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Cash IS King! – Securing Liquidity in Economic Crisis

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ABSTRACT:

The beginning of the year 2023 is marked by continued economic instability, some of it still lingering from economic ramifications of the COVID-19 pandemic, some brought on by the war in Ukraine, high energy prices and other more regional factors. For businesses of all shapes and sizes, this poses major challenges in terms of predicting demand, managing performance and supply chains, and ensuring financial stability at the same time - in an environment of steeply declining interest rates and a looming shortage of credit supply. In four parts grouped along the supply chain and the inverse chain of cash movements within a company, this paper seeks to make a case for the importance of liquidity management as a general management discipline rather than a specialized Accounting function. It promotes a broader understanding of the discipline and its rooting in a cross-functional manner in the hearts and minds of managerial staff throughout the entire organization.

KEYWORDS:

Working capital, cash management, liquidity expansion

JEL classification:

M10, M19, R41

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Introduction

Objectives and structure

The following discussion paper is based upon a series of articles published previously by the authors in German language in a likewise German business publication. This paper aims to convey the art and meaningfulness of a holistic approach to cash or liquidity management to a broader, more international readership.

The paper pursues this objective in four subsequent parts. After spotlighting the nature of the current crisis and the crucial challenge of a firm's liquidity management in this global environment, the second part of the paper focuses on the management of Receivables – in essence the art of turning money owed to a firm into money actually in the hands of that firm. Part 3 turns toward Payables – money owed to other parties that is still within the firm's grasp and to be frugally spent. Finally, part 4 will put into perspective the capital-binding, but also performance-critical role of Inventory. Taken together, these perspectives should allow for the target audience – as described in the next section – to understand and embrace liquidity management as a shared management task spanning many functions and departments.

Value and Target Audience

The target audience for this paper is a general management readership, as the authors will argue that liquidity management requires a holistic approach that needs to be both cross-functional as well as collaborative – and far exceeds the classic tasks usually performed by Financial Accounting and Treasury departments. Both the understanding of the mission-critical role of liquidity especially in times where economic affluence seems a distant memory, as well as an understanding of the distributed nature of the levers of liquidity improvements, are fundamental to all managers in business.

1. Liquidity is a Lifeline

"The crisis as an opportunity" - probably most managers in economies worldwide would wish for fewer "opportunities" than in the past 15 years. Especially at the beginning of the year 2023, the future of one's own company is often under high pressure and the old CFO wisdom "Cash is King" is the focus of action. The four-part series "Liquidity as a lifeline" provides concrete tools and suggestions for action on this central and vital topic.

Understanding the current crisis – a German perspective

Companies in Germany are facing enormous challenges. On the one hand, far-reaching transformations of economic life are on the horizon for the current decade and beyond. Demographic changes – the aging of the population – are increasingly exacerbating the shortages of skilled workers that have existed for some time and the associated production constraints. Added to this are the foreseeable financing problems in the general government budget and in the social security systems. Climate change requires fundamental adjustments in society and business. Technological progress and the many dimensions of digitalization are also putting business models across all sectors under considerable pressure to modernize. And last but not least, it is obvious that the efficiency and productivity potentials that have been familiar for a long time can no longer be reaped from more intensive inter-national cooperation. In the context of geoeconomic fragmentations (Akyar et al., 2023), new sources of innovation and productivity obviously have to be tapped.

Companies can only meet the many operational challenges posed by demographic change, decarbonization, digitalization and deglobalization by investing. Not investing is tantamount to resignation and paves the way to economic insignificance.

On the other hand, the pandemic and the war in Ukraine are creating additional and previously unimagined adjustment burdens. According to estimates by the Institute of the German Economy (Grömling/Kauder, 2023), there has already been an accumulated loss of investment in Germany of 120 billion euros over the years 2020 to 2022. These investment gaps create a permanent capital stock deficit - with pronounced effects on the development and renewal of the product potential – and the prosperity built on it.

Initially, the Corona pandemic placed immense strains on the supply and demand side of the economy (Grömling, 2021). Production processes were disrupted across the board by a lack of employees, disrupted supply networks and paralyzed logistics. Demand came to a standstill as a result of lockdowns - especially in the personal service sectors. With each new wave of infections, there was always a stop-and-go in economic life. Whereas earlier recessions in Germany were mainly industrial crises, the economy was now hit in its entirety. The global recession also put a severe brake on exports. Unlike all other economic crises, the pandemic was a multiple shock. Broad-based stabilization policies worth billions were implemented to combat the pandemic. Comprehensive Corona aid measures (e.g., short time working allowances, loan guarantees, KfW programs, restart aid) prevented many companies from collapsing. Consumption and exports returned to normal as a result of the continuing success of the vaccination program. However, the global supply networks are still not running smoothly. Production and logistics are still directly and indirectly affected by the pandemic. As a result, investment activity has not returned to its pre-crisis level (**Figure 1 below**). And, as already mentioned, these investment gaps caused by the pandemic represent a heavy burden for the secular challenges outlined above.

Investment in Germany

Price adjusted investment in machinery and equipment, index 2019=100

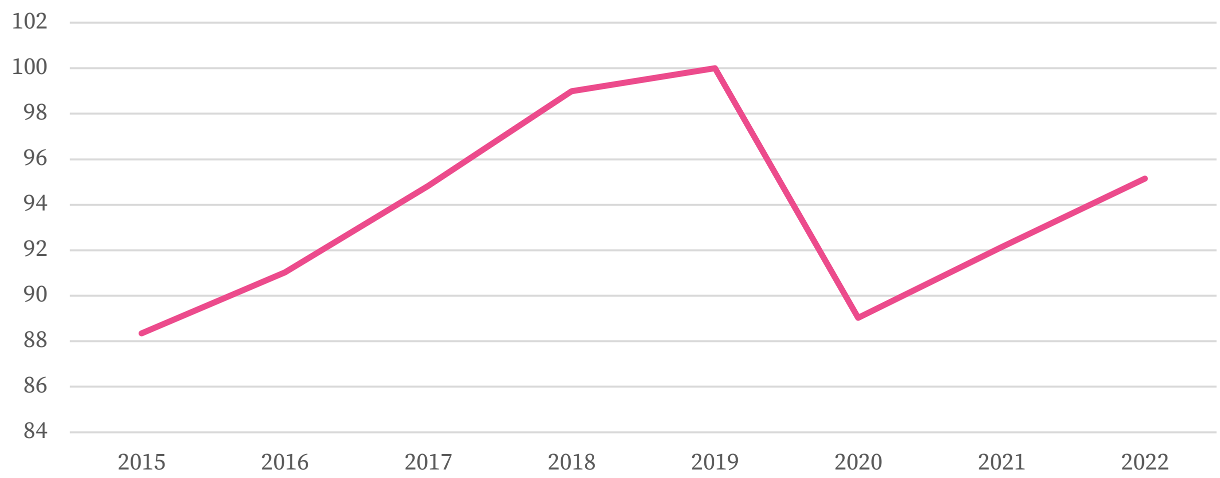

Fig. 1, Source: Statistisches Bundesamt; own calculations

Since February 2022, the burdens and uncertainties associated with the Russian invasion of Ukraine have been weighing on an economy, which is still in crisis mode in some areas. The war is having an impact on German companies primarily via three channels (Grömling, 2022; IMF, 2022; SVR, 2022):

Additional production shocks: In addition to the supply and production problems caused by the pandemic, there have been considerable uncertainties regarding energy supplies in a number of European countries since spring of 2022. The level of stress depends on the respective national energy mix and the country's own resources. Although substitution options (such as LNG terminals) have been developed and deployed to date, the energy supply - especially for energy-intensive companies in individual countries - is still not fully secure under the conditions prevailing at the beginning of 2023. Disruptions to critical infrastructure can exacerbate emergencies. All of this affects not only individual companies, but also complex business networks.

Additional cost shocks: In the context of the supply problems, high cost increases for intermediate inputs and raw materials have already occurred in 2021. In addition, the supply risks for energy and raw materials, mainly due to the war, have caused unprecedented cost shocks in many European economies. In the fall of 2022, for example, producer prices in the German industrial sector were a good 45 percent higher than in the previous year. This is historically unprecedented and is causing uncertainty in companies, additional transaction costs and is changing international competitiveness. Rising labor costs - with the understandable aim of limiting the loss of purchasing power for private households - can additionally worsen the competitiveness of companies and their sales opportunities. In some areas, it is not possible to pass on these sharply rising costs to customers, so there is a risk of a sharp drop in corporate earnings with negative effects on investment activity.

New demand shocks: The significantly higher prices at the producer and consumer level in many countries are having a direct impact on demand for consumer and investment goods. High inflation rates are eroding the purchasing power of private households. In view of the uncertain economic outlook and rising financing costs, companies are holding back on investment. The economic survey conducted by the Institute of the German Economy in summer 2022 provided an initial empirical basis for the impact of the war in Ukraine on investment activity in Germany (Bardt/Grömling, 2022). According to the study, the sharp rise in energy costs, uncertainties regarding energy supplies, global uncertainties and disruptions in international supply chains represent an even higher investment barrier in the view of the companies surveyed. In addition, there are possible long-term structural and reallocation effects as a result of the high price level. The global economy is again losing momentum, and this is impacting German exports. Overall demand is therefore suffering across the board.

In view of these broad-based burdens from the war in Ukraine, the German economy will be in a new but moderate recession in the winter of 2022/2023. Stagnation is currently expected for the year 2023. The outlook for the German economy has improved significantly in recent months. A number of indicators signal that material bottlenecks and disruptions in supply chains have eased significantly. Energy prices have also decreased noticeably, and the risk of a gas shortage no longer exists in spring 2023. However, this should not lead to the hasty conclusion that the general vulnerability to production disruptions in Germany has disappeared. Many companies are still reeling from the burdens of the pandemic. And this fundamentally distinguishes the current situation from previous economic crises, which were usually preceded by a good period. The outcome of the current crisis is far from clear. An end to the Russian invasion of Ukraine is unlikely in 2023. This continues to pose high risks in terms of a comprehensive energy supply in Germany and volatile energy costs. It is also currently open whether there will be further geopolitical conflicts. Disruptions to critical infrastructures cannot be ruled out. The same applies to problems on the international financial markets. As a result of the ongoing Corona pandemic, many normal production processes are still not possible. Production problems in China due to the pandemic could again lead to global disruptions and slow down the world economy. The possibility of bottlenecks in international supply networks cannot be ruled out. However, we are unlikely to see the same extensive lockdown measures as in the past years. Individually, these risks may seem manageable, but their interaction is dangerous. In particular, failures in central areas can quickly lead to downward spiral effects via the many interconnections. This has already been learned in the pandemic. The restart of complex production networks is not a trivial matter. Missing semiconductors and containers standing around somewhere have made this truly clear. Continuing problems - which are assessed significantly weaker in spring 2023 than in autumn 2022 - threaten to have long-term consequences for the economic structure. Abrupt interruptions to complex production processes and supply networks can have a lasting impact on them and thus trigger upheaval effects that cause lasting damage, primarily to industrial production in Germany. This also affects the business-related service sector through a variety of interconnected effects.

As in the tough months of the first pandemic wave in spring 2020, the government is countering the immediate effects of the war with broad-based support packages (SVR, 2022). The exorbitantly high electricity and gas prices are being countered with several relief packages and, in particular, liquidity assistance for households. Ultimately, however, the government's options for securing the liquidity of households and companies are also subject to financing limits. This is all the more true if the secular transformation trends outlined at the beginning are seriously considered. The threatening liquidity bottlenecks cannot be fully borne by the government. This means that the ability of companies to secure their own liquidity has a pivotal role in the current crisis.

Liquidity to secure Survival and a Future

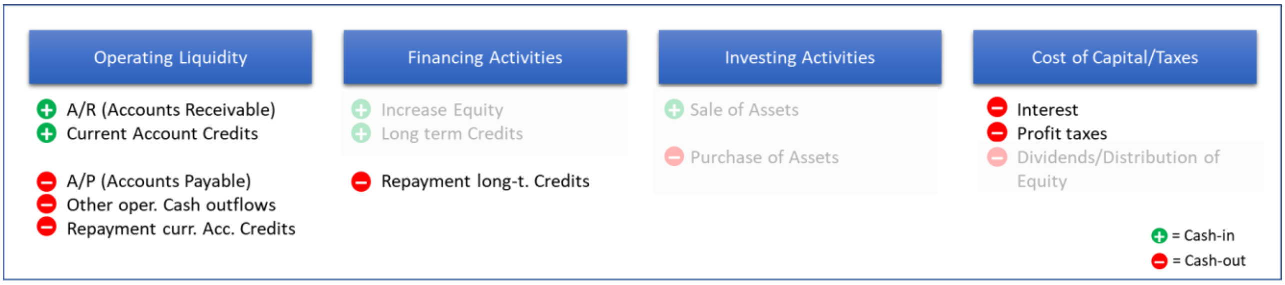

Fig. 2, Source: Authors

In order to get a better grasp of what is behind the task of cash management, it is helpful to take a systematic look at the main cash-ins and cash-outs in the company. **Figure 2 above** shows the structure along the four typical categories: Operating Liquidity, Financing Activities, Investing Activities and Cost of Capital/Taxes. However, many of the levers for liquidity management are only available to a limited extent or not at all in times of crisis (light gray shading).

Let's look at financing activities, for example: Taking out long-term loans is currently made considerably more difficult by the fact that banks require corresponding liquidity planning for this purpose. But it is precisely this which is often impossible because of the unclear future - at least to a reliable extent. This was already a major problem for many companies during the corona pandemic. Added to this are the recent sharp rises in interest rates. The possibility of capital increases by financial investors is also typically eliminated in times of crisis. What remains, however, as a cash-out, are the obligatory repayments of old loans and the associated interest payments. Investments in fixed assets can be stopped or postponed, although many companies have already done this in the past crisis. Disposals of fixed assets are difficult for many companies, as these are often indispensable for ongoing operations and ensure a decisive lead over the competition. In addition, buildings or machinery lose significant value in times of crisis.
This means that only operational liquidity remains under the influence of entrepreneurial action - and often offers unrecognized levers for increasing liquidity in the short term.

Understanding Operating Liquidity

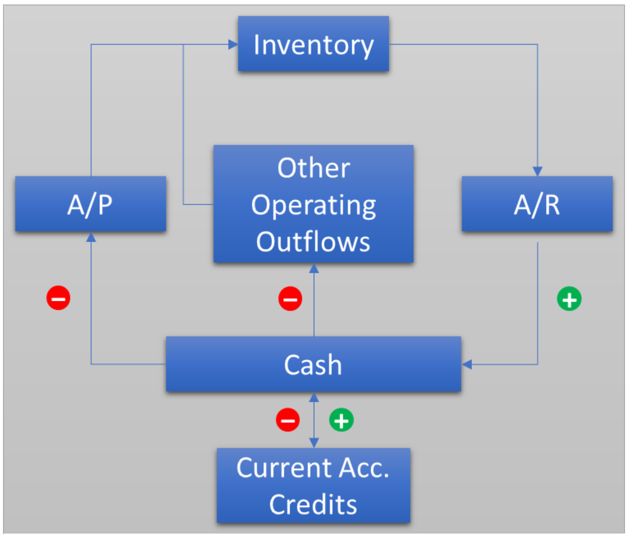

Fig. 3, Source: Authors

For a basic understanding, it is worth taking a look at the cash-to-cash cycle (also known as the working capital cycle) in **Figure 3 left**:

According to it, the main elements of the cash outflow are the A/P (*Accounts Payable* = trade payables) or actual payments to the suppliers, the other disbursements such as for rent or salaries, and the inventories due to the commitment of cash (*Inventory, e.g.* raw materials and supplies for production). The only element of the cash inflow is the A/R (*Accounts Receivable*), i.e. the sales revenues realized by the customer. The basic mechanics for improving the cash situation are simple: increase A/P, on the other hand reduce A/R and inventory. However, the concrete levers and their implementation are often less well known or tend to be neglected in a normal economic situation.

Quantification of Cash Improvement Potentials

To better understand how effective which of the three levers is, it helps to look at the time periods associated with them in **Figure 4 on the following page**: DSO (*Days Sales Outstanding*), DPO (*Days Payables Outstanding)* and DIO (*Days Inventory Outstanding*). DSO quantifies the average time until customers pay outstanding invoices, DPO quantifies the time until suppliers are paid after receiving their invoice, and DIO quantifies the inventory period that directly ties up cash. Since typically suppliers have to be paid before customers pay their invoices, this often results in a negative cash balance (see figure 3 below). Nevertheless, sufficient liquidity must be maintained for this bridging period to cover upcoming rent payments, salaries, and similar expenses. This either comes from the existing cash pool or has to be covered expensively by short-term loans.

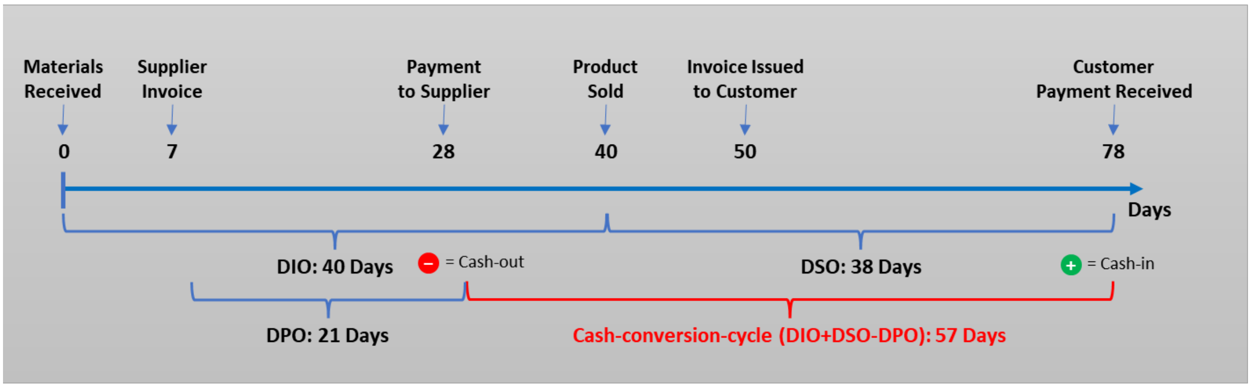

Fig.4, Source: Authors

In other words and from a cash perspective: DPO is a friend, DSO and DIO are the enemy. Every single day by which DSO and DIO are reduced and DPO is extended represents considerable potential for increasing cash holdings. And most managers are not even aware of this.

The calculation is very simple for the main levers DSO and DPO:

- Cash increase per day DSO reduction = Total Annual Revenue / 365
- Cash increase per day DPO extension: Total Annual *Cost of Goods Sold (COGS)*/ 365

In order to check whether and in which area there is liquidity potential in a company, the duration of DSO, DIO and DPO is usually calculated on the basis of key figures from the balance sheet and income statement (**Figure 5 below**). Whether all three levers apply to the individual company depends on the business model. For example, a company in the retail sector will find few options in DSO, as customers usually pay directly - but all the more opportunities in warehouse management (DIO) and supplier management (DPO).

Fig.5, Source: Authors

Another and often underestimated effect is the saving of capital costs in the form of interest on credit. Especially in the current times with strongly rising interest rates, this is an increasingly important factor. Since the bridging of the solvency in the enterprise is frequently transacted with a short term current account credit with a house bank, currently easily 10% per annum interest and more is due, and more than 4% for long-term loans.

If we take ten selected Dax companies as an example, the real dimensions become apparent: Based on the figures for fiscal year 2021, the companies examined show an average DSO of 63 days and a DPO of 115 days. The mathematical liquidity improvement per day depends, of course, on the size of the company, but is in the two- to three-digit million range – that is, for each day of improvement in the key figures. The secondary effect of interest savings contributes a further six-figure amount per day.

This logic applies even more strongly to medium-sized and small companies, since raising funds via the capital markets, e.g. issuing corporate bonds, is largely closed off to these companies and they are dependent on one or a few principal banks and classic loans. A medium-sized company with average annual sales of around 15 million euros, for example, can record five-digit amounts as cash inflow per day of improvement DSO and DPO. If you convert this into wages or rents, you can see that it is worth the effort!

2. The Art of: Receivables Discipline

The relevant process steps and responsibilities: C2C (*Customer-to-Cash*)

In order to identify all potentials for improving the cash situation, it is necessary to clarify the processes and responsibilities in one's own company. Typically, Accountancy is keeping an eye on open invoices and shortening invoice deadlines (experts speak of the accounts receivable days or D*ays Sales Outstanding, DSO for short*). However, this allocation is clearly too short-sighted, as it would only take into account the processes *after* invoicing. Everything that takes place in the specialist departments, whether in Marketing or Sales *before* invoicing, is left out of the equation. And this must not happen for two reasons: Firstly, these processes also contribute to DSO, and secondly, important decisions such as payment targets or the amount of the credit limit are made in Sales, which have a decisive impact on receivables management. Ultimately, therefore, all process steps and responsibilities must be considered, from the identification of potential new customers to the final receipt of payment after business has been transacted, which in Anglo-American terms is referred to as the C*ustomer-to-Cash process* (**Figure 6 below**).

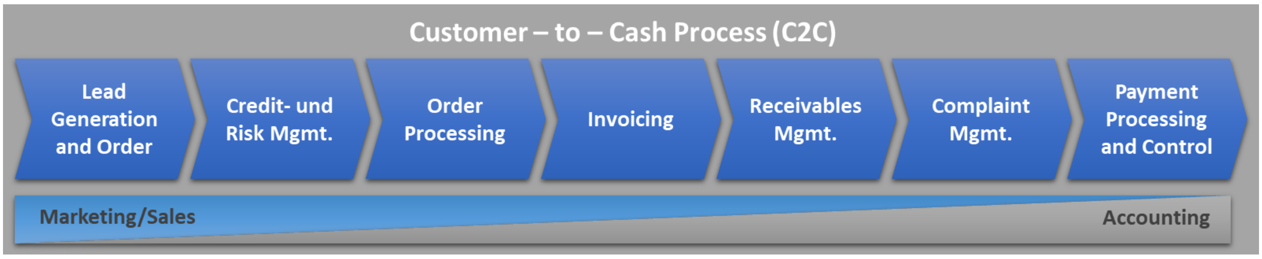

Fig.6, Source: Authors

A new proposal for the calculation of the DSO

In technical management literature, the following calculation formula is used almost throughout:

Fig.7, Source: Authors

DSO = (*Accounts Receivable* (A/R) / *Annual Sales) * 365 days*.

Here, the A/R (*Accounts Receivable*) is defined as the unpaid invoice amount after invoicing. This formula has its justification, as it allows a simple calculation of the DSO based on the key figures of the balance sheet or at least the income statement. But since the time until invoicing also belongs in the overall consideration of the entrepreneur, we plead for an adapted formula for the calculation of the DSO that includes the monetary amount of invoices that have not yet been sent (**Figure 7 above**). This is what the abbreviation WIP (*work-in-progress*) stands for. Companies should be aware that every day by which the period until invoicing (WIP) is reduced can make a decisive contribution to improving liquidity - this is up-stream of the reduction in A/R (e.g. by tightening up payment terms or stricter dunning processes). Studies show that the share of WIP in DSO can easily reach 30 to 40 percent. And something else becomes apparent: reducing WIP is significantly easier than reducing A/R, as these are exclusively internal company processes.

The concrete Levers for DSO Optimization

Lead Generation and Order

Incentive setting plays a major role early on in a company's ability to turn revenue from customers to cash. The Sales organization is primarily responsible for generating revenue. This is one of the reasons why there is an incentive system in this area: so-called bonuses and sales commissions that are linked to the sales that the individual Salesperson brings in. However, in most companies, the time when the revenue is booked and the time when the payment is actually received from the customer are far apart - in some countries like e.g. Italy even 90 days or more. And so Sales employees quickly loses sight of the question of when the money comes in.

To improve liquidity, companies should clarify responsibilities between Sales and Accounting. They should establish a clear and binding set of rules, including the specification of payment targets and the definition of payment-related key figures in credit and risk management, e.g. binding minimum credit ratings for new customers. In addition, it seems sensible to us to change the incentive system for Sales employees to actual incoming payments - for example, the total annual incoming payments instead of period-related sales. In this way, the payment behavior of customers becomes a bonus-relevant and thus monitored indicator for the Sales department.

Credit and Risk Management

A look at operational practice shows that Salespeople intensively negotiate certain things such as quantity and price with the customer, while commercial payment terms such as credit limits, payment targets and discounts tend to be handled on a subordinate basis - and often vary widely from customer to customer. This leads to a multitude of individual regulations that can hardly be controlled, let alone optimized.

This is where another lever comes in. Most companies have an ABC segmentation of customers, e.g., according to their sales volume or their total contribution margin. This should be expanded for each segment with standardized and binding rules regarding credit limits, payment terms and discounts. For example, small customers or customers with questionable creditworthiness would be classified in the C segment, for which there should be immediate payment, no credit line and also no granting of discounts. Conversely, A-type customers, for example, would be granted a credit line of several thousand euros, a 30-day payment period and the use of a two percent cash discount. The formation of the classes follows the credit rating with classification of all new and existing customers. This procedure significantly reduces the DSO - and thus also the risk of customer payment default.

A look at granting cash discounts to customers - does it make sense? Earlier cash receipt is of course desirable, especially since studies show that with a payment period of 30 days, the actual payment receipt is just under 40 days on average. A sample calculation shows the advantages and disadvantages: If a cash discount of two percent is granted for payment within ten days on an invoice amount of 1000 euros, an early payment of 980 euros is made, but the 20 euros cash discount represents a loss of liquidity. A counter calculation: If the full amount of 1000 is only paid after 30 days, the company incurs a cash-reducing interest expense of 5.47 euros for the 20 days of advance financing at an assumed ten percent interest rate, and even 10.94 euros for 40 days. It is therefore necessary to look at the actual values for discounts, interest and incoming payments and to calculate discounts against the cost of capital.

In addition to handling payment terms, it is important to push levers such as prepayment, down payment/partial payment, and direct debit much more strongly. Particularly among private customers, acceptance of this has risen significantly as a result of the established payment practices of the major online retailers.

Order Processing and Invoicing

Many companies still create their invoices on a weekly or bi-weekly basis. While this may still be understandable for small businesses, this practice should be banned for medium-sized and large companies. Ideally, companies should issue invoices or at least partial invoices at the moment they accept or execute the order. If this cannot be enforced with the customer, all parties involved should be trained and sworn in to fast invoicing in high quality. To do this, they should link the order and invoicing IT systems and maximize the standardization of the order format, as this makes slow and error-prone manual transfer of order information to invoicing obsolete. It is also important to look at how the invoice is sent. DSO can be further reduced by having companies agree with customers to send invoices by email or EDI, rather than by mail. After all, the agreed payment deadlines do not apply until the invoice is received. This also saves paper, postage and additional manual work.

A direct debit is the best solution. No banking services such as direct debits take place on Saturdays, Sundays, and public holidays. This therefore affects more than two-sevenths of all calendar days in the year. If the payment deadline falls on one of these days, the collection should be made one day earlier instead of the following Monday. Every day counts.

Receivables Management

Each day between the expiry of the payment deadline and the initiation of dunning measures contributes to DSO. A central but sometimes neglected prerequisite for initiation: ongoing and IT-supported verification of incoming payments.

Sometimes there are good reasons for a payment to be delayed. Therefore, Sales and Accounting should coordinate before a reminder is sent and possibly important customers are aggravated. This also includes agreeing on how the company addresses customers. Particularly with A customers, a telephone call between Sales staff and the customer may be more helpful than a formal letter. In the area of C customers, however, an immediate reminder is appropriate, ideally combined with a fee and thus a further cash increase. It is important to establish clear rules on which steps a company takes to collect receivables and when: When does one take legal action? At what amount is a collection service commissioned?

Factoring is another possible option. In this case, the performing company sells its receivables to a third-party service provider, who is then himself in charge of the collection. This may be of particular interest to companies that cannot take the collection step themselves effectively using their own resources. However, factoring is associated with a percentage fee for the service provider based on the amount of the receivable, and therefore the relinquishment of part of the total receivable.

Complaint Management

A customer's satisfaction has a direct impact on his willingness to pay. Whether the product does not meet the expected quality, the delivery is late or incomplete - all this often leads to the customer not paying, paying late, or paying at a discount. Research shows that a significant proportion of payment defaults or delays can be attributed to this. It is therefore advisable to systematically analyze such reasons for customer complaints - and take countermeasures. The initiative for this lies primarily with the Sales department.

It is equally advisable to recognize customers who make frequent and targeted, but usually unjustified, complaints about invoices and individual items in order to suspend payment altogether. This can lead to serious delays. Regular statistical evaluation of the complaint frequency of individual customers is therefore indispensable.

Payment Processing and Control

When posting incoming payments, it is not only a matter of checking the deadline, but also the amount of the payment or claiming of discounts. For example, many customers claim a cash discount even though the period for doing so has long since passed. In this case, the receivables management and credit rating processes must be triggered again. This step is therefore of particular importance once again.

And an add-on: The relevance of other corporate functions

In order to make the best possible use of the levers described, Sales and Accounting are particularly important. But other areas are also required: without modern software solutions, internal lawyers for the contracts to be negotiated, or the HR department, which must set up appropriate training and incentive systems, the measures will hardly achieve any effect.

The next part of this paper will now turn to the opposite side of Receivables, Accounts Payable, and reverse the logic of the principles described in this chapter to allow for the preservation of cash held by a business. The following checklist sums up all described steps (**Figure 8 next page**).

Fig.8, Source: Authors

3. Holding on to Cash: Managing Accounts Payables

The importance of the DPO

As long as an invoice has not been paid, the sale of goods and services by suppliers on terms of payment is in effect an interest-free loan granted said supplier to our company. The later we can postpone payment of an invoice, the later liquidity flows out of the company, which would otherwise have to be secured at a high cost, for example by means of an overdraft facility. In this context, the term DPO (Days Payables Outstanding) describes the average number of days from receipt of the invoice to its settlement, calculated over a year. It is calculated from the ratio of A/P (accounts payable) to total COGS (cost of goods sold), see **Figure 9 below**:

$$\text{DPO} = \frac{\text{A/P}}{\text{COGS}} * 365$$

Fig.9, Source: Authors

So, every single day by which a company increases DPO has a direct impact on available liquidity and, incidentally, lowers the cost of capital because this saves interest. What the DPO does not include, however: The equally valuable period between the receipt of services and the issuing of the invoice by the supplier, which can be extended, for example, by agreeing on a monthly collective invoice instead of individual invoices.

The basic logic for DPO optimization is simple: the later the payment, the better. The actual implementation, however, is more demanding.

The relevant process steps and responsibilities: P2P (Purchase-to-Pay)

The responsibility for increasing DPO does not lie solely with Accounting, but also to a large extent with Purchasing (or Sourcing) and other areas. It is therefore necessary to take into account all the steps from the first contact with a supplier to the payment of an invoice, which in the Anglo-American world is described quite succinctly by the term *Purchase-to-Pay process* (P2P, see **Figure 10 below**).

Fig.10, Source: Authors

When looking at the individual steps, it becomes clear that this is a complex interplay of different organizational areas with possibly different interests that have to be balanced. Purchasing, for example, will primarily focus on the price, while production may consider the reliability of a delivery to be more important. Successful liquidity optimization can therefore only succeed if all involved make their contribution.

The concrete Levers for Payables Optimization

Sourcing Strategy

A look at many companies shows that there is often no overarching strategy for purchasing, delivery reliability and liquidity optimization, but rather that different organizational units decide for themselves. However, if payment targets or credit limits are already fixed in the contract, there is hardly any leeway left for Accounting. Companies should therefore create a set of rules that defines goals, responsibilities and incentives across all steps from the perspective of the company as a whole.

What can this look like in concrete terms?

Supplier Choice and Contracting

This step is probably the most important. Whether with a broader Internet search or specifically via tools such as supplier portals - companies should segment their suppliers. Suppliers for strategic, i.e., production-relevant materials and goods (usually classified as A-suppliers) are significantly more important than suppliers for normal consumables such as office materials (C-goods). The screening of suppliers is followed by the negotiation of contractual terms such as price, quantity, delivery and payment conditions (!). It is in the nature of things that for both sides the focus is on price, quantity and delivery conditions, because these factors directly influence sales, costs and profit. Payment terms, on the other hand, are often given secondary consideration by the supplier's Sales department, which presents a great opportunity for Purchasing in terms of liquidity optimization.

In supplier management, there is room for individual agreements because the number of suppliers is usually manageable. At least for A and B suppliers, the payment conditions should be regulated individually. Particular attention should be paid to the A-suppliers because they trigger high invoice amounts. The goals of this negotiation are obvious: to agree on the highest possible payment terms and credit limits. The small C-suppliers, on the other hand, can be offered standard conditions in which long payment terms are already stipulated. The contracts should be regularly reviewed and adjusted.

Supplier Orders / Goods and Services Reception

We want to focus here on the commercial factors. How liquidity can be controlled via warehouse size and duration will be dealt with in the fourth part of our series.

In essence, the relevant levers are outlined by a simple question: Who is allowed to order what and when? Operational practice shows that a large number of employees often place orders and that there are few rules for this. And a high number of individual orders typically leads to many individual invoices, which are more difficult to control. Companies should prevent this by establishing consistent rules, e.g. on the role of Purchasing and the role of Specialist departments in purchase orders. Collective orders simplify the process, ideally with the utilization of a credit limit.

Invoice Reception

In the narrower sense, this is where the term of the DPO begins. One lever for extending it is to avoid individual invoices. If possible, companies should agree on collective invoices with their suppliers for fixed points in time, such as bi-weekly or, better, monthly. This approach delays the receipt of invoices as much as possible.

In this step, it is also important to keep an eye on discounts for early payment of the invoice. Conditions such as: "Two percent discount for payment within 10 days, 30 days net" can often be found in the payment terms of the invoice. So for an invoice amount of 1000 euros, a discount of 20 euros would come into effect for our company. This raises the question of how to proceed from a liquidity perspective: In times of crisis with low liquidity, the basic rule of paying as late as possible always applies as cash is the number one bottleneck and even short-term financing options severely limited. In situations with sufficient liquidity, however, drawing a

$$\text{Annual Int. Saved} = \frac{\text{Discount\%} * 365}{\text{Paym. days} - \text{Disc. days}}$$

Fig.11, Source: Authors

cash discount can make perfect business sense. True, two percent sounds just like a small inflationary adjustment. But this two percent is granted for a very short period of time. This results in astonishing returns - in our example an annual interest rate of 36.50 percent (**see Figure 11 to the left** for formula). If the cash discount for the same periods is three percent, it would even be 54.75 percent. In such a case, even financing the early payment via an overdraft facility - comparable to an overdraft facility for private individuals - can make sense. Ultimately, the advantages and disadvantages must be calculated on the basis of the actual percentage rates and the payment target (see Fig. 3). If a payment term of 60 or even 90 days is granted, then the value of a cash discount will always be lower.

Complaint Management

That this process step appears in the context of liquidity optimization may come as a surprise. But if there are reasons to complain, such as an incomplete or late delivery or quality defects, it is perfectly justified to defer payment until the defects have been rectified. For this purpose, Accounting should be informed about the defects and not yet settle the invoice. In the end, this behavior leads to two positive effects: Liquidity in the individual case is increased and future delivery quality is presumably improved.

Payment Clearance

A high number of supplier invoices typically leads to daily invoice runs. The question here is whether, at least for B and C suppliers where the company is in a stronger position, bundled payment runs can be introduced at around the end of the month. This way, all invoices that would have already been due would be paid in the later payment run after all. Another small effect is the consideration of weekends or holidays when the invoice run should actually take place. Instead of bringing this forward to the working day before, the following working day should be used first by default. A company can, of course, rely on letting the set invoice deadline pass and only respond to the reminder. This increases the DPO even more. But higher-level aspects such as a lasting supplier-customer relationship based on partnership and impact on one's own credit rating should also be taken into consideration here.

Figure 12 on the following page summarizes part 3. In the fourth and final part of the paper, we will discuss the relationship between inventory management and liquidity and present specific levers for reducing inventory duration.

Fig.12, Source: Authors

4. Key Levers: Reducing Inventory Burden

The relevant process steps and responsibilities: F2F (Forecast-to-Fulfil)

In many industries, high inventory levels are part of the business model. This applies, among other things, to wholesale and retail, but also to large areas of the manufacturing sector and thus to a large part of the economy. The topic of inventory and its impact on liquidity should therefore become a focus for these companies. The higher the value of inventories and the longer the days of inventory outstanding (DIO), the more liquidity is tied up in the company. It is only released when the product, e.g., consumer goods in retail or components in mechanical engineering, are sold to the customer or at least paid for. So, the shorter the DIO, the faster the liquidity flows back to the company. Analogous to the descriptions of DSO (Days Sales Outstanding, part 2) and DPO (Days Payables Outstanding, part 3), it can also be stated here that the optimization of DIO can only succeed if different areas in the company work together. And this is true even if they have conflicting interests. Purchasing, for example, will try to order as large quantities as possible in order to procure goods more cheaply. Especially at the present time, when there are supply bottlenecks for many materials such as semiconductors, it can make perfect sense to stockpile larger quantities. Production, for its part, attaches importance to high stock depth for raw materials and semi-finished products, i.e., a large quantity of available material as well as simultaneous proximity to production sites in order not to risk interruptions in production. And the Sales department would ideally like to have a large number of different products close to the customer in appropriate numbers so that the market can be served at all times. All this is contrary to the aim of liquidity improvement, which would aim to have the lowest possible stock levels in all areas. A solution can therefore only be found by weighing up all justified interests and thus involves various process steps from the definition of the product portfolio to the final sale, as can be seen in **Figure 13 below** "Forecast-to-Fulfill".

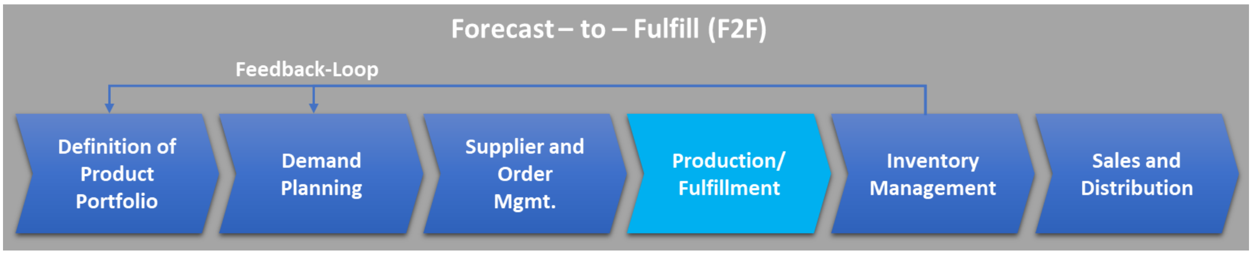

Fig.13, Source: Authors

In the following, we will discuss the optimization levers in more detail in the commercially relevant steps. The above figure relates more to the value creation steps of manufacturing companies and may require different focal points for companies in the service and retail sectors - but the generic levers discussed are the same for all companies.

The Interpretation of the DIO and Calculation of Savings Potentials

The DIO is calculated on the basis of the figures from the balance sheet and income statement. The value of the inventory on the reporting date is set in relation to the total COGS (Cost Of Goods Sold = manufacturing costs) of the period (see **Figure 14 left**). Ultimately, this expresses how much of the total cost of goods sold is held permanently in inventory. The amount of cash potential per day by which the DIO is reduced is calculated simply by dividing the inventory value by the DIO.

$$\text{DIO} = \frac{\text{Inventory}}{\text{COGS}} * 365$$

Fig.14, Source: Authors

However, shortening the DIO not only leads to an increase in operating liquidity, but can also lead to a significant reduction in other operating costs. Namely, these are all warehouse costs such as rent or depreciation, operating costs such as electricity and heating, insurance or personnel costs in the warehouse. Lower logistics costs can also go hand in hand with this.

The concrete Levers for DIO Optimization

Definition of Product Portfolio

The width (= number of different products or materials) and depth of the warehouse (= stock volume per product / material) naturally have a significant influence on the value of the inventory as a whole. Ultimately, therefore, this lever is about determining which products the company actually wants to manufacture and in consequence which it wants to stock. The choice will usually fall on those products in highest demand with customers. In the case of many other products with low or fluctuating demand, it usually makes more sense to produce or purchase them only to specific orders. Another aspect, especially for manufacturing companies, is extensive standardization and reduction of product variants through modular systems, uniform platforms, and a design suitable for efficient assembly.

Companies should therefore determine their product portfolio strategically: It must take into account both the requirements of production and sales and the minimum possible capital commitment in the warehouse.

Demand Planning

Demand planning is usually based on historical data and considers the sales of products over the course of the year and thus the upstream production or the necessary purchasing. It is helpful to differentiate between products with constant demand and those with seasonal fluctuations, such as summer and winter goods or products from the Christmas business. Companies should ask themselves: Which products need to be available where and in which quantity for which point in time? And this applies to both the company's own products and those bought from the outside. A regular and critical analysis of past forecast quality to improve the planning process is a must to improve performance and eliminate waste through excess inventories.

Supplier and Order Management

A decisive lever for reducing inventories is to negotiate the delivery mode with suppliers. Ideally, deliveries should be made in just-in-time (JIT) or even just-in-sequence (JIS) mode, which is familiar from the manufacturing industry in particular: material reaches production only at the moment it is actually needed. In retail, this is less practical - and in industry, too, it sometimes reaches its limits. For example, the dependency on delivery reliability is enormous and can lead to a complete loss of production if the delivery fails to arrive. Having two suppliers for the same material or holding small, in-house safety stocks can help mitigate this threat.

Especially in the case of important suppliers from whom a company purchases large quantities, consignment warehouses can make sense. In this case, the supplier sets up and operates a physical warehouse on the customer's premises. Only when materials or products are removed from the warehouse is ownership transferred and payment made downstream. The DIO is then only determined by the production and sales speed and is correspondingly lower.

Standardization of packaging and containers as well as barcode labeling also allow for much more professional warehouse management. If there is a long-term planned supplier-customer relationship, then a permanent EDI ("Electronic Data Interchange") connection can make sense, in which the customer's ordering systems are directly linked to the supplier and automatically replenish the stocks.

If methods such as JIT delivery are not possible, companies should still commission an optimal order quantity. This means: They should minimize typical cost types such as unit costs, order costs, storage costs and risk costs (due to production downtime or customer attrition).

Inventory Management

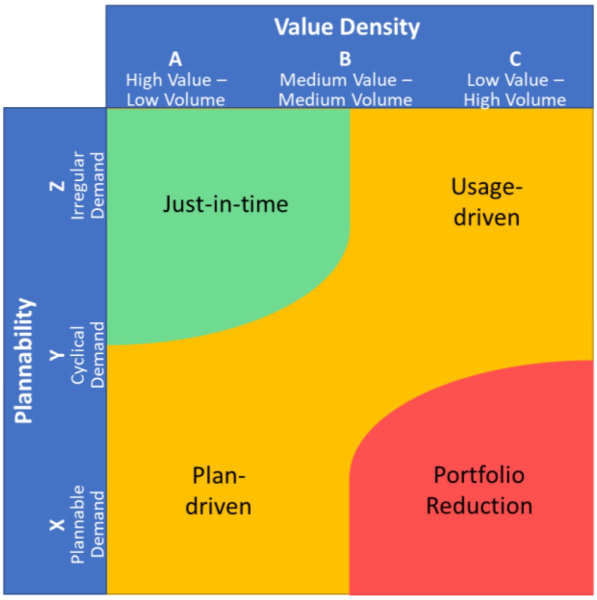

Fig.15, Source: Authors

Simply put, companies should try to keep sufficient stocks of all items with a high turnover rate (fast movers) and at the same time reduce or completely banish those with a low turnover rate (slow movers) from the warehouse. In concrete terms, this can mean identifying the products that are used or sold particularly frequently and should therefore always be available on the basis of withdrawal figures. Conversely, slow movers should not be stocked in the first place, but only ordered when needed. A tried and tested classic for this is the categorization of stock items according to ABC and XYZ. A-goods have the highest value of the stock, but represent only about 20 percent of inventory. B-goods represent about 30 percent by number with medium value and the remaining C-goods about 50 percent. The XYZ classification evaluates predictive accuracy in terms of consumption or sales: high, medium, low. Combining both analyses, this results in the recommendations for action to optimize the inventory, as simplified in **figure 15 at the end of the previous page**.

If possible, the items should be marked via RFID or barcode. This makes it much easier to book in and book out of stock and allows the actual stock levels to be recorded and analyzed in the merchandise management system in real time. Companies should regularly adapt their product portfolio and demand planning to actual inventory behavior.

Sales and Distribution

Sales is responsible for selling the inventory and thus has a direct influence on the DIO. However, it is often observed in practice that the Sales department has little or no knowledge of the inventory or is not keenly aware of the necessities of inventory/liquidity optimization. It is therefore recommended that the Sales department has access to the inventory management system and is aware of the inventories per product as well as critically high inventory levels. The goal should be for Sales to proactively market existing inventory levels and also bring so-called slow movers to the market, for example, by cross-selling with popular items. For example, if a customer buys a computer printer, a savvy Salesperson will try to co-sell printer paper, replacement cartridges and a printer cable. Something similar happens in the restaurant industry, to take an example from the service industry. A daily menu often includes an already popular dish as the main course and then, as appetizers and desserts, products that urgently need to be used up due to their shelf life. Inventory management and cross-selling at its most practical ...

Another lever in this process step is the incentivization of the Sales force. If a Salesperson is only paid on the basis of sales, he or she will try to sell only the most popular products. Products with low sales or that are not in high demand are often left out. A clever incentive system will also include targets for the turnover rate of all products and thus make the Salespersons more aware of labyrinth stocks. **Figure 16 on the subsequent page** sums up the levers identified in this part 4 of the paper.

Fig.16, Source: Authors

Discussion and Conclusion

For many companies, the business outlook for the new year is difficult to assess. This also applies to costs as a risk factor, for example due to rising energy, material and not least capital costs. Looking at cash-reducing and cash-increasing factors across all areas of the company – regularly and in a coordinated manner – is a discipline that is healthy for any company even in economically sound times.

But it becomes even more crucial and potentially relevant for survival for any business in trying times. The authors are, as also indicated in the main text of this paper, well aware that the generic cash levers have different power in given particular businesses. This in no way diminishes the value of educating managers on every level of a firm about them and the crucial value of cash management and liquidity in general for the health of a business.

Too often, cash – its procurement and its spending – is seen as a specialized, slightly nerdy function to be best left to Accountants. Even worse, the authors found that all too often, revenue is equated in the managers' minds with cash-inflow, and costs with cash-outflow, most notably so in large corporations. This is far from the truth and dangerously separates many line-managers from the daily battle for cash, which in turn leave firms with less financial efficiency, and a potential financial exposure in crisis.

We therefore hope to make a case for a much broader and cross-functional integration of liquidity management in everyday business, cultivating frugality and cash discipline like most of us would prefer to do for their private finances (where, admittedly, similar dire failure to do so is frequent). It is too late for management to understand and appreciate the true value of cash only when there is not enough of it left to make the next payroll. After all, Cash IS King!

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