) module further enables merchants to be onboarded electronically without ever having to visit a bank branch. The project needed to address the perceived risk to the accuracy of KYC data used to maintain compliance with the bank's regulatory framework. An electronic KYC module was implemented to capture images of all the required documents together with a geo-tagged image of the retailer's physical premises. The KYC data was then integrated with the bank's automated sanctions screening and customer risk assessment back-end systems to ensure regulatory compliance prior to the onboarding of merchants.

Informal retail merchants who have been onboarded can supplement their income with OTC electronic transactions, from which they earn transaction commissions. Retailers trade based on a cash-first model for 30 days, which generates sufficient transactional data that is applied to the automated credit scoring process.

The credit scoring module then creates personalized credit offers for each merchant. These are presented to the merchant via their Android app.

The loan is originated by the retailer accepting an offer, which triggers a loan disbursal routed internally within Nomanini's platform. Loans can be used as a means of paying for stock – either in the form of credit to their current account for OTC electronic transactions, or as supplier credit for the purchase of physical goods.

At scale, this base of customers allows banks to grow their points of presence into the informal market without the costly capital expenditure associated with branches and ATM networks.

Results

Following the initial partnership with Standard Bank, data shows banks are able to onboard more than 20 merchants per week per branch with minimal back-office staff through partnering with FMCG companies.

More than 70% of onboarded retailers were eligible for credit after the initial 30 day period, and over 80% of those retail merchants who used credit once went on to become repeat borrowers. Significantly, this credit funded between 60% and 80% of the retailers' trading volume.

After six months, through the close alignment of the credit offer, the business of the retailer, the stock financed, and the FMCG value-chain, fewer than 1% of loans were classified as non-performing.

Future of the Solution

Nomanini is continuing to expand the capabilities of its platform to further enable retailers to access more lines of credit for electronic and physical goods financing in addition to their current account. Plans are in place to expand the range of financial services that these enterprises can access through the platform, including business-focused insurance, goal-based savings, funds disbursals, and foreign remittances for immigrant retailers back to their home countries.

An additional avenue being explored is the leveraging of the FMCG partnerships to provide a channel for cash handling. Retailers in the cash-based informal trade tend to accumulate cash. FMCG distribution chains have well-established cash handling processes for the payment of physical goods. Nomanini believes these cash handling capabilities can be leveraged to support the digitization of cash deposited by retailers into their wallets. These cash channels are more convenient for the retailer at a lower cost.

Lessons Learned

- **Focus on the customer need.** Once a bank starts serving informal retailers, it is able to move faster to improve and introduce new services based on real customer insights. In an underserved market, this requires an iterative and inclusive approach. There is a distinct need for customer-centricity and the openness to inter-operable solutions if banks are to succeed in this space.

- **Ensure alignment between partners.** A partnership between a bank and FMCG distributors is complex to set up but once all parties are aligned, both the bank and the FMCG distributors benefit. It is essential to spend time upfront to ensure that all stakeholders are aligned on:

  1. How implementation unlocks value for each stakeholder.

  2. The specific roles and the responsibilities of each and how they interact.

Simple Credit: Digitized Agri-Lending Solutions Tailored to Value Chains

Country: China

SCF instrument: Distributor/Producer Finance

Context[1]

Simple Credit (XYD.CN) provides microfinance, supply chain finance, and consumer finance through digital distribution channels with its big-data-based credit assessment methodologies (it has obtained more than 100 international patents on anti-fraud modeling, data analytics, and blockchain technology). Founded in 2015, Simple Credit established an Agri-finance department in 2018 to provide financial services to farmers and SMEs along agriculture supply chains.

The Supply Chain Finance Program and Digital Solutions

By partnering with agricultural input and machine manufacturers (anchor companies), Simple Credit leverages historical customer and sales data in a partners' Enterprise Resource Planning (ERP) system for its loan appraisal and approval process. This enables it to provide non-secured loans to farmers and Agri-input dealers – and consequently addresses one of the

biggest bottlenecks in China's Agri-finance, as large commercial banks are generally reluctant to lend to small farmers because they often lack the collateral and the necessary credit history.

The anchor company markets Simple Credit's offering to their customers seeking loans. Given the important role anchor companies play in this model, Simple Credit selects the highest quality partners and implement strict risk control procedures. An anchor's recommendation does not guarantee a loan for the customer. Simple Credit verifies the customer's identity using

face recognition technology, runs the basic information in the anti-fraud model and/or screens other third-party databases to detect outliers, and checks the customer's repayment capacity and willingness through phone calls as well as the authenticity of the submitted documents. Utilizing big-data analytics and technology-driven solutions, Simple Credit is able to serve customers quickly and efficiently.

Simple Credit offers three supply chain finance products: two Agri-input loan products for farmers and rural MSMEs to purchase inputs (seeds, fertilizers, animal feeds, etc.), and one Agri-machine loan

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[1] This case is excerpted from a more in-depth study conducted by IFC, "Digital Solutions for Merchants and Fast-Moving Consumer Goods Companies and Distributors: The Tienda Pago Experience", International Finance Corporation, 2019.

supporting farmers and micro, small, and medium-sized enterprises (MSMEs) to purchase machinery (tractors, spreaders, cultivators, etc.). As shown in the charts below, the lending process for each product is slightly different. For the three products, the credit line validity is generally between 12-24 months, with a maximum loan amount of RMB 200,000 (US$ 28,237) and a flexible loan tenor that matches the individual borrower's production cycle.

Figure 1. Agri-input Loan (Product A) Lending Process

Results

Simple Credit's loan products effectively helps address issues encountered by anchors and their clients. For example, one anchor company's customer retention rate rose from 85% to around 92%, and monthly sales increased by RMB 3-5 million (US$ 423,345 - 705,576), due to the introduction of the stable, collateral-free financing channel that addressed clients' short-term liquidity issues (farmers/MSMEs). Clients also appreciated the quick loan approval and disbursement process, (15 minutes after loan application initiated), flexible repayment schedule, and short tenors (1-3 months).

Figure 2. Agri-input Loan (Product B) Lending Process

However, there is still room for improvement. Currently there are no incentives for the anchors' sales team. As the company relies heavily on the anchor companies' sales force for loan marketing, it is important to ensure that the sales force's interests are aligned with that of Simple Credit. Also, according to borrower feedback, the current maximum loan amount is relatively low.

Figure 3. Agri-machine Loan Lending Process

Future of the Digital Solution

Simple Credit plans to apply this supply chain finance model to different value chains, with more data- and technology-driven tailored solutions. Simple Credit is also planning to share technologies and SCF experiences with other financial institutions in and outside of China.

Lessons Learned

- **Technologies can enable a streamlined and safe process, increased efficiency and customer satisfaction and behavior data accumulation.** Digital strength and footprint will constitute a core competitive element and allow a financial institution to better adapt to the digital marketplace.

- **High standards for value chain partners is crucial.** Simple Credit partners with large agricultural anchor companies with extended value chains, such as publicly listed companies, and top-ten players in terms of sales in a given sector; engaging first at the top of the value chain, where players have more impact over the entire value chain to reduce risk.

- **Regional pilot programs can prove the sustainability of partnerships and test product diversity.** In a large country like China, it is important to test the regional network of the SCF partners first through pilots and monitor the quality of the partnership before expanding nationally. Identifying regions with high agricultural potential will be conducive to risk mitigation and diversification, enabling broader experiments with diversified products fitting different production cycles throughout the year.

Annex 2: Product Case Studies

Factoring
Institution: HSBC Bank| Country: Brazil (Global)

HSBC

> The challenge: suppliers need a flexible way to finance their working capital and manage their debtors' risk

Benefits

- Supplier:
- Access to cheaper finance
- Increase turnover
- Ability to negotiate better sales terms with the debtors
- Flexible way to finance the working capital

Business Model

1 — Invoice accepted by buyer #1
3 — Financing provided to supplier

Supplier **Bank**

Buyer (Large Corporate) #1

4 — Repayment at maturity

2 — Invoices sent to bank to obtain financing

1 — Invoice accepted by buyer #2

Buyer (Large Corporate) #2
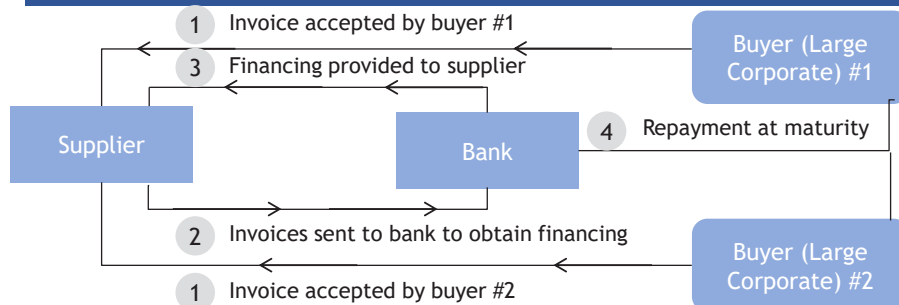
Solution: The Model at Work

- The bank reviews debtor's portfolio and determines eligible debtor ("Corporate") risk
- Suppliers sends their list of certified receivable to the bank
- Bank advances funds to the supplier at a discount and manages the collection process from the debtors

Source: HSBC

Reverse Factoring
Institution: Barclays bank | Country: Global

BARCLAYS

The challenge: suppliers need cheaper access to finance and anchor wants to extend payment terms

Benefits

- Anchor:
- Can negotiate better payment terms with supplier (i.e. longer payment or lower price)
- Supplier:
- Access to cheaper finance
- Increase turnover
- Obtains visibility on approved invoices
- Seamless collection of payments

Business Model

1 Invoice submitted by seller

Seller → Buyer

3 Assignment of receivables

2 Accepted Invoice updated as Collateral on the system

5 Invoice paid on due date

Bank Platform

Advance funds

4
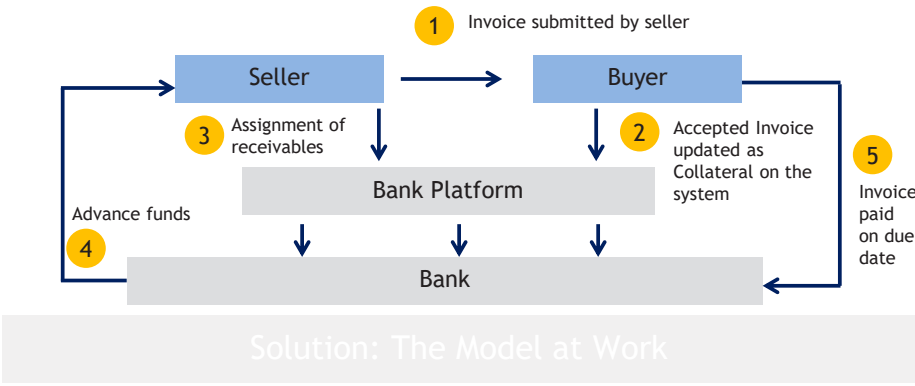
Bank

Solution: The Model at Work

- Bank defines overall credit limit based on the 'Anchor' risk
- Anchor uploads approved invoices information
- Suppliers choose the respective invoices to be discounted which get financed by the bank
- On maturity the bank debits anchor account

2

Source: Barclays

Distribution Financing

Institution: HDFC| Country: India

DEALER

CORPORATE CUSTOMER

1 — Order Booking

5 — Delivery of Goods

Internet / Branch

3 — Dealer Financing

Loan Repayment

6

HDFC BANK

2 — Order Details

Indent of Dealer Finance

4

Internet

- Customer Limit
- Dealer Financing
- Customer Credit
- MIS
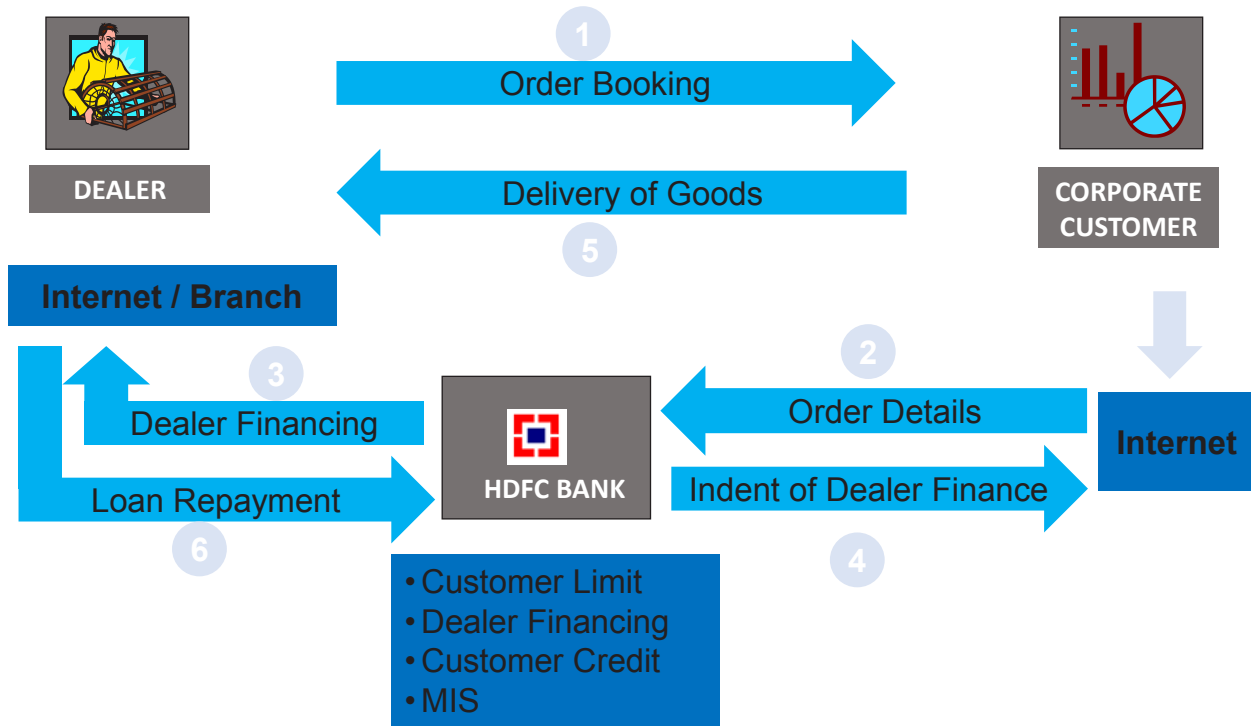
Source: HDFC

Payables Finance

Treasury and Trade Solutions

citi®

How Citi Supplier Finance works for you

- You come to an agreement with your supplier on extended payment terms

- By extending DPO, you hold on to cash longer for improved working capital

- At the same time, your supplier can opt for early payment from Citi at a discounted rate and improve their working capital

- Citi then debits your account on the agreed-upon date

In addition to helping your suppliers gain access to much-needed financing, you effectively improve commercial terms without increasing expenses in your supply chain. This is combined with simplified administrative processes since collection calls are all but eliminated, helping you realize a lower COGS.

Why Citi for Supplier Finance?

Citi has suppliers in 81 countries participating in over 850 Supplier Finance programs.

- **North America:** 52 buyers, 4,086 suppliers

- **Europe:** 191 buyers, 1,813 suppliers

- **Asia:** 415 buyers, 50,400 suppliers

- **Latin America:** 183 buyers, 8,510 suppliers

Citi is the only major supplier finance provider that operates its own proprietary processing platform. For our suppliers, that means there is never an interruption in service since Citi has complete control over the quality, functionality and security of the system and its processes.

Here's how it works.

- **Buyer**

1. You approve your supplier's invoice and send instructions to Citi

4. Your supplier can opt to receive early payment on the invoice, on a non-recourse basis and at competitive discount rates

- **Citi® Supplier Finance**

2. Citi sends you an e-mail indicating that the payment has been approved

5. Citi transmits payments to your supplier electronically

3. Your supplier logs onto the Citi Supplier Finance website to view, print or download payment details

6. Citi debits required funds from your bank account on maturity

- **Supplier**

Invoice Finance
Institution: GT Nexus | Country: USA

GT Nexus

GT Nexus is an IFC Partner and provider of the cloud-based collaboration platform that IFC clients use to automate their supply chain processes on a global scale, and resolve short-term financing needs.

BUYER

Buyer confirms acceptance (Payment Authorization Document(PAD)

2

Buyer pays invoice through GT Nexus at maturity

6

GTNexus sends payment to the supplier

GT NEXUS

Platform Settlement Service (PSS) at JP Morgan Chase

5

SUPPLIER

1

Supplier creates e-invoice on GTNexus and selects financing for the invoice (in case of auto setup, all invoices are selected for financing.)

7

IFC receives funds at maturity from GTN

4

IFC reviews funding request and upon approval sends payment to PSS.

3

GTNexus sends the suppliers' funding request to IFC

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

Distributor Finance
Institution: SupplierCard | Country: Brazil

suppliercard

- ✓ SupplierCard offers a short-term credit facility to the Anchors' clients, which are MSMEs.
- ✓ SupplierCard does not depend on availability receivables to be pledged (which are non-existent in some segments and limited in others) or audited / solid financial statements (which are rare for smaller companies).
- ✓ SupplierCard relies on a credit scoring largely based on the history of the commercial relationship with a large supplier and the importance of the relationship with this supplier for the SME business.

Source: IFC analysis
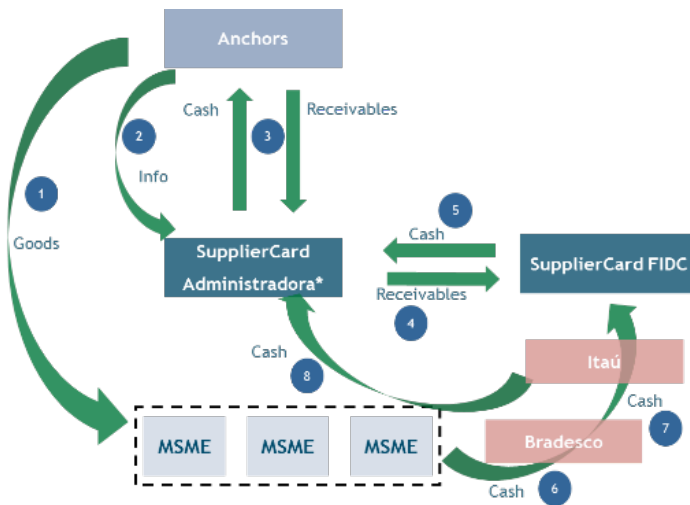
Business Model

- SupplierCard establishes relationships with large ("anchor") companies (Votorantim, Bunge) to finance the customers of these companies. The anchor companies agree to (i) provide them the credit history and other information on their customers; and (ii) cease to supply to these customers in case they fail to pay obligations with SupplierCard.
- SupplierCard pre-approves limits to customers of the anchor companies, based on proprietary credit scoring model
- When customers purchase goods from these anchor companies, they can select to use the pre-approved limit as form of payment.
- Once purchases are paid, client can continue to utilize advised limits in new purchases from the anchor company.

Annex 3: Tools

Tool 1

Market Sizing Tool: Seven Key Steps

IFC has designed a proprietary tool to estimate the size of a given market. Market sizing consists of seven key steps, commencing with the selection of sectors. The tool is designed to support data collection and analysis in a structured form. The slides following illustrate the underlying methodology.

Sector Selection	Sector A	Sector B	Sector C	Sector D
Market Size for Loans				
Non-Discountable Spend				
Average Cost of Goods Sold				
Days Payable Outstanding				
Market Size for Reverse Factoring				
Market Size for Loans				
Ranking Based on Volume				

Market-sizing methodology follows 7 key steps

1 Sector selection	2 Total COGS	⊗	3 COGS breakdown	⊖	4 Non-discountable spend	⊗	5 % of COGS funded through SCF	⊗	6 Days payables outstanding	=	7 Market size

| Select sectors conducive to SCF | Identify total COGS of public and private companies

Sum inputs for each sector using I/O tables (excluding sales to final consumers) | Split COGS for large corporations and for SMEs

Large corporates serve as the market for reverse factoring

SMEs constitute the market for loans, receivables discounting and factoring | Exclude non discountable spend (cost of personnel, R&D, professional services) | Identify average % of COGS funded through SCF (companies do not fund 100% of their spend through SCF) | Determine payment period for which financing is required under 3 scenarios:

1. Extended payment period (potential DPO)

2. Current payment period (existing DPO)

3. Delta in payment periods | Calculate market size for:

1. Reverse factoring (*large corporations*)

2. Loans, receivables discounting and factoring (*SMEs*) |

Largely service-related industry subsectors are less suitable for SCF

	100% All industries	86% Finance excluded	82% Finance sub-industries excluded

Industries	Excluded industries	Excluded sub-industry
1 Consumer discretionary		a Media b Consumer services
2 Consumer staple		
3 Energy		
4 Financial	4 Financial	
5 Healthcare		
6 Industrials		c Commercial and professional services
7 Information technology		d Software services
8 Materials		
9 Utilities		

SOURCE: Capital IQ

Input-Output tables were used to calculate COGS for public and private sector
(Example: Pakistan)

Illustrative IO table

Input-Output (IO) consists of matrices that describe industry interactions including buying-selling relationships & product composition by industry

Governments produce and utilize IO tables for a variety of applications, including benchmarking GDP

IO data is used to develop multipliers that measure the direct, indirect and induced impacts of a change in output in one industry on output, value added and jobs across all industries

Industries as buyers (read down columns)

Industries as sellers (read across rows)

	Agri-culture	Forestry	Mining	Const.	Utilities	Retail trade	Other
Agriculture							
Forestry							
Mining							
Construction							
Utilities							
Retail trade							
Other							

Consumption + investment + Net trade

Intermediate demand **+** Final demand **=** Gross output

Intermediate inputs
+
Primary inputs (wages + profits)
=
Total inputs

GDP

Total inputs = gross output

Summing inputs for each sector (excluding sales to final consumers) yields COGS for the economy

SOURCE: GTAP IO Tables, Expert interviews, Team Analysis

GDP contributions were utilized to break down COGS by company size

Contribution to GDP by company size, %

60	40	100
Contribution of large companies	Contribution of SMEs	Total

Breakdown of COGS by company size, US$ Bn

173	104	69
Total COGS	COGS for large companies	COGS for SMEs
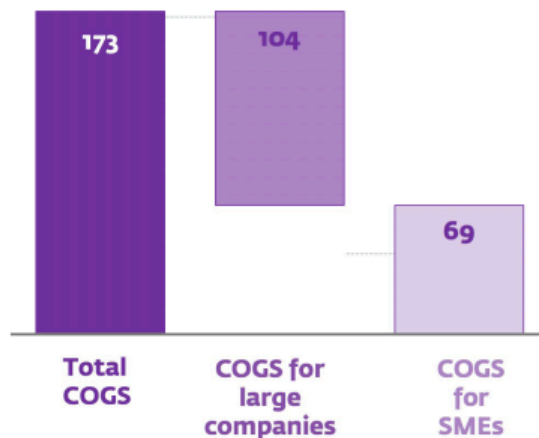
SMEDA[1] provides contribution of SMEs to the overall GDP (~40%), contribution of large companies is assumed to be the remaining 60%

1 Small and Medium Enterprises Development Authority is an autonomous institution of the Government of Pakistan under Ministry of Industries and Production

SOURCE: GTAP IO Tables, Expert interviews, Team Analysis

Discountable spend varies across industries and is ~79% on average

Discountable spend* by industry
% of total cost

Legend: Nondiscountable ▓ · Discountable ■

Industry	Nondiscountable	Discountable
Energy	13%	87%
Software & services	55%	45%
Materials	21%	79%
Food, beverage & tobacco	18%	82%
Capital goods	31%	69%
Automobiles & components	14%	86%
Consumer durables & apparel	35%	65%
Consumer services	66%	34%
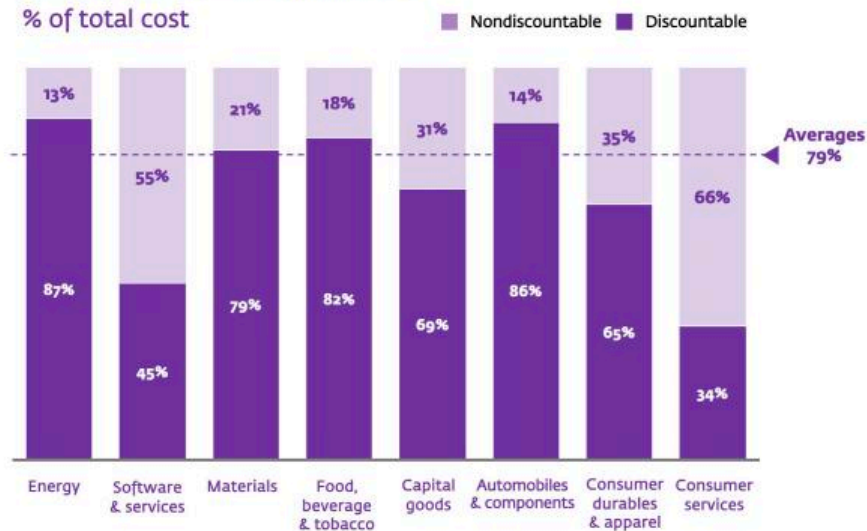
Averages 79%

Adjustment for SMEs is required since discountable spend varies by size of company.

On average, SMEs have ~2x the discountable spend compared to large companies (often results in 100% discountable spend for SMEs).

* % contribution of raw material cost to COGS

SOURCE: IFC data of public companies, Orbis, Team Analysis

Average % of COGS funded through SCF is estimated to be ~70% across industries

Utilization rates for mature SCF programs*

% of implied SCF assets
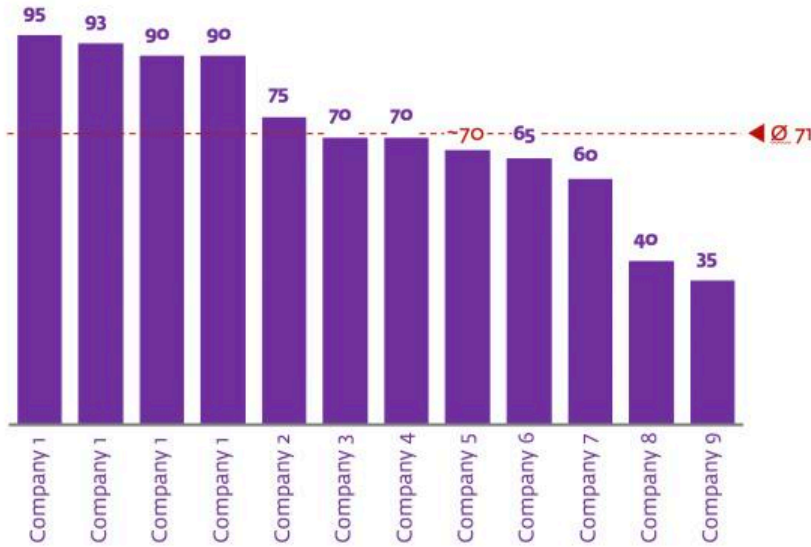
Unweighted average utilization is ~71% for mature programs (after 3 years).

We take a constant view across industries as we believe that utilization, once a program has been set, is driven by operational efficiency that is idiosyncratic to a given company, rather than a structural factor attributable to an industry.

This implies a limited upside by increasing utilization in mature programs.

* Industries that these companies were in included Pharmaceuticals, Biotechnology and Life Sciences, Household and Personal Products, Technology Hardware and Equipment, Consumer Durables and Apparel, Retailing, Materials

SOURCE: Expert interviews

Average DPOs for buyers could potentially rise from ~24 days to ~71 days upon enrolment in an SCF program

Average DPO before and after SCF program, Days

Industry group	DPO across sectors for Pakistan	Best in class* DPO across sectors	Delta
Total	24	71	47
Media	96	106	10
Retailing	80	66	-14
Consumer Durables & Apparel	43	74	31
Automobiles & Components	39	82	43
Consumer Services	20	81	61
Food, Beverage & Tobacco	30	63	33
Energy	51	87	36
Pharmaceuticals, Biotechnology & Life Sciences	47	95	48
Capital Goods	50	93	43
Materials	29	74	46
Real Estate	4	110	106
Telecommunication Services	53	108	55
Utilities	67	106	38

- Adjustment for DPOs will be required for SMEs as they typically tend to have shorter DPOs
- An adverse differential of 23% in DPOs of an SME compared to large companies

* Based on 75th percentile of highest possible global DPO

SOURCE: Capital IQ, EY's Capital Agenda Insights 2011, Team Analysis

Pakistan market potential for SCF assets is estimated at US$18-20bn

| | 1 Sector selection | 2 Total COGS | ⊗ | 3 COGS breakdown | − | 4 Non-discountable spend | ⊗ | 5 % of COGS funded through SCF | ⊗ | 6 Days payables outstanding | = | 7 Market size |

Market Potential

Reverse Factoring

US$ Bn

173 — Total COGS for public & private sector
104 — COGS breakdown for large companies
22 — Non-discountable spend
82 — Discountable spend
57 — SCF asset size
11 — Market size based on potential DPO

Selection of industries conducive to SCF

Other Receivables and Loans Products

US$ Bn

0 — Selection of industries
173 — Total COGS for public & private sector
69 — COGS breakdown for SMEs
0 — Non-discountable spend
69 — Discountable spend
48 — SCF asset size
8 — Market size based on potential DPO

Pakistan Case Illustration

Total market potential for SCF asset, 2017

US$Bn

■ Reverse factoring
■ Other products

19
11
8

SOURCE: Capital IQ, Expert Interviews, Team Analysis

Tool 2

Assessing Market Conditions

It is critical to understand the general market environment, as well as the key players and their activities. This tool is both a checklist of players to map, and a worksheet to help summarize findings on market participants.

Market mapping facilitates understanding the competitive landscape and the needs of buyers, sellers, and distributors.

Market Conditions	Responses
Identify segments under financial stress: Which segments have the greatest financing needs? Why?	
Map E-commerce penetration: What e-commerce platforms are in the market? What is their market share? How many vendors trade on the platform? Do these vendors have access to financing?	
Market player developments	
Identify potential anchor organizations. Which are organizations with a number of suppliers/ buyers? Are there existing relationships to any e-commerce platforms/ FMCG/ manufacturers?	
List digital platforms entering market: Are there any digital platforms operating or planning to operate in the market?	
Identify new buyer entrants: Are new products produced which attract new buyers? Are buyers from other markets beginning to source in the market?	
Identify potential growth areas	
Understand existing customer profiles: What corporate customers are being served? Who are their suppliers/ distributors?	
Identify anchor enterprise customers: Are any current customers potential anchors?	

Market Conditions	Responses
Buyer assessment	Questions for buyers: • *nature and challenges of supplier network* • *book of payables and aging schedule* • *DSO, DPO, DIO* • *supplier relationship histories*
Existing customer base	
New market entrants	
Existing anchors (not yet customers)	
Seller assessment	• *DSO, DPO, DIO* • *Business associations* • *Current sources and costs of credit*
Buyer profile (number of buyers, history with buyers)	
Receivables profile (volume + aging)	
Distribution assessment	Questions for distributors: • *receivables profile (e.g., volume + aging)* • *DSO, DPO, DIO•Sources and costs of credit* • *Does the business provide informal financing? what terms?*
Wholesalers and distributors, existing	
Wholesalers and distributors, primary	
Retail assessment	
Sales volume	
Sources and costs of credit	
Sources of goods and degree of SCM maturity (e.g., paper based? distributor or anchor institution enforced system?)	
DSO, DPO, DIO	

Tool 3

Supply Chain Finance Instrument Assessment

This tool helps to both identify the SCF instrument (or instruments) best suited to the targeted market segment, and to assess the firm's challenges in service provision. The tool is designed to aid with the initial diagnosis of the most appropriate digital innovations that best address the SCF needs of a company, especially if that company is an MSME.

Assessment questions are intended to prompt the user to consider what activities need to be planned to deliver a SCF offering, and what constraints the user's institution is anticipated to face. For those constraints identified, the user is asked to consider where digital solutions might help overcome those

constraints in a most cost effective and scalable manner. For this evaluation of digital possibilities, the evaluation of digital solutions aiding SCF may prove helpful.

This tool, is used to clarify key activities that need to be addressed to deliver an SCF service. It also prompts exploration and identification of areas where digital solutions can aid in conducting those activities.

The targeted customer type is identified with the help of the Market Assessment tool.

Target customer type: _____

Value Proposition: _____

Envisioned SCF instrument: _____

Assessment questions	Activities to undertake	What constraints?	Constraint type K = knowledge I = infrastructure O = operations
Acquiring and interfacing with customers			
Does the institution need to build brand awareness as a source of SCF?			
Does the institution need to build brand awareness among target market?			
Does the institution have its own sufficient outreach and service network or existing partnership?			

Assessment questions	Activities to undertake	What constraints?	**Constraint type** K = knowledge I = infrastructure O = operations
Does the institution have an existing base of customers that can serve as early adopters (perhaps small businesses depending on personal consumer credit for business working capital purposes)?			
For relationships with key supply chain actors to leverage for acquisition: Is identification/KYC an obstacle for target customer type?			
Are there means for regular/ routine monitoring of payments due and reminder mechanisms?			
Credit decisioning			
What is the current level of data analytics capacity?			
What are the relationships with key supply chain actors to leverage for risk assessment (e.g. validating payables, vouching for applicants)?			
Is there sufficient data availability for risk assessments?			
Processing and collection			
What is the current and forecast state of infrastructure for accepting and making payments?			

Tool 4
Solution Option Modeling

Given the user's current capacity and development plans, this tool helps determine which business models are best suited to each solution option. By completing the Solution Option Modeling Tool below, the appropriate business model should emerge, alongside the possibility of hybrid options.

In undertaking this exercise, more than one model may be worth the user's consideration. In such cases, it is useful to return to the previous assessment tools to compare costs and conditional criteria.

Assessment category	Actor	Sector
Instrument Name		
Solution Category (Customer Service, SCF Service, Supporting Operation)		
Prerequisites		
Customer acquisition		
Credit decisioning		
Processing and collection		
Staffing Needs • *Assign existing?* • *Hire new (how many and cost)?*		
Operational Needs		
Infrastructure Needs		
Partner Needs		
CAPEX		
OPEX		

Tool 5

Business Model Assessment

This tool is designed to help financial institutions determine their best option for delivery of supply chain finance, by identifying and comparing their market(s) and existing customer(s).

	Bank extended	Bank digital subsidiary	Bank modular	Partner led
Customer Service Options				
Option 1				
Option 2				
Option n				
SCF Provisioning				
Option 1				
Option 2				
Option n				
Supporting Operations				
Option 1				
Option 2				
Option n				

Annex 4: IFC Supply Chain Finance
& Digital Financial Services Offering

Together, IFC's Supply Chain Finance and Digital Financial Services practices engage with interested institutions to examine their capabilities and needs. Prior to the administration of any advisory support, the institutions are put through a comprehensive exam of operational capabilities, products and services, delivery channels, staffing and system resources, and risk management competency.

IFC Supply Chain Finance Competency Framework

1 Operating Model	Buyer/Supplier Segmentation	Research & Data Mining	Transfer Pricing	Financial Plan
	Coverage Model	Competitive Differentiation	Opportunity Sizing	Organizational Synergy

2 Products & Services	Buyer/Distributor Finance	Receivables Discounting/ Factoring	Reverse Factoring	Advisory Services
	Coverage Model	Research & Development	Transaction banking solutions	Complete Relationship mapping

3 Sales & Delivery Channels	Specialized VCF technical team	Industry Specialization	Anchor Selection & Onboarding	Networking & Third Party	Proximity Value Chain
	Buyer/Supplier onboarding	Buy in from Anchor Procurement/Sales	Alternate Channels		Buyer/supplier Prospecting ranking

4 HR & Systems	VCF Players Training	Agent skills	VCF Reward & Recognition	Service Level Agreement	CRM	VCF platform
	Sales Incentives	Stakeholder Commitment		System Interfacing	System & Doc Maintenance	Data Warehousing

5 Credit & Risk Management	VCF Application Scoring	Credit Underwriting	Rule based delegations	VCF Behavior Scoring	Portfolio Management
	Anchor Data Analytics	Industry Benchmarks	Collections Framework	Early Warning Systems	Risk based pricing

IFC SUPPLY CHAIN FINANCE AND DIGITAL FINANCIAL SERVICES OFFERING

IFC advises financial institutions to consider these five critical matters when planning to build a supply chain finance service:

Organizational Structure	• Appoint a **supply chain finance champion** *for the Bank* • **Establish cross functional team**, *from Corporate, SME, credit, IT, Product Development* • **Develop incentive, reward, and recognition plans** *for key personnel, e.g. Corporate RMs, specialized SCF salesforce, and SME RMs*
Products & Processes	• **Decide which supply chain finance products to develop** *(and sequence of deployment) based on customer base, projected demand, risk appetite, etc.* • **Design product programs**, *e.g. eligibility criteria, features, commercial approach, pricing, etc.) and* **align credit policies** • **Develop key processes**, *e.g. credit & risk management, monitoring, sales*
Technology Platform	• **Identify technology platform requirements** *based on proposed product offering (with participation from both business and IT)* • **Develop vendor shortlist** • *Develop Proof of Concept, Request for Proposal, and* **conduct selection process** • *Work with selected vendor on system integration and* **implementation**
Sales Plan	• **Design Anchor engagement plan** • *Develop specific* **pitch and onboarding** *material for both anchors and suppliers/distributors*
Pilot	• **Develop plan to pilot product(s)** *to be launched initially, e.g. customers, targets, timelines* • **Launch pilots** • **Refine** *based on learnings, and* **prepare for full launch**

Beginning with its Competency Assessment Framework, the IFC Supply Chain Finance Practice guides financial institutions through a comprehensive process to bring solutions to market successfully:

Stage 1: Need identification	• *Competency Assessment Framework* • *Maturity matrix & benchmarking* • *Regulatory/legal due diligence*
Stage 2: Market sizing	• *Market revenue pool sizing* • *Portfolio linked opportunity sizing* • *Sector linked physical, information, financial SC mapping*
Stage 3: Product Program Design	• *Product program structures & templates* • *Credit underwriting standards, scoring, and portfolio management* • *Documentation with Anchor and SMEs*
Stage 4: Process Automation	• *Process design and existing technology performance assessment* • *Option analysis with knowledge sharing on available 3rd party platforms* • *Proof of concept, RFP, selection matrix, vendor documentation*
Stage 5: Pilot Design	• *Pilot Anchor selection criteria design* • *Anchor client dialogue, EVA tools, Peer Group comparison* • *Pilot Program Design and KPI framework*
Stage 6: Onboarding	• *Anchor onboarding program for scalability* • *SME customers onboarding program design* • *Implementation Support (training, marketing, troubleshooting)*

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