Supply Chain Financing and Pandemic: Managing Cash Flows to Keep Firms and Their Value Networks Healthy

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Abstract

The COVID-19 crisis has interrupted firms and their value networks. The lockdown measures taken by governments around the globe have triggered a massive supply and demand shock. The ensuing crisis has created economic chaos that resulted in massive business disruptions for companies, their customers, their suppliers and their affiliated service providers (banks and logistics providers). Firms are turning to supply chain financing solutions to stabilize liquidity and their net working capital to maintain solvency and ensure continuity of supply through their supply chains. This paper discloses several different types of supply chain financing solutions and how these can impact firms and their value creation partners struggling through the uncertain business environment caused by a global pandemic.

Introduction

The COVID-19 pandemic has resulted in millions of people infected and hundreds of thousands killed during 2020. It has created economic chaos and caused great damage to firms, their customers, and their suppliers. A critical need for firms is to maintain their financial liquidity to facilitate demand and supply challenges.

Across the supply chain, organizations have been forced to reduce staffing to cut costs. These cuts resulted in a dramatic fall in demand for goods and services. For some industrial sectors such as hospitality, tourism and airlines, most revenues were wiped out. Managers had to take drastic decisions to maintain liquidity to survive which resulted in eroding cash reserves, further headcount reductions, reduced expenditures and postponing capital investments. Late customer payments increase in bad debt, and restrictive bank lending practices compounded cash flow problems and decreased liquidity. These problems led to an increased risk of insolvency and resulted in more employee layoffs. Firms found themselves in a downward spiral.

A key strategic priority for companies is ensuring that they can meet their net working capital (NWC) needs, where NWC = current assets – current liabilities. Supply chain financing (SCF) is an approach that builds on traditional trade finance solutions to help organizations manage its net working capital more flexibly and at a lower rate of interest than is normally available to a supplier. Suppliers are able to sell their approved invoices to a bank or financial technology (fintech) firm. From a buyer perspective, SCF provides an opportunity to finance suppliers on favorable terms increasing their business resilience and overall health. From a supplier perspective, SCF enables opportunities to reduce receivables risks of customers and continue to be financially viable.

SCF is not a 'silver bullet', but it has been increasingly used since the financial crisis in 2008/2009 to stabilize the liquidity of a supplier organization and interrupt the vicious circle.[1] SCF has been incorporated into an organization's supply chains including customers on the demand side and suppliers on the supply side to assist the organization with its cash flows by securing enough liquidity to ensure supply continuity.[2] SCF can help mitigate the impact of the pandemic and can also enable an organization and its suppliers to position themselves for a post pandemic upturn.

Over the previous decade practitioners and academics have referred to SCF solutions as a win, win, win for buyers, suppliers and financial service providers (FSPs).[3] However, the pandemic has revealed some negative aspects of SCF too.[4] For instance, SCF has been accused of aiding buying companies force cash discounts on their suppliers. Therefore, decision makers want to know what SCF is about and how this approach might help

to manage cash flows to keep firms healthy. We raise the following question: *How can supply chain financing (SCF) mitigate the disruptive impact of the COVID-19 pandemic on an organization's ability to finance and protect their supply chains?*

To understand the financial impact of the COVID-19 crisis on organizations and its supply chains, a group of researchers studied the emerging practitioner literature and interviewed leading experts in SCF. As a group, we recently published two books in SCF and numerous articles on this subject and in related areas. In this paper, we address the management of NWC by considering the impact of the crisis on the organization and the affiliated supply chain partners, the measures taken to mitigate the impact, and the future for SCF after the crisis passes. Our analysis provides decision-makers with a powerful set of options for action in the SCF field to respond adequately to the current crisis and future pandemics.

Concept of supply chain financing

SCF can assist firms and their supply chains by increasing the velocity of cash flow and making those flows more consistent. Implemented properly, the firm and its supply chains can enjoy a symbiotic relationship. Rogers et al. (2020) define SCF as follows:[5] *"Supply chain financing is using the supply chain to fund the organization and using the organization to fund the supply chain."*

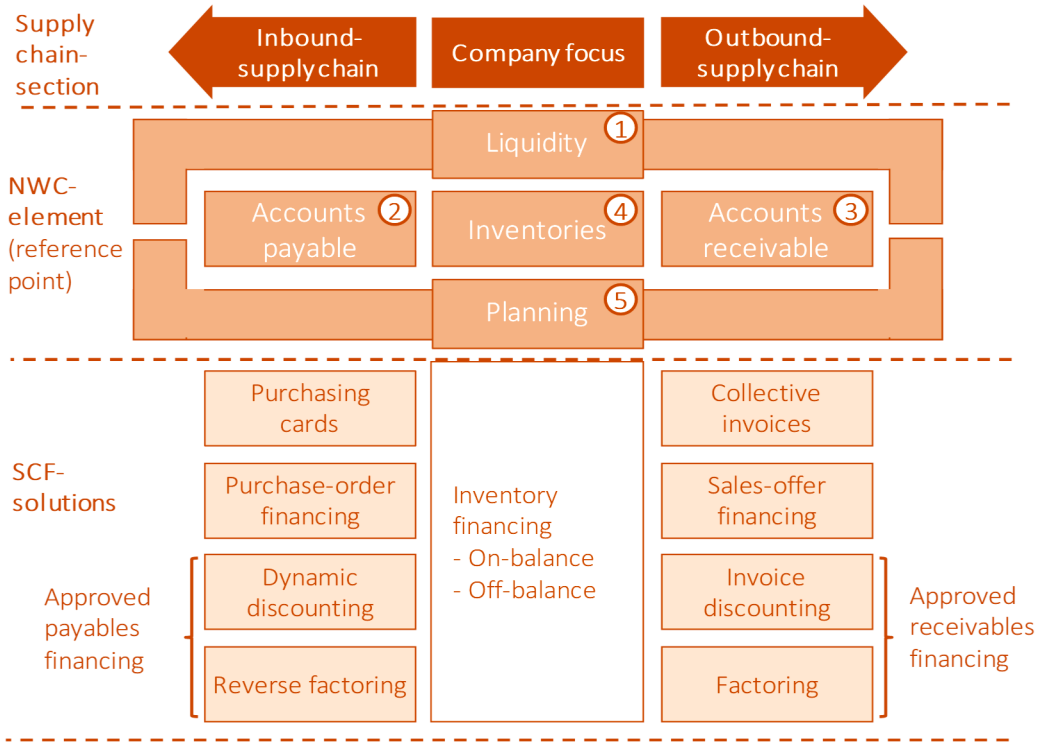
In a simplistic sense, SCF has been mistakenly equated with approved financing approaches (i.e., reverse factoring). This understanding does not go far enough—SCF is more. In its broadest interpretation, SCF covers not only the financing of all the transactions being done in the end-to-end upstream and downstream supply chain, but also the long-term financing of all resources and capacities required for operating activities.[6]

Banks and other financial service providers have moved away from the term "reverse factoring." Supply chain finance (not supply chain financing which encompasses all solutions related to using the supply chain to fund the organization and vice versa) Includes all solutions that utilize helping the supplier deal with buyer extended payment terms. Additionally, in this era reverse factoring typically takes place at lower interest rates than it did several years ago. Because of its bad reputation as being close to usury, banks and other financial service providers are using supply chain finance because what factoring and reverse factoring used to mean.

SCF encompasses a broader class of solutions that provide NWC and trade financing to firms and their supply chains. These can be grouped around the following supply chain activities: inbound supply chain and accounts payable (AP) solutions, company focus and inventory solutions, and

outbound-supply chain and accounts receivable (AR) solutions. Over recent years a variety of SCF instruments have been made available to firms, to mitigate the impact of a supply chain disruption on their cash flow. See Figure 1 for an overview.

Figure 1. Overview of SCF instruments



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Typical SCF solutions with NWC reference point accounts payable are:

- ✓ **Purchasing cards** is a type of commercial card that allows organizations to take advantage of the existing credit card infrastructure to make electronic payments and enable goods and services to be purchased from predefined suppliers without a traditional procurement process. Purchasing cards are used for smaller purchases.
- ✓ **Purchase order financing** is an SCF financing solution agreed between buying companies and suppliers to achieve financing at an early stage (i.e., at the time of the order). It is a kind of advance payment.
- ✓ **Dynamic discounting** is an SCF solution where the purchasing company offers the supplier earlier payment of the invoice at a

discounted rate based on a negotiation between buyer and supplier. In contrast to conventional discounting, dynamic discounting uses adjustable payment terms and is generally conducted via a dynamic SCF platform. The earlier an invoice is settled, the higher the discount.

- ✓ **Reverse factoring** is an SCF solution which essentially enables a buyer to obtain pre-financing of liabilities from their supplier via an approved invoice. A financial service provider can help suppliers obtain early payment with a discount typically computed using the interest rate of the financially stronger buying firm.

These SCF solutions with NWC reference point inventory can include:

- ✓ **On-balance sheet inventory financing** is an instrument for financing inventories. In contrast to the off-balance solution, the inventories remain on the buying company's balance sheet with the on-balance solution and serve only as a guarantee for a credit agreement. These solutions encompass an asset-based lending approach.
- ✓ **Off-balance sheet inventory financing** refers to the financing of inventories where operational goods logistics and ownership are transferred to an external logistics service provider. This method results in reduced costs due to lower storage and logistics costs and an increase in liquidity through a reduction in the capital tied up in inventories.

SCF solutions that are related to the management of accounts receivable are:

- ✓ **Collective invoices** are a form of billing where a cumulative invoice is sent to a customer for several deliveries per period.
- ✓ **Sales offer financing** refers to financing solutions that suppliers use to promote the sales of their products and to create financial flexibility for customers through the use of payment by instalments.
- ✓ **Invoice discounting** uses invoices for accounts receivable as collateral for short-term financing (asset-based lending approach). The use of digital invoice discounting platforms provides companies with flexible access to liquidity while reducing the risk for external financial service providers through increased transparency.
- ✓ **Factoring** refers to the commercial, revolving transfer of a company's accounts receivable to a financial service provider or a factoring company. Factoring as an SCF solution provides companies with an increase in liquidity while at the same time reducing financing costs and unpaid invoices.

Suppliers have always offered discounts to their buying companies to get paid early. For instance, we often talk about phrases like 2/10 net 30, which basically means, the supplier is willing to give the buyer a 2% discount if they pay in 10 days on an invoice due in 30 days. Dynamic discounting (DD) is a similar concept but more intricate. The supplier can review their approved invoices on-line using the buyer's platform which is likely operated by a fintech and can elect to be paid earlier. They can also leave the invoice to be settled on the agreed date. Whenever they decide to be paid, the system calculates the discount charged to the supplier for the early payment.

Traditional forms of financing focus on funding the corporation through traditional means. In supply chain financing, the corporation is specifically using suppliers and customers (usually suppliers) to fund the organization or vice versa. Supply chain financing is a special form of financing that includes using external entities in the supply chain to fund the organization instead of traditional means that we would typically think of as financing.

Major players engaged in SCF practices are suppliers and buyers. Logistics service providers (3PL's, transportation companies, etc.) are mainly involved in the physical flow of goods and information. In addition, public authorities and regulatory bodies (central banks, professional organizations, etc.) also play a certain role by shaping the formal framework for SCF. The SCF service supply market is dominated by fintechs such as Taulia, PrimeRevenue, CRX Markets, Orbian, C2FO, TrustBills, etc.[8] Banks are also important players in SCF and usually support high volumes of transactions between buyers and their largest suppliers. They operate extensive SCF programs. Deutsche Bank maintains 600 SCF programs worldwide with 30,000 connected suppliers.[9] There are now numerous instances of cooperation between fintechs and banks.

Five NWC elements affected by the COVID-19 crisis

During the COVID-19 crisis, every firm was out to fend for its survival. Buying firms extended payment terms, while at the same time suppliers tried to shorten payment terms to stay viable. Buying companies reduced their inventories, often at the cost of other firms in their supply chains. These strategies may be sensible from the point of view of securing liquidity, but from the point of view of the supply chain they can be damaging. They tend to shift the problems to suppliers and weakens the resilience of the supply chain.

We describe below how SCF works in practice. One example comes from Apple. A *New York Times* article explains how Apple no longer plays the profit maximization game.[10] The article contends they now instead play the cash

flow game. Apple puts suppliers on 90–120 days term, but they receive payments from consumers immediately buying phones and other products. Concurrently, Apple keeps the inventory at suppliers which results in a negative cash conversion cycles at around –70 days and cash reserves of over $200 billion.

Appropriate measures of SCF can be divided into five areas, which correspond to the key elements of NWC. For each of the elements, we address what happened during the pandemic and the challenges caused by the pandemic crisis.

NWC element 1—Liquidity and the interface to financial service providers

During the COVID-19 crisis, a core priority for companies is preserving liquidity in the form of cash. With sales plummeting due to lockdowns and credit markets tightening, companies grapple with higher financing costs and more stringent borrowing structures. They are short on cash and find it difficult to meet all NWC requirements.[11] The expression "cash is king" has never been so important as many companies were no longer able to pay their suppliers and were not able to keep their own operations running. They had to consider alternative ways to fund their businesses and their supply chain as credit was getting tight.

In this regard, the pandemic has had significant implications for FSPs. It accelerated a trend that was well under way before it struck – higher private and public debt, lower interest rates and shrinking fiscal and monetary room for policy maneuvers.[12] In the crisis, a number of banks have also run into difficulties and had to adapt their lending practices, for instance, by reprioritizing credit lines. Banks (lenders) have begun to incorporate anti-cash-hoarding provisions into their lending agreements.[13] However, massive public stimulus is masking the true magnitude of the economic impact of the COVID-19 crisis. Provisions being taken by major financial institutions indicate they believe that loss rates will exceed those from the Great Recession.[14] These provisions are designed to preserve banks' liquidity by ensuring that borrowers only draw funds for specific needs and deploy them accordingly. Some banks have failed to serve as a facilitator for the liquidity needed within the supply chain. For instance, companies running a dynamic discounting solution were unable to supply these systems with sufficient cash. The consequence was that suppliers connected to such a SCF solution did not receive early payments.[15] Additionally, reverse factoring programs of some companies were not secured, and FSPs were not able to provide sufficient liquidity.[16] One of our interviewees explained:

> *"In the early days (of the pandemic) we were reaching out to our financial industry to ensure credit lines were secured, just in case, if the worst case is happening."*

Also, companies see potential covenant violations with their cash lending facilities, having no clear picture of how the pandemic will affect sales at the demand side of the supply chain. In addition, it is not clear whether they will be able to operate at all if their current production facilities are closed.[17] However, if organizations can use their supply chain assets (whether inventory or receivables) as collateral, it may provide them with additional time to ride out the crisis.

When the global economy restarts, it may be that overall economic output will settle at a lower level than before the pandemic crisis. Improved incoming orders from customers will lead to increased material procurement with an increase in payment obligations to suppliers. A new challenge arises. FSP's will need to consider how to prepare for a sustained return in sales demand and checking that there is enough liquidity to support the ramping-up of supply chains.

NWC element 2—Accounts payable and the interface to suppliers

The value-added share attributable to suppliers is more than 60% for manufacturing companies[18] and in some cases as high as 80 or 90%. In most countries, small and medium sized enterprise (SME) suppliers account for the vast majority of the value adding work. However, the negative impact of the COVID-19 crisis has been particularly acute for SMEs. For example, in Northern Italy where the significance of SMEs is critically important, SMEs have been particularly vulnerable to the disruption of supply chains.[19]

Compared to MNEs with a larger resource base, SME suppliers are likely less resilient dealing with the costs the pandemic shocks entail. Costs for prevention as well as requested changes in work processes, such as the shift to teleworking, are relatively higher for SMEs, with their low level of digitalization and difficulties in accessing technologies. If production is reduced, the costs of underutilized labor and capital weigh greater on SME suppliers. In the US, 50% of SMEs are operating with fewer than 15 days in buffer cash and that even healthy SMEs have less than two-month cash reserves.[20] There is a significant risk that even solvent suppliers, particularly SMEs, could go bankrupt.[21]

Buying companies have generally extended payment terms with their suppliers. This is because such supplier credits can be enforced spontaneously, and such supplier credits are usually interest-free. This trend of extending payables to suppliers during the crisis with an increasing

number of SME suppliers claiming late payments by their customers.[22] Some companies were able to offset their increased accounts receivables from customers with longer accounts payables to their suppliers, as one of the interviewed companies points out:

> *"We were able to set off AR impact with AP for the first half year, which is good news."*

Ultimately, extending payment terms with suppliers is a zero-sum game. The problems are passed on to the suppliers, who now must deal with the financing challenges, even though they may have worse refinancing conditions than the buyer. From an overarching supply chain perspective, not only does this not seem to be effective, but such a practice may even be considered unethical, as the Australian Small Business and Family Enterprise Ombudsman pointed out in a recent report.[23]

In countries like Germany, Austria or Switzerland during the pandemic, companies are sheltered from filing legal insolvency. The Federal Ministry of Justice and Consumer Protection in Germany states: "*The suspension of the obligation to file for insolvency gives companies in distress the necessary scope to apply for state aid and to press ahead with restructuring efforts.*"[24] However, this "well-intentioned" measure may lead to mistrust in the supply chain; in the absence of transparency, suppliers cannot estimate whether a customer is actually insolvent or not. In fact, suppliers would likely switch to advance payment, because if payment is not made and insolvency is filed, the managing directors and board members of the company that is left sitting on the damage suddenly find themselves confronted with personal liability risks. They could be accused of having delivered or paid without collateral in the wake of the crisis and thus acted in breach of due diligence.[25]

Furthermore, it should be noted that the financial stability of the supply chain depends not only on the immediate suppliers at tier 1, but also on the sub-suppliers far upstream in the supply chain. The financial failure of a critical nexus supplier[26] at the n-th tier level due to insolvency can bring the entire supply chain to a standstill. Such interlinked relationships beyond direct business relations must also be considered in the context of a global pandemic crisis.

NWC element 3—Accounts receivable and the interface to customers

Throughout the global economy, lockdowns during the COVID-19 crisis have caused sales to collapse abruptly, except a few product groups that were temporarily in high demand at the beginning of the crisis (e.g., healthcare

equipment, food, medicines, consumer electronics for home office, personal protective equipment). The lockdowns caused the stationary distribution channel to dry up, which in turn led to a massive drop in accounts receivable and a tightening of the liquidity situation. An interviewed representative from a pharmaceutical company makes this clear:

> *"(Cancer) patients were not showing up and/or infusion centers were not open and so this had an effect to our sales."*

Before the crisis, the payment terms for supplier credits granted to customers ranged from just under 30 days in Switzerland to 90 days in Italy.[27] When the outbreak began to spread outside China, late payments already affected 52% of the total value of business-to-business invoices issued in Asia.[28] These average figures skyrocketed during the COVID-19 crisis. Customers asked for a deferment of payment or were temporarily unable to pay at all. Large customers seemed to be no longer willing or able to pay their suppliers on time. The receivables collection periods of 60 to 90 days, which were increasingly being observed even in Switzerland, are tantamount to a unilaterally forced extension of the supplier credit by buying firms. In some cases, the changes were not explicit, as one interviewee clarifies:

> *"You're used to getting payments two to three times a month. Now you are receiving them once a month. So that's a significant difference."*

With the suspension of the obligation to notify insolvencies make it difficult for companies to assess the liquidity situation of their customers and their willingness to pay, COVID-19 is creating an insolvency time bomb. Even as economies emerge from lockdowns, it is expected a bulk of insolvencies are still to come. The top increases will be recorded in the U.S. (+57% by 2021 from 2019), Brazil (+45%), China (+20%), the UK (+43%), Spain (+41%), Italy (+27%), Belgium (+26%) and France (+25%).[29]

Finally, trade credit insurance companies started to reduce their exposures and would no longer cover the trade risks caused by the COVID-19 crisis. For example, the trade credit insurer Euler Hermes has announced that insurance coverage for companies with a weak credit rating will expire at the end of 2020.[30] Due to the rapidly deteriorating creditworthiness of customers, many suppliers no longer want to work on a payment term basis and require more expensive solutions such as payment in advance or letters of credit. This has led to a drying up of the trade flows and increased default risks in supply chains. As soon as the first dominoes fall, a chain reaction of

bankruptcies is feared, as the insolvency of their customers puts suppliers in financial difficulties.

NWC element 4—Inventory and the interface to logistics service providers

Due to the COVID-19 crisis, major manufacturing hubs in China were locked down such as Wuhan and Shenzhen and borders were temporarily closed. As result, buying firms around the world found themselves running out of inventories. Lockdowns in Europe and the US followed relatively quickly, which further worsened the supply situation. These lockdowns initiated panic consumer buying behaviors that saw a rush and stockouts of different goods, from personal protective equipment (PPE) to certain basic foods and drugs. One of the SCF experts interviewed illustrates this as follows:

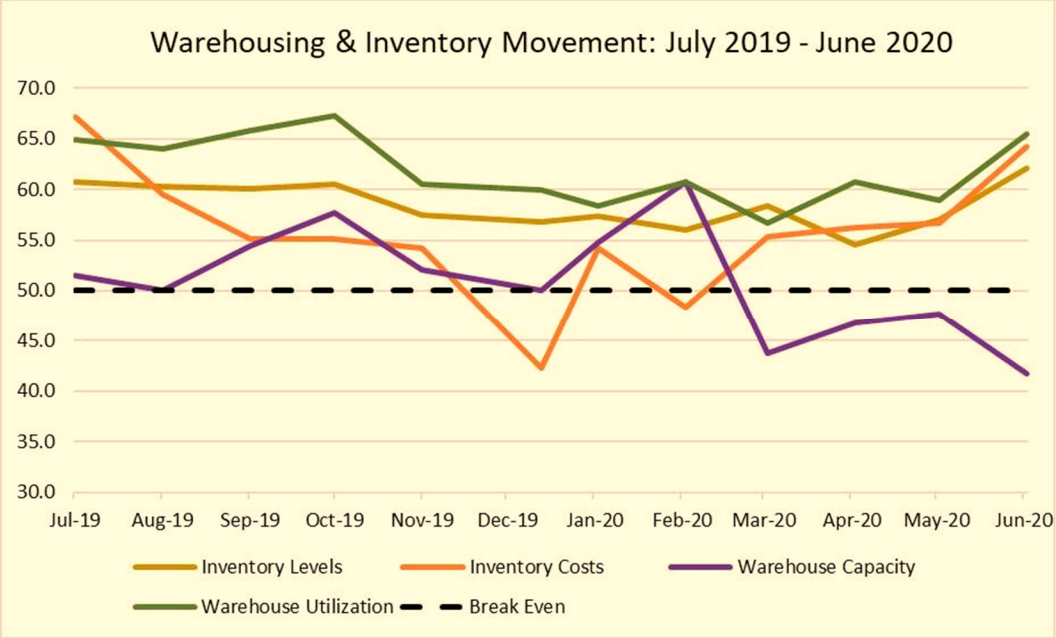
> *"We had such a backlog for the first two, three days when sales spiked, it took a month to get through that."*

Organizations were unable to move inventory fast enough to replenish empty shelves. Their supply chains now became fragile, disclosing the potential danger of being "lean, leaner, too lean!"[31] This was supported by one interviewee as follows:

> *"Inventory is at a record high. It is just because of risk mitigation inventory we established."*

Reducing inventory levels over recent years has resulted in the associated inventory carrying costs, which can be between 20 and 30 percent of the value of the goods being held.[32] Often, companies have outsourced the inventory management to logistics service providers (LSPs). It reduced assets and put the emphasis on the third-party to continue managing the inventory and ensure the outsourcing company's just-in-time goals are met. Outsourced inventory had slowed down even in such companies looking to pivot quickly to counter the effects of the pandemic. Figure 2 illustrates that from January 2020 that inventory costs and levels are now rising with warehouse capacity decreasing and utilization increasing.

Figure 2. Warehousing and inventory movements during the COVID-19 crisis



Source: Logistics Managers Index (The-LMI.com).

The inventory challenges during the pandemic were significant. Organizations did not have sufficient transparency regarding the inventories held by their suppliers and customers.[33] The lack of inventory visibility at a customer level is relevant for estimating the actual net demand. Inventory transparency at the suppliers is important for the deriving production planning. Combined with a lack of trust and insufficient information, issues surrounding inventories and capacities are compounded further. During the COVID-19 crisis, sales and operations planning (S&OP) became imprecise due to the massive interruptions and uncertainties and made it impossible for firms to adequately plan demand and supply.[34] As a result, many companies continued to order from their suppliers despite the abrupt slump in demand from customers, leading to a massive bullwhip effect.[35]

During normal times, companies with valuable assets could leverage them to get an asset-based loan. Usually, lenders would loan funds based on a percentage of the secured assets' value (i.e., 50 percent of the value of finished inventory). However, the physical and economic consequences of the pandemic made it difficult to conduct physical inventory appraisals. The pandemic crisis is tantamount to unsafe environment for loan collateral appraisers to perform physical assessments of inventory. Moreover, the liquidation market for inventories was disrupted because retail distribution channels were closed. There was also the question of timing: How should

companies appraise merchandise meant to be sold during a given season if it needs to be replaced with inventory for a subsequent season when reopening for business? Interest rates on asset-based lending rose by 75–100 basis points since the COVID-19 outbreak to reflect the current liquidity environment and increased credit risk.[36]

During the recovery phase of the pandemic crisis, it seems to be essential that organizations carefully consider before making inventory purchases whether they are proportionate to customer demand and sales. Such "uncovered" stocks are a risk of over-extending credit to purchase inventory resulting in a negative borrowing cycle.

NWC element 5—Planning and the cross-functional interface

Planning relates to intra- and inter-organizational interfaces between the various actors involved in managing liquidity and NWC. To manage NWC, several functions within the organization must be involved. Often, different tasks are linked to different reporting lines, and responsibilities are often not clearly defined. In manufacturing, for example, purchasing is usually responsible for negotiating payment terms with suppliers and is often under the supervision of the operations board. Treasury is responsible for cash management and reports to the CFO. This condition often leads to internal conflicts of interest. The primary goal of purchasing is to keep the price low. The terms of payment, which the finance department examines every month, are often neglected in negotiations with suppliers. The disconnect was compounded during the COVID-19 crisis, as cooperation became more difficult as employees and decision-makers were either furloughed or working from home.

Even in companies that have already initiated a SCF program, there are always interface problems across the functions involved. The cooperation between treasury and purchasing is relatively well established in such companies. However, the severity of the COVID-19 crisis made it necessary to additionally involve the sales and operations departments in order to obtain a holistic view of NWC.

The pandemic generated significant planning challenges for organizations both internally and externally. In many companies, there was a lack of transparency to NWC. This could be attributed to the good economic situation of the past years, among other things, when liquidity was not the focus. Those who pursued growth targets also accepted that the NWC had become bloated. But with the COVID-19 crisis this changed. As one of our interviewees recognized:

> *"Our normal S&OP processes were inadequate because of the volatility and in some cases, you just can't make enough so you make all you can and you get as much as you can in the market and we're playing catch up on those products as we as we go forward."*

Transparency is often lacking with regard to the partners in the supply chain. Especially SMEs often realize in the COVID-19 crisis that they do not have sufficient data to evaluate the liquidity situation of their suppliers and customers. Larger MNEs have more resources to establish good financial supply chain risk management. Especially in a phase of high uncertainty like a pandemic, the exchange with important suppliers and customers was not always sought in a timely manner.

Supply chain financing measures to the COVID-19 crisis

A broad variety of measures have been launched to mitigate the business impact of the pandemic on the organization's NWC including the affiliated supply chain and financial partners. Table 1 shows the recommended SCF measures along the five NWC elements.

With regard to the NWC element 1 liquidity, companies need to recognize the balancing act during the recovery phase of a pandemic crisis. The balancing act pertains to investing in growth versus cost control, as the costs are immediate, but the revenues are still uncertain. Considering the NWC elements 2 and 3 on accounts payables and accounts receivable, firms have to recognize that depending on the size and complexity of their supply chains, it takes between eight weeks and four months to set up an SCF program. One reason for this is the complex and time-consuming supplier onboarding process. For companies that are experiencing acute liquidity difficulties, this is probably too long. With regard to the NWC element 4 inventory, companies should expect an increase in average safety stocks during a pandemic crisis. This is primarily to cushion the distortions in the supply chain. However, the transition from crisis mode to the recovery phase and the post pandemic crisis phase should not be overlooked. Finally, with regard to the NWC element 5 planning, companies must adapt their supply chain planning based on the experience from the pandemic. During a pandemic, the speed is important. The speed enables organizations and their supply chain to react quickly to unforeseen events.

Table 1. SCF measures to mitigate the pandemic effect on the five NWC elements

NWC element 1—Liquidity
➢ Hold regular meetings to assess your current cash and financing situation together with key FSPs, to be able to estimate the liquidity requirements in the short, medium and long term on a rolling basis. ➢ Establish diversified SCF programs with several FSPs. We suggest a multi-bank model as it reduces dependence on a single bank. ➢ Accept responsibly, if necessary, the governmental support (e.g., enabling banks to lend providing liquidity via short-term credit lines), but note that this aid usually corresponds to a loan and must be repaid at a later date. Such government stimulus efforts include: ○ Paycheck protection programs, a loan dedicated to SMEs that helps businesses keep their workforce employed[37] ○ Non-repayable grants on application, which partially compensate for loss of revenue[38]
NWC element 2—Accounts Payable
➢ Support suppliers with financing advice, as part of an overall supplier development program. Suppliers should benefit from the buyer's financial expertise. ➢ Pay suppliers voluntarily and on your own initiative with shortened payment terms. That will help SME suppliers get stabilized financially (see for example the Obama 2011 SupplierPay initiative).[39] ➢ Establish a dynamic discounting program, in order to use the buyer's own liquidity. It should be noted that sufficient liquid funds must be available to ensure the long-term operation of such a program. ➢ Adopt a reverse factoring program, where a factoring company (factor) finances invoices from the suppliers. They usually benefit from the better creditworthiness of the buyer. ➢ Switch to purchase order financing especially for very vulnerable suppliers. For them, this means early payment, even before the goods are delivered and the invoice is issued.[40]
NWC element 3—Accounts Receivable
➢ Analyze and evaluate the financial health of your customers on a regular basis including receivable trends and customers' risk exposures. ➢ Examine payment deferrals closely, while non-negotiated payment arrears should be followed up with dunning procedures. Introduce clear rules for payment deferrals (e.g., per customer group, country or severity of the pandemic) and ensure enforcement. ➢ Settle asset backed finance instruments, most notably invoice discounting in the US and factoring in Europe and rest of the world. The degree of disclosure to the debtor under this type of facility varies, ranging from full disclosure to no disclosure. [41] ➢ Use innovative trade receivable auctions platforms (e.g. TrusBills[42]), on which a supplier can upload specific trade receivables and institutional investors can bid on them. ➢ Watch out for government safeguarding efforts that guarantee trade credit insurers, since it cannot be excluded that the credit protection for outstanding receivables could be reduced or, in the worst case, even cancelled completely.

NWC element 4—Inventory

- Realign the just-in-time and lean management systems with a higher "minimum sliding stock," barring prohibitively high holding cost. This measure increases the resilience of the supply.
- Establish a single pool of inventory for the traditional and online distribution channels. This will increase flexibility, especially when one channel is suddenly in greater demand than the other.
- Ensure that suppliers, especially of critical goods, have an adequate safety stock. Optionally, diversification of the supplier base could help to increase the robustness of the supply chain.
- Increase, together with your key LSPs, transparency in the supply chain, both on the demand and the supply side. Ideally, this can enable an anticipatory reaction to emerging fluctuations or disturbances in the supply chain.
- Investigate with LSPs and FSPs the possibility of using on- and off-balance inventory financing solutions. For example, the instrument of asset-based lending (ABL) could be used to interim finance inventory.[43]

NWC element 5—Planning

- Establish a cross-functional team covering NWC, both strategically and operationally. Ensure that adequate governance is established, which includes incentives that are balanced with NWC objectives.
- Introduce zero-based planning principles, especially in phases of a lockdown and of recovery from a pandemic. In line with zero-based budgeting, no recourse is made to past values in supply chain planning until the "new normal" is reached.
- Include critical suppliers, customers and service providers in regular NWC planning. Supply and demand network mapping with reference to NWC issues can help to identify critical suppliers and customers.
- Enforce the SCF performance measurement including access to internal and external parameters as this enables an overview of the current status of the NWC in the organization and the connected supply chain partners during a pandemic crisis and beyond.
- Link operational risk and disruption management systems with the financial and liquidity planning in order to bridge the operations-finance divide.

Looking beyond the COVID-19 crisis

Although the impact of the current pandemic on global economy is enormous, a proactive approach to this black-swan event can be used as an opportunity to make lasting changes for the organization and supply chains. In the following, we show selected aspects of managing cash flows in supply chains to keep firms and their partners financially healthy beyond the pandemic. For structuring, we will again use the five NWC elements.

NWC element 1—Liquidity

The COVID-19 crisis shows the relevance of managing cash flow. Based on the weakest link in the supply chain, liquidity needs to be reorganized in

a way which ensures that supply chain financing does not only cover the top tier of the supply chain, but functions smoothly across every supply chain level. KPIs, based on liquidity factors including the cash conversion cycle,[44] should be part of the repertoire of every supply chain manager. Of the three factors that affect cash conversion cycle (i.e., accounts payable, inventory, and accounts receivable), supply chain managers have traditionally been responsible for managing accounts payable and inventory. Now, with increasing pressure to integrate upstream activities with downstream demand, supply chain managers touch all aspects of the cash conversion cycle (including the use of SCF instruments).

The pandemic highlighted the important role that state institutions, including the re-routed aid and support programs, can play in supporting organization's liquidity and maintaining financially sustainable supply chain operations. However, organizations should be prepared to tap into the governmental support offered. FSPs and supporting fintechs play a vital role to maintain the financial health of supply chains. They are poised to become an integral part of operations and supply chain management.

NWC element 2—Accounts Payable

It is essential that organizations in the future, not only focus on the financing of direct suppliers but also sub-tier suppliers must be considered. Deep-tier SCF programs should be established. Blockchain technology could be used in this form of financing the "long-tail supply chain."[45] Traditional SCF models rarely reach beyond the first-tier suppliers of large corporates, and thus exclude the long tail and SME deeper tiers. Using an open blockchain protocol for supply chains, suppliers may be able to prove their creditworthiness, and this, in turn, helps to obtain financing. In addition, the trust and reputation of large companies ripple down the supply chain through interconnected business relations. Therefore, a funder provides financing for sub-suppliers for a rate based on the anchors buyer's credit risk.[46] Above all SME suppliers would benefit from this.

Further, the pandemic may provide an opportunity integrate supplier sustainability programs with SCF. The buyer can define certain sustainability criteria. The suppliers that score high on these criteria can receive preferential conditions as part of the SCF program. Choosing the right sustainability criteria is still a big obstacle to the further spread of sustainable supplier financing. The number-driven treasury departments are still struggling with the limited comparability of sustainability-based ratings. There is still a need for standardization in this area. Specialized rating agencies like EcoVadis could help to develop and establish such a standard. Treasurers and SCF program owners should therefore rely on the expertise of

the sustainability department and the purchasing department when introducing such a program. In addition to lower reputation risks, studies indicate that sustainable suppliers are also more stable.[47] The food manufacturer Nestlé has securitized sustainable supplier financing, using CRX Markets' NWC financing marketplace. The securitization was a bundle of invoices from a certified coffee supplier participating in a Nestlé sustainability program.[48]

NWC element 3—Accounts Receivable

Post pandemic, an organization's key account managers and customer relationship management teams must focus on the financial stability of their customers, while developing and retaining sales revenue. An organization should enable their customers to achieve long-term sustainable growth, which also generate future customer lifetime revenues for the supplier.

Supplying organizations will decide whether they accept the SCF solutions of their customers (e.g. a reverse factoring program) or whether they want to establish their own solution for their account receivables. It is not yet clear how the clash between supplier-driven trade receivables financing programs and buyer-centered accounts payables programs will eventually pan out. It would be desirable if technology-based interaction between these two accesses were possible. The technological progress and the increasing interoperability of different SCF programs should reduce manual efforts to a minimum in the future. Moreover, the future efficiency of trade finance solutions could be increased by using digital solutions, which may be based on blockchain technology, especially for international transactions.

NWC element 4—Inventory

Post the COVID-19 pandemic, organizations may take a joint approach to inventory management in their supply chain operations. Enhanced transparency in the supply chain requires reliable and independent data in real-time, enabling informed decisions based on augmented intelligence providing them with greater insights into their operations.[49] In the future, it seems to be essential that organizations have the ability to acquire and analyze data in real-time, from customers, suppliers, manufacturers, and transportation and warehousing providers. For instance, a combination of internet of things (IoT) sensors and cloud-based software allows companies and their supply chain partners to manage the moving bottlenecks that arise in inventory management. With greater insight, practitioners can make faster and evidence-based decisions, rather than leaning on assumptions. Supply transparency solutions, like the Swiss based "real time cargo

monitoring provider" Arviem, are providing the data that allows suppliers and buyers to more accurately manage their risk, allowing each actor within the supply chain to optimize their finances and reduce costs.

Moreover, a future innovated solution referred to as "off-balance inventory finance" has the potential to be attractive for organizations. However, the establishment of such a solution on a broad scale is still pending as are challenges relating to the accounting treatment that need to be solved.

NWC element 5—Planning

As a consequence of the pandemic, most companies have learned to work effectively without physical meetings. Remote and virtual interactions will be the new normal, which will also affect supply chain and NWC planning. In addition, we witnessed how the asymmetrical responses of governments and regulators, local shutdowns, workforce requisitions, and the lack of a coordinated regional or global political response were considered in S&OP in times of a pandemic. Conditions should be created to proactively address these critical factors.

Companies need to be aware that especially during a pandemic, with all the restrictions, local operations increase, and standard planning shifts from the short-term issues that threatened distributed operations for a period of days or weeks to long-term crisis-resistance scenarios. Moreover, the pandemic crisis highlights the fact that not everyone has the same level of NWC planning professionalism and access to the necessary technologies and digital tools. In the future, it must be ensured that customers and suppliers in the supply chain have access to appropriate planning capabilities, so that limits in NWC knowledge should not be used as an excuse.

The COVID-19 crisis has opened new avenues to combine financials with the value of data in supply chains. Cash flows among supply chain partners in return for the accomplishment of specific tasks and the exchange of comprehensive data sets. Thus, liquidity and NWC pairs with data in a hitherto underexploited way. This helps to get data out of existing data silos, thereby significantly increasing transparency in the supply chain.[50]

Finally, the disruption of global supply chain networks and the following economic crisis caused by COVID-19 might trigger a wave of innovations. The liquidity and NWC issues provoked by the pandemic will lead to a shakeout in the FSP and other SCF companies, facilitating initiatives that promote clear long-term economic viability. Nevertheless, it is quite likely that this development will lead to a new landscape at the operations-finance interface with the emergence of SCF ecosystems, geared more to well-balanced

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