# TECHNOLOGY ANALYST REPORT

The Definitive Guide to Treasury Technology Solutions

- Treasury and Risk Management
  - Treasury Aggregation 

    Treasury Aggregation
- Supply Chain Finance and Cash Conversion Cycle
  - Treasury Ecosystem •



This special edition provides an exclusive look at the solution set offered by Trustmi.







# 2024 Analyst Report

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Welcome to the 2024 Treasury Technology Analyst Report! This document is intended as a definitive guide for thoughtful financial stewardship in the digital age, aiding practitioners in exploring how treasury technology meets treasury needs.

Technology is becoming a vital part of the treasury function, but parsing out which buzzwords matter and how innovations are relevant in finance can be difficult. This report aims to clear up the alphabet soup of Al, ML, API, Bl, SaaS, PaaS, and more, offering both new and veteran practitioners relevant explanations of what today's technology means for the treasury profession.

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# **Table of Contents**

Introduction	01	$\Big)$
Overview	02	$\mathbf{i}$
The Current Treasury Landscape	02	
The Current Technology Landscape	05	
General Principles for Obtaining Treasury Technology	13	
Treasury Management Systems	16	$\Big)$
Defining the TMS	16	
The Solution to Several Core Problems	17	
Emerging Technology Impacting the TMS	19	
Selection & Implementation: TMS Tips	20	
Treasury Aggregators	22	$\Big)$
Defining the TA	22	
TAs: Simplifying the Complexity	22	
Emerging Technologies Impacting the TA	26	
Implementation: TA Tips	27	
Supply Chain Finance and Cash Conversion Cycle Solutions	28	$\Big)$
Introduction	28	
Understanding Working Capital, SCF, and the CCC	28	
Cash Conversion Cycle Solutions: AP & AR Automation and Beyond	30	
Supply Chain Finance Solutions	32	
Leading Practices for Working Capital Initiatives	36	
Trustmi	38	$\Big)$
	40	$\overline{}$

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# **Introduction**

The treasury profession has come a long way since it first became a common corporate role. From grappling with digital payment and data transfer methods to taking on a more strategic role, the changes in treasury have varied. One thing most of the changes have in common, however, is that they have required treasury to adopt increasingly sophisticated technology. Now, as a result, familiarity and aptitude with relevant technologies is quickly shifting from a bonus skill for treasury staff to a necessity.

However, this does not mean that treasurers must understand everything about every technological innovation. For some technologies, treasury should be well-versed. For others, treasury should be aware, but does not need deep knowledge. Other innovations may lie so far outside the scope of treasury that even awareness is hardly necessary.

While the internet is teeming with information on technology, there is not much guidance for treasury on which technology falls into which category. In addition, most of the technology information online is either highly technical or extremely vague.

The goal of this report is to discuss the innovations and solutions treasury professionals need to know about in the level of depth that is relevant to them. The first section, the Overview, provides contextual and overall technological information as relates to treasury. The sections that follow the Overview delve into more detail on some of the most important treasury technology solution categories. Following that, you will find the vendor analysis section.

Finally, on page 42, you will find a **Works Cited** page detailing the sources for the statistics used in the text and in the charts throughout the report. Strategic Treasurer runs several surveys each year, using strict methodologies to poll treasury and finance professionals and build a database of longitudinal as well as timely data. Most of our survey reports can be downloaded for free on **our website**.



Please note that we have referenced data points from our recent surveys throughout this report. Charts and graph numbers might not add up to 100% due to rounding. The surveys from which the findings were derived can be found on the Works Cited page.

# **| The Current** Treasury Landscape

In order to understand how technology applies to treasury in 2024, we first need to understand the landscape treasury finds itself in, with its challenges, pressures, and opportunities. These are many of the drivers that push providers to build new tools and push the industry to adopt solutions. From interest rates and geopolitical events to AI developments and staffing concerns, each factor below is shaping where treasury stands and how it is looking to technology for help.

#### Economic and Geopolitical Status

In the past twelve months, the global economy has seen moderation become the norm. Despite concerns, the world did not move into a recession, and many larger economies have been moving in a tentatively positive vein. While the world is still operating in a high interest rate environment, rates have been declining at some central banks. As we move toward 2025 in the US, the Fed has begun to cut rates.

Geopolitically, the atmosphere remains tense and wars remain active in Eastern Europe and the Middle East. At the same time, the high numbers of elections all occurring within the same year has resulted in some uncertainty but not in the turmoil many anticipated.

Every economic crisis puts a spotlight on treasury management, emphasizing to the C-suite the importance of liquidity risk. In the wake of a few years of economic volatility and with some factors still



causing uncertainty and strain, treasury is facing an environment of heightened demand for its skillful guidance and rapid, well-informed responses to the shifting geopolitical scene.

#### | Staffing

Overall employment levels are high, and after several years in which few new workers entered the treasury space, the industry is now seeing some new people moving into the industry. However, a substantial number of open positions continue to exist, and ideally, we would see a more rapid influx of new employees who can begin engaging in and gaining experience in the field. These workers will be needed as treasury encounters its next level of transformation, specifically within the area of technology.

Age cohorts have been an important topic of conversation recently, as "boomers" move toward retirement and "gen Z" workers enter the workforce. The younger generations, while often criticized for impatience with mundane work, are often rightly pointing out where automation could save the company time and money and where manual data entry no longer makes sense. They are not eager to join departments with highly manual processes or with outdated technology.

The instincts and competencies of younger workers for technology will be important in moving treasury forward, but they will need some time in the field to learn and gain context and confidence. Attracting and retaining talent is a concern for today's treasury department, and this is deeply tied to the department's use of technology.

#### Data & Analytics

Data management continues to increase in importance for companies. With technology facilitating the creation and storage of more and more data, the amounts have now become staggering, triggering the term "big data" and the need for significantly more intentional strategies for storing, analyzing, and using it. This is important for two main reasons: visibility and competitive advantage.

As data proliferates, visibility into liquidity and financial situations becomes harder to achieve. Version control issues may arise, data may end up being repurchased multiple times due to silos, or visibility may be simply limited or delayed without a thoughtfully architected data strategy.

Meanwhile, companies are identifying creative ways in which they can leverage the abundance of internal and external data to optimize other strategies. For example, some companies leverage business intelligence (BI) tools to assess, report on, and improve their performance. Other companies during the pandemic made use of "alternative" data such as satellite images of parking lots to more rapidly gauge market changes. In each of these cases, intentional approaches to data strategy offer a competitive advantage. As implementing a robust strategy for managing and leveraging data becomes more common, failing to do so leaves organizations at a competitive disadvantage and, in some instances, unprepared for economic, market, and geopolitical changes.

#### | Security

Fraud continues to increase, and past months have seen new types become more common. The threat is now creating massive challenges for all payment areas. Treasury is rightly the "superintendent" of payment security: bearing responsibility for ensuring that what is necessary for securing payments is being done, although not often being the person responsible for carrying out those activities. This needs to become more widespread practice, however, as the treasurer is not currently functioning as the actual superintendent of payments at many companies.

On the whole, treasury has been more active in taking its responsibility for fraud seriously, but the majority of firms are still not doing enough to protect payment

#### ?) We plan to spend more on treasury fraud prevention, detection and controls because: 1



E DEFINITIVE GUIDE TO TREASURY TECHNOLOGY SOLUTIONS

companies are experiencing. As criminal actors succeed in gaining larger payouts, they use those payouts to fund better technology to gain even larger payouts. This results in a constantly rising threat level and new methodologies that are increasingly difficult to combat. For example, some criminals are now able to deploy deepfakes with good success. As technology continues to advance, treasury departments will not be prepared without regular payment security training and periodic updates as fraud techniques advance with more realistic schemes.

Facing these threats, treasury must ensure that its organization is also constantly strengthening and

processes against the high levels of threat that all

updating its defenses. The post-pandemic corporate move to "return to office" (RTO) is resulting in more of a hybrid environment than a fully in-office situation, also adding some complexity to the current security situation.

#### Compliance Burden

Most of the regulations impacting treasury are driven by the need to protect against fraud or against financial crises. Neither of these risks is likely to diminish, so the regulatory burden cannot be expected to lighten either.

For treasury's part, Know Your Customer (KYC) compliance is typically ranked as the most burdensome, with others including PCI-DSS, GDPR,

#### $^{\prime}$ ) Are there currently any responsibilities that you don't have time to perform? $^{3}$



FBAR, and PSD2.<sup>2</sup> Beneficial ownership information (BOI), a new regulation, will also impact some treasury departments. Most of these regulations require treasury to have clear data ready for reporting purposes or documented security measures in place.

#### **Operational Needs**

As treasury teams try to cope with all these areas of rising demands and pressures, they require efficiency, scalability, and flexibility in their daily operations. These three requirements feed into one another and support strong liquidity management, risk management, and security.

Treasury teams are typically lightly staffed, and as noted earlier, entrance into the field is slow. With limited manpower, treasury teams must prize efficiency within their department. As liquidity managers, they must also value efficiency across the organization, as efficient operations overall tend to benefit liquidity in various ways. For example, efficiency in AR processes leads to faster and more accurate invoicing and fewer delays in collection. (Keep in mind that efficiency implies not just speed, but also accuracy.)

Efficiency also leads to scalability and flexibility. Efficient AP processes may make it possible to take discounts for faster payment, and that flexibility may be useful at certain times in managing liquidity. Efficient processes also scale up and down more easily and securely, allowing staff to keep to the intended processes without skipping controls to try and save time.

SENDOR

CONTENTS

# | The Current Technology Landscape

Technology is clearly developing rapidly, with more innovative digital consumer products appearing on the market constantly. As the underlying technology and its applications improve, vendors continue to bring these improvements to bear on treasury's current challenges by expanding and adding offerings. The past year has seen solid growth in both innovation and spending for treasury technology, and 2025 is expected to continue in the same vein.

While treasurers do not need to be experts on all technological concepts and rarely need extremely deep technical knowledge of innovations, a certain level of understanding is becoming increasingly vital. Having a solid base of knowledge regarding relevant technologies helps treasury staff understand 1) how current and emerging technologies may apply to treasury, 2) what technology they may need, 3) how to better use the technology they have, and 4) where the technology may be heading in the future, which supports wise long-term planning.

The following sections will cover some basic concepts, trajectories, and types of technologies, how they relate to treasury, and what might be expected in the future.

#### | Foundations of Treasury Technology

There are several concepts and areas of progress in technology that form a foundation for much of the innovation and functionality that is relevant in treasury. These include data, processing power, the democratization of technology, hosting models, connectivity, and speed. Each section below describes a trend of some kind of progress or growth that drives or powers more innovation. Keep in mind that these trends are continuing and may continue indefinitely.

#### Data

The digitally connected world has created an environment of rapid data generation. Estimates suggest that the amount of data in the world now doubles every two years. Data is useful, so its proliferation poses a massive opportunity for organizations. Still, harnessing the amounts of data now in play requires intentional strategies and tools.

#### **Processing Power**

The efficiency of computer processing power grows even faster than data, doubling approximately every 18 months. This rapid progress of processing enables the rapid growth of technological functionality and capacity, meaning that even as data proliferates, computers are continually able to offer ways of storing, analyzing, and leveraging the abundance of data.

This pace of advancement in technology can also lead to obsolescence and to tools moving from new to outdated quickly. However, the cost of technology also





tends to drop with the increase in processing power. New technology is both more powerful and more affordable than older technology, leading to what we call the "democratization of technology."

#### Democratization of Technology

This term refers to the trend of increasingly sophisticated technologies becoming affordable for a broader demographic. When treasury management systems (TMSs) were first introduced, they were prohibitively expensive and resource-demanding for all but the largest and most complex companies, who were also the most desperate for such digital levers. Now, however, with the drastic progress in processing power and other innovations over the past few decades, TMS options exist that are 1) affordable for companies under \$500M in revenue and 2) more powerful than the original, prohibitively expensive offerings. It is expected that this trend of a broadening market for increasingly powerful tools will continue.

#### **Hosting Models**

Hosting is another area of progress that has supported democratization and has made treasury technology from the 20th century look far different from the treasury technology of today. This progression has been especially notable for the TMS. Three primary hosting models have emerged over the years:



The TMS/TRMS platform type you use or plan to use is or is expected to be: <sup>4</sup>

\* UNSURE responses have been excluded

- On-premises: Initially, on-premises hosting was the only option. Solutions were maintained on the client's own servers, placing the burden of "care and feeding" on the client. This contributed to the exclusivity of these solutions, as only the largest companies had the funding, server capacity, and IT resources to support this. In addition, the on-premises model manifested problems with backlogged upgrades and obsolescence. Installed solutions are still in use at many organizations, but they will need replacement eventually. Few newly purchased solutions today use this hosting model.
- Application Service Provider (ASP): In an attempt to solve the upgrade and maintenance issues of installed solutions, the ASP model (sometimes referred to simply as "hosted") involved a third-party provider that hosted and maintained the solution. While it partially accomplished these purposes, upgrades were still not enforced, obsoletion still tended to occur eventually, and ASP was ultimately overshadowed by the third hosting model.
- **3.** Software-as-a-Service (SaaS): The SaaS hosting model moved treasury solutions to the cloud in a multi-tenant platform. The vendor maintains the solution and upgrades it. The cloud-hosting allows for more thorough and more seamless updates, and a subscription payment model incentivizes vendors to continue improving the solutions, so SaaS solutions are often seen as retaining and even increasing their value over time. Despite being met with skepticism initially, SaaS has been the standard for hosting for several years now.

#### Connectivity

Treasury's connectivity needs, both internal and external, are extensive. The past several decades have seen quite a few innovations come and go in this area. While teletype machines, once a significant step forward from relying on the mail service, have been thoroughly phased out, host-to-host (H2H) connections and secure file transfer protocol (SFTP) are still fairly common. The application programming interface (API) has also become a main connectivity option, allowing treasury staff to retrieve data from within their systems at the click of a button. Europe prompted an uptick in global API adoption by issuing the Revised Payment Services Directive (PSD2) in 2015, which required banks to allow customers to access their banking data through third parties (achieved via API use).

#### Speed

As processing power, connectivity options, and other innovations develop, more speed is possible for digitally enabled processes. Market expectations then adjust to more rapid processes, and more speed is expected and demanded. At this point, the expectation in many areas is becoming not only "fast," but "real time," where there is essentially no delay at all between the initiation of a process and its completion. For treasury, this trend of increasing speed is especially relevant to payments, visibility, and data.

#### | Recent and Ongoing Innovations

Moving from the broader technological concepts and trends over time to specific, current innovations, we encounter many buzzwords. Artificial intelligence (AI), for example, has become a topic of more immediate interest to the average person since the launch of ChatGPT in November of 2022. With an overabundance of headlines covering certain topics and little clear explanation of the direct impacts on treasury and finance, practitioners may find it difficult to tell where the excitement points to relevant, meaningful implications for their technological options and where it does not. Other innovations, meanwhile, may lack the news coverage but be guite significant to treasury. While no one can predict with complete certainty which innovations will impact treasury the most and how, this section covers what currently appear to us to be some of the most important topics to understand and follow and how they are expected to relate to treasury technology.

#### **GENERATIVE AI**

Generative AI tools have burgeoned since the release of ChatGPT in late 2022, and they have remained a common topic of conversation in both the consumer and corporate spaces. To understand how generative AI differs from traditional AI and ML, one must understand that traditional AI/ML identify patterns in historical data and use those patterns to make predictions. Generative AI leverages this same capability, but it uses it to create unique content and to interpret natural language and respond interactively with a user.

Currently, generative AI tools fit into most processes in much the same way as a well-educated intern might. It can gather and present information, create a rough draft of a report, and offer a starting point for many tasks, but its work must be checked. While future improvements may make generative AI tools' work more reliable, they currently tend to invent fictitious data at times. This is referred to as "hallucinating." In other instances, they can misinterpret and therefore misrepresent data when asked, for example, to summarize information.

Asking questions in a way that is most likely to get an accurate response and checking the answers provided are skills that can help treasury and finance staff leverage the new technology effectively. In addition to focusing in on the technological skills that can help them leverage new tools, staff should also consider focusing on strategic skills that are more difficult to replace.

07

#### Artificial Intelligence

Al is a fairly broad category of systems that attempt to mimic human cognitive abilities, "learn" from trial and error, and adapt to new information without requiring additional, specific coding on how to handle that new information. Subsets of Al include machine learning (ML) and generative Al.

ML focuses on the development of algorithms and statistical models that use large datasets to learn and make predictions and decisions. It excels at pattern detection and has become an integral part of many of the AI systems available today. Generative AI, which has seen significant strides in recent years, leverages natural language processing (NLP) and the analytical and predictive abilities of AI to create new content and converse with the user.

Current Al use in treasury is almost exclusively within treasury systems. The more established uses include detecting potential fraud and helping with forecasting, but generative Al is opening up new possibilities, such as supporting treasury's ability to document, communicate, summarize, and report.

The past year's growth in AI use has resulted in a significant majority of corporate treasury professionals using AI tools regularly for personal reasons. However, a minority of those in treasury (and banking) are using AI for business. We can view this as a learning and

Please indicate your use of AI (e.g., ChatGPT, Google Bard\*, other AI services): (Select all that apply) <sup>5</sup>

Use personally. Use for self-learning or for other personal uses

Use for work. Use for treasury work, research or analysis

Testing for work. Evaluating for work applications, but have not implemented

Do not use. Have not tried yet



\*Please note that this survey was conducted prior to Bard changing its name to Gemini on February 8, 2024. piloting phase, with treasury personnel seeking to determine the uses of AI more fully before employing the tools in the workplace.

We expect it to take many years for AI to have the impact that its proponents are anticipating, but this does not mean that treasury can disregard it for now. Some carry a significant level of skepticism regarding AI's usefulness in treasury, and looking out only six months into the future, they may seem correct. Looking out five years, however, many of the limitations and roadblocks may have been overcome, and the companies and vendors who do not delay in putting their own building blocks in place to deploy and leverage AI may be using it to great effect.

In addition to skepticism about its realistic usefulness, there is also some concern of AI taking jobs in treasury. While AI may well take over certain tasks, it may also open up new areas of activity. This is not a zero-sum game for humans and AI. Those whose roles are dominated by replaceable tasks should consider upskilling and leveraging AI rather than opposing its use.

#### **Business Intelligence**

With the rapid growth of data, organizations need tools that can help them store and leverage masses of data effectively. Business intelligence (BI) tools are built for this job, collecting and transforming data from across the company and enabling users to easily draw insights from that data. Modern BI tools make use of AI to analyze the data and create an interface where users can ask questions in natural language and have answers delivered based on the data available. This "self-serve" data access powers better decision-making through better insights.

It should be noted that simply having a sophisticated BI solution by itself does not constitute a full and proper data management strategy. The BI tool is only as good as the data it receives, and this requires that the company's other systems integrate with it and feed it accurate data in a timely manner.

The use of BI tools is continuing to grow above trend in finance generally, although less in treasury specifically. The growth is mostly coming from leading companies who are working to take full advantage of their data. It is still the early days for this technology, and its use is likely to become more extensive as the years pass.

#### Application Programming Interface (API)

APIs themselves are not exactly a recent innovation, but the past several years have seen a dramatic uptick in their use, particularly in finance. An API is a set of rules and protocols that allow software applications to interact with each other. With APIs, users can click a button in one application and access data from another application, as when the Uber app allows customers to access payment functionality and map data that shows where their ride is all within one mobile application.

In treasury and finance, APIs have been used to support both "open banking" and "open treasury," referring to the approaches that seek to allow more streamlined integration with banking systems (open banking) and between internal treasury and other finance systems (open treasury). As mentioned in the section on connectivity, Europe's PSD2 regulation drove adoption of APIs as a means of achieving open banking by making banking information accessible within third-party applications. While this external connectivity that makes banking and other data instantly accessible from internal systems may be the most popular use case of APIs for treasury, they are also useful for achieving open treasury, as APIs can facilitate connectivity and smooth integration between internal financial systems.

The API "library" is another concept to be aware of in the open treasury movement. An API library is a set of multiple APIs offered by a vendor, with each API serving a specific routine or functionality. API libraries streamline the API calls for integration with the vendor's solution set, simplifying connectivity and integration, and promoting seamless cooperation among different solutions.

Larger banks and primary technology systems that treasury uses are continuing to expand the partners they connect with through APIs. APIs have seen several years of strong growth, and 2025 and 2026 are also expected to continue the trend.

#### Platform-as-a-Service

Platform-as-a-service (PaaS) has to do with how providers build the systems they offer. PaaS providers, such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform, offer a ready-built platform on which developers (for example, a software company building a treasury management system) can build and maintain their solution. It offers a complete development environment, with hardware, operating system, development tools, database management systems, and runtime environments already in place. The pre-configured platforms and services allow the developer to focus their efforts on the application itself with increased flexibility, efficiency, scalability, ease of deployment, and cost effectiveness.

While PaaS may seem like a back-end, technical element that is a boon only to the developer, treasury and finance should understand that the benefits of PaaS flow down to the user as well. With a foundation already in place and tools at the ready, PaaS allows for faster development and a quick, seamless upgrade experience. In addition, PaaS solutions are hyperscalable since they are not limited by the vendor's server space. This allows the end-user of a PaaS-based system to toggle the capacity of their solution up or down as needed.

#### PAAS SCALABILITY USE CASE

Certain intermittent tasks may require higher computational power than the other tasks treasury routinely performs. For example, end-of-month hedge reporting may require notably more power than any daily tasks. With traditional platforms, treasury would have to pay for this maximum power all month just to have it available for the month-end reporting. With PaaS, however, the vendor can allocate a client more or less capacity as needed. Treasury can turn up the power for the couple of days that they need it and then turn it back down for the rest of month, paying for the capacity they need only when they need it.

09

THE DEFINITIVE GUIDE TO TREASURY TECHNOLOGY SOLUTION:

PaaS has facilitated the growth of several other innovative and interconnected ideas. These areas are growing quickly. While they are not necessarily receiving the news coverage that AI is, these areas of development are important for treasury staff to understand and maintain awareness of, as they are already impacting treasury solutions and are likely to continue changing the landscape:

- Cloud-Native: Many of the solutions currently offered via cloud began as installed applications and migrated to the cloud. While the cloud environment is beneficial regardless, these migrated systems are not optimized for the cloud. A cloud-native solution, on the other hand, was built for the cloud in the first place. As a result, they are able to take advantage of certain capabilities the cloud provides that migrated solutions may be unable to leverage. These advantages include some of the following developments, such as microservices.
- Microservices: Microservices are independent pieces of functionality that can be combined into a more comprehensive system. Since each piece of functionality can be developed, scaled, deployed, and upgraded without impacting the others, microservices allow for agility and flexibility.
- Low-Code/No-Code: With a similar concept to microservices, low-code/no-code software uses pre-written pieces of code. Users with little to no coding expertise can combine this pre-written code to create a full application to their own specifications. This high level of customization and rapid development is attractive to many.
- *Embedded Functionality:* Instead of building a standalone system, many modern technology

vendors are embedding their functionality into other systems. Many PaaS-based offerings use this method, and treasury is increasingly likely as time passes to encounter specialized solutions that embed into their treasury management system – or even treasury management functionality that embeds into their ERP.

#### **Networks**

"Network" may not be a term that excites as much interest as, for example, AI, but networks are an increasingly important piece of the treasury technology landscape. Networks typically serve any of three primary uses for treasury:

- Information: Names like Swift, EBICS, and Zengin are probably familiar to most treasury staff. These are payment information networks, which have become a critical part of the global corporate payments infrastructure. Some of these networks are national (for example, Zengin serves Japan), some are regional (EBICS is primarily used in the Eurozone), and some are global (Swift would be the prime example here). Regardless of geographic spread, however, each network helps connect banks and financial institutions with each other and with corporate clients, transmitting data including account balances, transactions, and payment instructions. For treasury, information networks are largely valuable for the visibility they provide.
- Outsourcing: Some networks provide outsourced services for treasury needs, including data management and compliance services. These services may range from handling payee information to KYC assistance that streamlines the compliance process for banks and corporations.

Security: A major use of networks in recent years has been to enhance security. A large payments network can validate and cross-check payee information and requested changes against other information in the network. Verifying that payee information matches that of the payee's other customers can help prevent fraudulent changes, and a fraudulent request can be flagged across the network.

Regardless of the type of services offered, each network derives its value from two elements: its participants and its functionality. Both are necessary for a network to properly provide value. No matter how many people are on the network, it must enable you to do something to be worthwhile, but no matter how much it allows you to do, it doesn't matter if no one else participates. Usually, participants and functionality drive each other's growth on networks, as more people join functional networks, and providers are motivated to add more functionality to well-used networks.

### Distributed Ledger Technology (DLT) and Blockchain

Distributed ledger technology (DLT) uses decentralized recordkeeping and transaction verification across a system of multiple network participants. This allows for greater security and transparency than with centralized systems. Blockchain, a type of DLT, chains together blocks of transaction data in a way that is immutable. This enables peer-to-peer transactions that can be verified without the need for a third party.

While blockchain and DLT have seen significant buzz and use in areas such as cryptocurrencies (Bitcoin uses blockchain technology, for example), their use

SENDOR

CONTENTS

in treasury has been limited. Specific use cases do exist, such as verifying cross-border transactions, and treasury practitioners need to have some familiarity with the technology but should not expect to see it around every corner of treasury-specific functionality.

#### Solution Categories

As internal integration methods improve and the need for internal integration increases, organizational technology ecosystems become more and more interconnected. Many technologies impact something treasury cares about, from accounting to working capital. As a result, the landscape of solutions that matter to treasury can be surprisingly broad.

#### **Categories Covered**

The following pages of this report include in-depth coverage of three main categories of solution types, along with vendor representation from across the treasury technology ecosystem. While some of these solutions are specifically aimed at addressing treasury's own operational concerns, others may be housed in other departments but impact issues that matter to treasury.

#### Treasury Management System (TMS) / Treasury and Risk Management System (TRMS)

The TMS is the core solution aimed at serving treasury's operational needs. Its functionality covers daily treasury tasks such as cash management, accounting, visibility, cash forecasting, and often more. TMS offerings typically have strong integrative capacity, allowing them to serve as a central platform

#### ) Which of the following technologies are you using/interested in using in treasury? <sup>6</sup>



11

where staff can access current information and carry out their daily workflows in a secure, streamlined environment. Varying levels of sophistication and power are available. Depending on the solution, a TMS may be anything from a step up from Excel to a sophisticated core solution for the largest and most complex treasury departments.

#### **Treasury Aggregator (TA)**

The TA assists with an organization's payment and data needs. On the payments side, the TA offers payment hub functionality by establishing connections and converting payment formats, offering a centralized, efficient, secure payment environment. On the data side, the TA aggregates banking data and translates and distributes it to internal areas as needed, significantly improving efficiency for many companies.

#### Supply Chain Finance (SCF) and Cash Conversion Cycle (CCC) Solutions

While treasury staff are not the primary users of SCF and CCC solutions, the offerings that fall into these categories can be used to improve working capital management, making them important to treasury. SCF platforms offer ways of supporting supplier liquidity while also benefiting the buyer. This may be achieved by leveraging the buyer's credit to obtain third-party funding for the supplier or by making efficient use of a buyer's excess capital through dynamic discounting. CCC solutions include a broad variety of tools that automate portions of the cash conversion cycle. They improve efficiency and flexibility in the cycle, allowing for better control over working capital.

#### **Treasury Ecosystem**

Vendors in this broad category are innovating specialized solutions for the various issues that plague treasury and areas treasury cares about. These solutions are likely to work alongside a TMS or ERP system and provide advanced support for issues such as forecasting, payments and payment security, FX, hedging, and much more.

#### EMERGING SOLUTION CATEGORY ENTERPRISE LIQUIDITY MANAGEMENT

The larger an organization becomes, the more widespread the factors that impact its liquidity. Regardless, treasury remains the group responsible for stewarding the entire company's liquidity, no matter how complex that task may become. As complexity and demands rise, more powerful tools may be required to maintain adequate visibility and sufficient functionality to take in and address the breadth of a complex company's liquidity.

Several vendors are now recognizing this issue and providing solutions for the specific needs of large, complex liquidity organizations. Strategic Treasurer has dubbed the technology category emerging to meet these rising demands "enterprise liquidity management" (ELM). ELM solutions meet the requirements of large, complex companies for rapid and comprehensive visibility into areas impacting liquidity across the organization.

The ELM space is still developing, and vendors are seeing the opportunity and approaching it from different angles. Some are expanding their own solution ecosystems to encompass full ELM capabilities, while others are building highly integrative tools that can connect with others to support a comprehensive view of liquidity. However they approach the problem, ELM systems offer a cohesive platform from which treasury and other relevant groups can use the functionality they need to view and manage liquidity across the company.

# General Principles for Obtaining Treasury Technology

The primary purpose of studying treasury technology as a treasury professional is to understand how it can be used to benefit your department or larger organization. This, however, is only the beginning of the process. If, after examining the types of solutions available and how they help, you decide that getting a new solution or replacing an old one would be worthwhile for your company, more challenges present themselves: gaining funding, choosing the exact offering that will suit your needs, implementing the solution in a timely manner, and using it well.

Parts of this entire process will necessarily look different depending on the type of solution you are choosing and implementing. However, there are a number of general leading practices that can help you navigate the process smoothly regardless of the technology category. In this section, we will cover these general guidelines, and the following sections on specific solution types will include some targeted leading practices for each type.

#### Mindset: Looking to the Future

Throughout each step of the process as you look to obtain new technology, your mindset will be crucial. An awareness of current problems and a desire to solve them without delay is typically what prompts a technology implementation process, but while various pressures pull your attention to the present, the

mindset that will lead to success is one that keeps the future clearly in view from start to finish.

Certainly, your solution should address your current problems, and the present is important, but many modern solutions should last for decades. Your selection and implementation must take into account not only the present situation, but also your company's trajectory and, insofar as it can be predicted, its future needs and constraints.

Others in the organization may put pressure on your department to attempt an unrealistically rapid implementation schedule or otherwise compromise long-term value for short-term goals. Dealing with the

**BUSINESS CASE** 

Strategic case

 $\simeq$ 

Stakeholder

buy-in

detailed issues that may arise at various points may also draw your focus to the short-term. Do not dismiss short-term goals, but at each stage, be sure to take a step back and refocus on what will be needed down the road and how your current decisions might impact that. From the start of building your business case to the final go-live, keep your long-term goals foundational to your project and revisit them and your mindset often.

#### The Business Case

Moving to the more practical, the first hurdle that meets the treasurer who has decided a technology solution would be beneficial is the business case to obtain funding for the project. Key leading practices to accomplish this include making a good financial case,



#### **Developing a Realistic and Comprehensive Roadmap**

 $\simeq$ 

Short list

13

making a good strategic case, and communicating with key stakeholders to gain buy-in.

#### The Financial Case: ROI

Showing a return on investment (ROI) is the most widely known part of making a business case. Without a doubt, it is vital to demonstrate how you anticipate the solution will pay for itself over time and why it is a smart move financially. An ROI will be expected. However, an ROI is not a sufficient business case in itself. Your project will be competing against many others for limited finding, and every competitor will also show their ROI. Use your ROI to demonstrate how the exact way you propose solving the problem is wise, but build your case for solving the problem solidly on the strategic aspect first.

#### The Strategic Case

With your strategic case, the goal is to show how your solution contributes to the overarching organizational mission. If your project is, indeed, a good one, it ought to be far more than simply convenient for your own department. Whether it empowers your department to more effectively support your organization or directly benefits other areas, explain how funding your project will be a strategic move that will further the mission of your company.

#### Stakeholder Buy-In

For nearly all technology projects, there will be some outside of your own department who will be impacted by your new solution. These are your key stakeholders. Identify the key stakeholders in your project and proactively discuss your plans with them. Find out what their concerns and interests are, explain how you anticipate the project impacting them, and make adjustments to support their needs as well as your own. By making the project a win-win and clearly communicating that you're hearing their concerns and needs, you can make allies of these stakeholders, and having allies can make a difference in the competition for funding, as well as in the project's success.

#### Selection

As time passes, more and more vendors are entering the treasury technology space and offering a broader variety of solutions. With so many options, there is very likely to be one that suits your company's needs quite well. Identifying it amidst so many other choices, however, can be a challenge. Many solution types will impact your daily operations for years or decades to come, so much is at stake in the selection process. To reduce overwhelm without compromising the quality of your selection, consider the following leading practices.

#### Aim for the Right Target

Selecting a solution means selecting a provider. Returning to the future-focused mindset, the provider controls your solution's future. Consider carefully not only how they have crafted the solution as it currently stands, but also what their attitude is toward the future and your ongoing relationship. While we frequently use the term "vendors," some vendors see themselves only as vendors, while others take on the mindset of a strategic partner. A "vendor mindset" sees the relationship with the customer as purely transactional: provide a product, receive payment, fulfill any ongoing obligations, and nothing more. Vendors who view themselves as strategic partners to their customers are aiming at ongoing improvement, with attentiveness to the evolving needs of their customer base. As you seek a solution, consider providers who will accompany you as a partner and support your growth over the years.

#### Focus on the Short List

In addition to identifying what you should be aiming at in terms of a provider, it is also vital to identify early on what you are aiming at in terms of your own needs. Defining clear business requirements that detail what your company needs out of its solution allows you to

Regarding your current system, what was the expected implementation time, and how long did the implementation process actually take?<sup>7</sup>



4 TREASURY TECHNOLOGY ANALYST REPORT

OVERVIEW

quickly weed out the solutions that fail to match that list, leaving you with a short list of providers and solutions that might be a good match. This short list is where you can focus. Here, you can perform the due diligence necessary for a solution that will be handling your organization's financial data and use demos and other methods of diving deep on the compatibility of the solution with your needs.

#### | Implementation

Implementations are not easy. Much can go awry, leading to the project taking too long, costing too much, and/or leaving the company with a poorly implemented solution that they must hobble along with for years. While implementations do not have to go poorly, many treasury professionals may go through decades of their career without encountering one, so the experience that can help avoid pitfalls is often lacking. This makes the following leading practices particularly important, as they can allow for a smooth implementation process that successfully leads to a fully functional solution.

#### A Realistic Approach

Since implementations are known to often take longer than intended (sometimes even expanding over the course of years), treasurers and upper management may be concerned and emphatic that the project must take as little time as possible. As a result, they may advocate for an "aggressive" timeline that involves brute forcing the project to completion.

Unfortunately, this approach tends to backfire. The timeline is often simply unrealistic, failing to take into account that some tasks cannot be sped up regardless of manpower and urgency. The lack of realistic planning leads the project to fall off-track, ironically meaning that the implementation may end up taking far longer than necessary. Errors, rework, and functionality that is never fully implemented are also likely to result from an overly aggressive timeline.

To avoid this, ensure that your planning is both detailed and realistic. Plan out what resources will be needed when, what order the implementation steps need to occur in, and how long each portion will take. Discuss your plans for the project with the vendor, IT, other stakeholders, and third-party experts if necessary.

#### **Phases with Banded Timeframes**

Breaking the project into phases allows for more organized planning, focus, proper testing checkpoints, and a logical progression. Rather than setting hard, precise schedules for each phase, banded timeframes are recommended (for example, 1-2 months rather than precisely 1 month). By infusing flexibility into the plan, you allow your plan to expand and contract where needed to accommodate the reality of the unexpected. This means your project can progress without falling off-track when the inevitable delays happen.

As you plan out each phase, identify critical path items and take time to consider the most logical progression of tasks and phases to avoid having to revise your plan more than necessary. As each component is put into place, test it and fix any issues you may find before progressing and building on top of it.

#### Implementation Phases with Banded Timeframes



FULL IMPLEMENTATION: 6 MONTHS

# **Treasury** Management Systems

#### | TMS: Snapshot

#### **Basic Functionality:**

- Cash positioning & visibility
- Cash management
- Forecasting
- Accounting
- Integrating with other internal treasury tools to provide a central workstation

#### Who Needs One:

- Any treasury department for whom manual processes are no longer sufficient for core treasury activities.
- Treasury departments with heightened needs for margin, analytical power, or security due to increases in complexity, economic pressures requiring treasury to focus more on advisory and strategic tasks, or other factors.

#### | Defining the TMS

The TMS or TRMS (still sometimes referred to by the older term, "treasury workstation") is the treasury department's core solution. While there is a breadth of variety in the functionality and levels of specialization in different TMS offerings, all solutions in this category are specifically designed to streamline the daily operational needs of treasury staff. The base functionality common to most TMS offerings will include cash positioning, visibility, cash management, forecasting, and accounting. Some may specialize more deeply in one of these areas. Others may expand into other areas, offering tools for FX, payments, compliance, bank account management, debt and investments, and more.

Any TMS will assist with risk management, but some offerings are more directly geared to supporting risk management. These solutions are likely to be referred to as treasury & risk management systems, or TRMS. While we will use the term TMS throughout the remainder of this report, keep in mind that we are using it broadly to encompass both types.

Typically, a TMS will have strong integrative capabilities, allowing it to connect to various other internal treasury and finance systems. Coupled with robust data management and core treasury functionality, this allows the TMS to function as a central dashboard where treasury staff can view current information and seamlessly carry out workflows. This not only facilitates efficient treasury operations, but also contributes to broader excellence in data management and fosters open treasury practices and connectivity throughout financial departments.

#### Hosting Models and Adoption over Time

The TMS has been a staple of large organizations' treasury departments for decades at this point, but those decades have brought many changes to this solution category. Changes in hosting models have played a major role in the history of the TMS, leading to changes in the solutions' lifespans. The steady democratization of technology has also applied to the TMS, with its user base expanding over the years from only the largest of the large companies to now include small to medium-sized organizations.

Early TMSs were exclusively available as on-premises installations. Coupled with their high cost, the server capacity and IT resources required to support these offerings made it impracticable for any but the largest companies to use one. Over the years, the usual democratization trends of rising processing power and dropping costs contributed to making them more affordable in the first place. In addition, with the advent of the ASP model and, soon afterwards, the appearance of SaaS, the resources required to maintain a TMS decreased significantly.

As of 2023, 72% of large organizations (>\$5B in annual revenue) reported using a TMS, while only 25% of small and medium-sized organizations (<\$5B in annual revenue) had one. However, with more options that suit their needs now available, smaller companies seem keen on narrowing the gap, and 24% reported planning to implement a TMS within a year or two. This would nearly double the TMS user base in the small to medium-sized group.<sup>8</sup>

While installed, ASP, and SaaS solutions all exist now, SaaS has claimed the vast majority of the market, with For a TMS/TRMS by type of platform, how do you view the projected value proposition? <sup>11</sup>



82% of respondents in 2023 stating the solution they used or planned to use was SaaS-based. In addition to the reduction in internal resource demands, SaaS's popularity is also likely driven by the perception of its projected value proposition compared to competing hosting models. For installed TMS offerings, the most common perception (50%) was decreasing value over time. For hosted, the most common answer (38%) was stable value over time. For SaaS, however, half of respondents perceived the value as actually increasing over time, with none suggesting a decrease. This is likely due not only to the seamless upgrading capacity of cloud hosting, but also to the subscription payment model that incentivizes vendors to keep adding value to the product lest their customers look elsewhere.<sup>9</sup>

#### | The Solution to Several Core Problems

The problems that a TMS solves are fairly numerous, but they can be collected into a few different

categories. Mostly, treasury departments need these solutions to solve for staff overwhelm, economic volatility, connectivity issues (both internal and external), and security and control concerns.

#### Staff Overwhelm

Typically a lightly staffed department, treasury can be quickly overwhelmed as more demands are placed on it. The demands that increase pressure on treasury may come from rapid organizational growth or acquisitions, geographic expansion, times of economic turmoil (see next section), or the simple increase of demands in industry standards and treasury's responsibilities over time. Whatever their individual causes, 46% of treasury professionals reported in 2024 that they have responsibilities that they do not have time to perform.<sup>10</sup>

When facing such a situation, there are two options: 1) add staff or 2) give staff levers to allow them to do more. In some cases, an additional staff member is all that is needed. Often, however, the complexity of treasury operations is being multiplied, and adding one to your staff will not allow you to keep up. Expanding into one additional country, for example, may add currencies, banks, multiple accounts, payment formats, payment methods, and more. The solution should match the problem: if the complexity is being multiplied, not simply added to, then the solution should multiply the efficiency of your team, not just add to it.

Multiplying the effectiveness of the treasury team is the central purpose of the TMS. It streamlines daily tasks such as cash positioning and allows staff to begin the day with accurate visibility instead of using hours reaching that point. This frees your team to support your organization in a more strategic and advisory function, leveraging accurate, current data. It also provides them with plenty of margin to think things through and perform their tasks with an eye to excellence instead of pure haste.

#### **Economic Volatility**

While technically another source of complexity that causes overwhelm for staff, economic volatility merits its own section. Since 2020, the geopolitical and global economic scene has been quite turbulent, with multiple unexpected twists and turns. When the environment is volatile, treasury's risk management and advisory functions become both more difficult and more urgently required by the C-suite. To guide their organizations well when things are changing quickly, treasury needs tools like the TMS. A TMS may rapidly provide high-quality information, help produce more accurate forecasts, and leave staff with ample time to assess, strategize, and advise.

#### **External Connectivity**

In order to aid treasury professionals in achieving visibility, forecasting, or almost anything else, the TMS must have data from external sources. These sources range from banks and networks to FX portals and market data providers. The types and number of sources depend on the organization. For many treasury departments, the manual process of gathering all of this data, not to mention formatting and bringing it all together in a usable manner, is one of the tasks that most rapidly grows out of hand.

While some TMS offerings specialize more deeply in connectivity than others, reducing the manual

17

component of data gathering is one of the common benefits of a TMS. In decades past, this was primarily accomplished using SFTP connections, but recent years have seen APIs become far more popular for bank and other connections, as SFTP cannot offer the same level of flexible connectivity for multiple sources that APIs can. However, most TMS options still come with a few SFTP connections to common sources such as Reuters and Bloomberg.

#### Data & Analytics: Single Source of Truth

In addition to the external connectivity needs, treasury has extensive internal connectivity needs. Data

and analytics are part of what makes this internal connectivity so important.

The organization's technology ecosystem is home to a data ecosystem. Data in one department is needed in another, where it is altered and must then return to the first department and yet another one in its new form, and so on and so forth. If one of these departments along the path of data is siloed, or the integration between systems is poor, the larger data ecosystem is affected. The problems that result may include version control issues, inhibited usability of a BI tool, bottlenecked processes as one department waits for another to manually relay information, and unnecessary costs and hassle from repurchased data.

Especially at larger companies, there is a growing urgency for strong corporate data management strategies as data continues to burgeon, but even smaller companies should be planning ahead for how they will manage data over time and in the face of growth. Many companies' data strategies may include a "single source of truth" approach that leverages robust digital integration to support a steady, logical flow of data throughout the entire ecosystem.

#### P) Please indicate how you feel about each of the following statements. <sup>12</sup>



For treasury and finance, a TMS can be an important piece of this strategy. With the capacity for robust internal integrations, it can serve as a central dashboard that allows access to current data and helps distribute it to other areas as needed.

#### Straight-Through Processing

Another area where internal connectivity is needed is straight-through processing (STP). STP refers to the automation of financial processes throughout the front (trading), middle (settlement/confirmation), and back (accounting/reporting) offices directly, without the need for human intervention. The front, middle, and back offices typically struggle with integration despite having a desperate need for it. The TMS's internal connectivity proves helpful here, as well, supporting STP for efficient workflows and streamlined processes throughout the financial offices.

#### **Security and Control**

In addition to functioning as the superintendent of payment security across the company, the treasurer must also see to it that the payments and sensitive data handled within its own department are safeguarded appropriately. Digitizing treasury operations through a TMS can improve security significantly. There are several factors that contribute to the TMS's security:

 Reduced Touchpoints. By automating payments and other sensitive processes, the TMS helps to minimize manual touchpoints. This boosts efficiency, but it also improves security. The fewer touchpoints, the fewer opportunities criminals have to insert themselves into the process.

- Built-In Controls. Manual controls are often far too easy to bypass, and even if for innocent reasons such as speeding up a payment process, bypassing controls leaves the company open to attack. A TMS can enforce controls, preventing the process from moving forward without the proper steps being taken.
- Visibility. It is always harder to protect what you cannot see. Since a TMS helps treasury achieve timely, accurate visibility to bank accounts, activity, and other financial data, fraud can more quickly and reliably be identified and stopped.
- Narrowed Front. When complexity increases, the figurative front in the war against fraud becomes broad and difficult to defend. By centralizing data and payment processes in a secure environment, a TMS can help narrow the front.
- Scalability. Treasury departments are sometimes called on to scale up or down rapidly to accommodate organizational needs. With manual processes, rapid scalability is difficult to achieve without compromising security. A TMS's secure automation of otherwise time-consuming processes, however, gives your staff the tools and margin necessary for secure scalability.

### Emerging Technology Impacting the TMS

Technology is always developing, and new innovations are constantly coming into play in both the consumer and corporate realms. While the Overview section of this report covered several emerging technologies, this section will discuss how exactly recent and progressing innovations are being used in TMS offerings.

#### AI/ML

While separate AI tools, specifically generative AI tools, are seeing significant development and interest in the consumer space and are being piloted in some business settings, AI's current use in treasury is primarily via platforms such as the TMS. Many TMS vendors have been leveraging AI to power up two main areas of functionality: cash forecasting and anomaly detection.

Forecasting has become an ongoing and significant pain point for many treasury teams, consistently topping lists of tasks treasury does not have as much time for as they need.<sup>13</sup> Many treasury professionals also report substantial levels of inaccuracy in their forecasts.<sup>14</sup> Recognizing this need, some vendors have been deploying ML within their TMS offerings to enhance forecasting functionality.

Assuming adequate historical data is available, ML has proven to be highly effective at providing rapid and increasingly accurate cashflow forecasts. While not yet widely available across all TMS offerings, this will likely become more common. Based on recent survey data, treasury professionals are eager to adopt Al-based forecasting tools.

Survey respondents this year have also been eager to leverage AI for anomaly detection and fraud prevention.<sup>15</sup> AI excels at identifying patterns and, by extension, items that break patterns.Criminal activity and fraudulent payments tend to break the normal patterns of the business in some way: an unusually large transaction initiated outside of normal working hours, a massive number of files being accessed in rapid succession, etc. Al-based anomaly detection built into a TMS can flag and, in some systems, block payments or activity that are suspicious until an analyst reviews them.

#### Analytics

As a central source of truth for treasury data, a TMS becomes an integral part of the company's data and analytics strategy. The ongoing push to leverage data and the ongoing innovation in BI tools make a solution that helps facilitate clean data flow and integration with analytics tools more desirable. In addition, some TMS vendors are developing their own BI and dashboarding tools for analytics functionality within the solution itself.

#### API

While SFTP connections to a few of the most common sources are still frequently available in TMS offerings, APIs have taken the center stage of TMS connectivity. In addition to helping systems access data from external financial institutions, APIs are also facilitating improved integration between internal systems and tools. This is creating new opportunities for vendors to push the boundaries of functionality and leverage the full ecosystem to greater advantage. Different vendors take different approaches with integration and API libraries, and treasury teams selecting a TMS today must carefully consider the range of options available to them and how APIs might allow their ecosystem to integrate, both now and in the future.

#### Please describe your current and planned use of AI in the following areas: <sup>16</sup>



#### **Microservices & Miniaturization**

The fintech world continues to shift to smaller components. Microservices and cloud-native architecture are enabling vendors to bring improvements to the TMS landscape in several ways. Solutions built on the cloud and leveraging microservices are typically highly flexible, scalable, and customizable, as components may be plugged in, upgraded, downgraded, or removed without disturbing other functionality. This also allows for rapid development and deployment of new functionality. These benefits add value to the TMS offerings that leverage microservices, the cloud-native environment, and related innovations.

#### **Faster & Real Time**

Faster is not inevitable, and data richness matters more than speed. That said, speed is important, and nothing is moving more slowly. The standard for speed, influenced by the consumer space, is becoming closer and closer to instant as people increasingly expect little to no delay in their information. This goes hand in hand with the trend away from batch and toward streaming for data of various types. These expectations and trends, as well as the innovations that support them (APIs, etc.), have been influencing TMS functionality and what data can be leveraged through a TMS for some time, and this trend is expected to continue.

#### Selection & Implementation: TMS Tips

As a core system providing functionality or assistance for so many of treasury's daily tasks, the TMS is a high-stakes project to select and implement. A bad outcome will mean years of daily frustration, as well as a poor ROI and track record that will make it more difficult for your department to gain funding for future projects. A good outcome, on the other hand, can dramatically amplify your department's effectiveness and reduce stress for years to come. In addition to the guidance laid out in the Overview, we recommend the following specific considerations and practices for a TMS project.

#### Selection

*Discussing the Ecosystem:* Due to the TMS's extensive internal connectivity, coupled with its longevity, IT should be heavily consulted during both selection and implementation. These discussions should cover the organization's current technological ecosystem, how that ecosystem is expected to evolve over time, and how the TMS will fit. Continue to consider these factors and consult with IT as you narrow down providers and research offerings.

Beware of Biases: If you've been in treasury for a while, you have likely become familiar with some of the major players in the TMS market. You may have heard anecdotes that recommend or caution against certain providers or types of TMS offerings. Be aware that you likely have some level of bias as a result. While anecdotes and general impressions of the market should not be ignored, make sure you do not prematurely rule out or fixate on certain options without sufficiently researching and objectively considering what would fit your company's needs best.

#### Implementation

*Margin:* There are now a wide range of TMSs on the market, and the implementation processes and timelines will look different for different offerings.

However, as a system that typically has significant connectivity needs and will be used for many daily tasks, the TMS can make for a demanding implementation project. The phases and banded timeframes approach outlined in the Overview section will be particularly important for a TMS project, as various tools, functionalities, and other elements will need to be set up and tested before moving forward. Be sure to allow ample margin, and stand firm against the aggressive timeline approach.

Resource Allotment: Implementing a TMS requires resources from multiple different areas, from IT to your vendor and any third parties contracted to assist with the implementation. Keep in mind that your needs for each resource are likely to vary from one part of the implementation to another. Another advantage of breaking your implementation up into phases is that it gives you the ability to plan for this properly by calculating out what resources will be needed at what phases and ensuring they will be available.

*Process Adjustments:* People can become attached to their daily routines and processes. As a result, many treasury departments are tempted to try to recreate their old processes as closely as possible when beginning to use a TMS. This is likely to be inefficient. Allow your workflows to adjust to what is most efficient now, not to what is most familiar.

#### WHAT WILL INFLUENCE OUR FUTURE STATE?

When considering current technology decisions, one must also think carefully about the future state: What will your technological ecosystem need to look like five to ten years down the road, both for your department and for your organization overall? What will the industry's technological standards look like then? Miniaturization, containerization, cloudnative, embedded functionality, PaaS, and other related trends are more than a one-time boost in innovation. They are a continuation of ongoing trends. Microservices are the most recent

innovation in the decades-long trend of "small is big," in which vendors increasingly split functionality out into separate, smaller pieces for easier upgrading and the many other benefits described elsewhere in this report. Cloud-native technologies are also a recent development in a long-standing movement to the cloud. One can never perfectly predict the future, but with triedand-true momentum behind them, it seems likely that these are some of the innovations that will shape the future landscape of treasury technology. Keep them in mind as you make choices about solutions and vendors now.

# **Treasury** Aggregators

#### | TA: Snapshot

- **Basic Functionality:**
- Bank connectivity
- Bank data consolidation
- Payments
- Format management
- Reporting

#### Who Needs It:

- Companies with high complexity in payments.
- Companies with high complexity in bank accounts.
- Companies facing difficulty in connectivity, security, payment compliance, format adoption and sunsetting, or internal payment stream issues.
- Companies running multiple systems due to a merger or acquisition.

#### | Defining the TA

The treasury aggregator (TA) is a specialized solution with twofold functionality: pulling data into the organization and sending payments out. It automates tasks that can otherwise quickly grow overwhelming for companies with heightened banking and payments complexity. At the core of a TA's functionality are connectivity, format translation, and data management.



For its data consolidation function, the TA pulls in bank statements (detailed and summary) and aggregates the information. After formatting the data so that it can be used by other internal systems, including ERPs, TMSs, reconciliation platforms, BI tools, etc., it passes the data along to them. TAs employ a variety of connectivity methods, ranging from SFTP to APIs and networks.

Simultaneously, the TA doubles as a payment hub. In this capacity, it allows for payments to be initiated directly within the system, or it can originate payments based on files received from other internal systems. The TA formats the payment files and securely delivers them to the banks, again via SFTP, APIs, or networks.

#### | TAs: Simplifying the Complexity Complexity Area 1: Banks and Accounts

For treasury teams handling just one or two banks and a handful of accounts, it is typically manageable to log into each portal, download files, and input and manipulate that data in Excel. It might take only a little organizational growth, however, for the manual process for collecting and aggregating all bank data to begin taking more time than treasury can spare.

It does not take a massive multinational company for bank and account complexity to outgrow manual processes. Since compiling bank data is a necessary first step for many of treasury's daily cash management and strategic activities, a delay here creates a bottleneck, impeding visibility and decisionmaking. Rushing to try and complete these processes manually can also result in errors, leading to further delays or poorer decisions.

Not all treasury tasks are easily automated, but aggregation is. Leveraging a TA to collect and consolidate banking data allows treasury staff to begin their work with accurate, current data instead of spending a large part of their day getting to that point. When staff have more immediate visibility, they can spend more time on other pressing tasks that are more difficult to automate.

#### **Complexity Area 2: Payments**

There are three main factors contributing to payment complexity: payment types, payment messaging formats, and payments intensity. Payment types and messaging formats increase with innovation. Innovation leads to new and improved rails and formats, which companies must then work to adopt. FedNow is a recent example of a new payment type, and XML is a (somewhat) recent example of an innovative format.

Improved speed, enriched data, and other aspects make these new rails and formats desirable, but adopting and using them takes work. While old formats are eventually retired, this is often a slower process than the adoption of new ones, so many companies end up needing to support more and more payment formats and types as the years go by.

Meanwhile, the internal factor of sheer payments intensity contributes significantly to complexity. Certain industries tend to have far higher payment volumes, and organizational growth or acquisitions can bring rapid increases in payments intensity.

Each of these factors contributes to overall payments complexity. As with banks and accounts, payments complexity can be difficult to adequately manage with manual processes, taking time and expertise that treasury could better use elsewhere. It is also an area where automation can be incredibly effective, with solutions such as TAs offering fluency in all payment messaging formats, old and new alike, and efficient management to streamline high-volume and otherwise complex payment situations.

#### **Visibility and Cash Positioning**

Visibility is a key component of what the TA offers, and the ability to achieve it quickly, accurately, and with minimal effort from staff makes nearly everything else treasury must do daily easier. TAs also support cash positioning, taking the visibility a step further. This data may then be passed along to other internal systems such as a TMS. While a TA and a TMS are usually used in conjunction, TAs typically do offer basic reporting functionality on their own.

#### Security

No matter how efficient and convenient a payments or data aggregation solution is, no treasury department could consider its use if it were not also highly secure. Due diligence must be performed on anything that will

CONTENTS

#### WHAT DIFFERENTIATES A TA?

TAs bear significant overlap with other systems, from payment hubs and payment factories to data consolidators, as well as the TMS. What, then, makes them a separate category?

The TA is distinguished by its combination of payment and data functionality. A payment hub and a payment factory will make payments, but they will not consolidate banking information, while a data consolidator will perform the aggregation portion while lacking the payment functionality.

Each of these areas of functionality must be extensive for a solution to qualify as a TA. A TMS will often have a certain amount of bank connectivity and payment functionality, but most of these offerings are more focused on analyzing and applying the data, not aggregating it in the first place, and they do not always have the intensity of payments validation, compliance, etc. that a TA will. That said, there are a few specialized TMS offerings that offer substantial enough data and payments tools to be counted as TA offerings as well. These, however, are the exception, not the rule, and most TMSs would need to be used in conjunction with a TA by companies with very high complexity in data or payments.

23

be a part of channeling funds out of the company or handling sensitive bank data, and TAs are typically held to a high standard. You can expect to see them using SOC certified data centers, data encryption, and secure access methods.

With those elements in place, implementing a TA can improve your security in multiple ways. First, corralling payments processes into one secure location can "narrow the front" for payments fraud. Particularly for companies with high payments complexity, payments channels may multiply to the point that it is difficult to monitor them all. Companies that perform a formal inventory of all their payment flows frequently discover that they have 50-100% more than they thought they had. Protecting a high number of payment processes is hard enough when you are aware of all of them and is essentially impossible when you aren't. Concentrating all payment flows through a TA increases treasury's visibility to them while keeping them secured within a single payment environment with strong security standards and enforced controls.

TAs address similar security issues on the bank data side. The clarity that the connectivity and aggregation provide help companies achieve daily visibility to 100% of their bank accounts. While we consider this a standard of good corporate conduct, as every bank account constitutes a point of exposure (not to mention cost), 18% of treasury groups in 2021 reported that within the past two years, they had discovered active bank accounts they had not known about before.<sup>17</sup> Here, too, treasury cannot adequately protect what it is not aware even exists, and the increased

#### Payment Complexity Calculator

#### >20 >31 >20 >30 >40 FINAL SCORE RANGES Total your blue score >20 >20 16-20 21-30 16-20 26-30 31-40 HYPER COMPLEX 51 + numbers. Multiply by 16-20 11-15 16-20 21-25 HIGHLY COMPLEX 11-15 37 - 50 16-20 21-30 complexity direction 11-15 11-15 COMPLEX 9-10 11-15 9-10 16-20 16-20 22 - 36 number for final score. MODERATE 7-8 9-10 9-10 9-10 7-8 11-15 11-15 15 - 21 SIMPLE 7-8 7-8 Increasing Rapidly 7 - 14 5-6 6-8 5-6 6-10 6-10 x 1.5 5-6 3-4 5-6 4-5 3-4 3-5 3-5 Increasing x 1.2 3-4 15 3-4 2 2-3 2 2 2 Remaining Constant x 1 Sample Raw Total (2+3+1+2+3+2+2=15)1-2 1-2 1 1 1 Decreasing x 0.75 PAYMENT ORIGINATION PAYMENT SYSTEMS PAYMENT TYPES PAYMENT FORMATS PAYMENT BANKS PAYMENT CURRENCIES COUNTRIES COMPLEXITY DIRECTION With Factor Applied 18 ADEAS

#### Data Aggregation Complexity Calculator

									FINAL SCORE R	ANGES
3	>20	>10	>20	>20		>20	Total your blue score numbers.		HYPER COMPLEX	43 +
7	16-20	9-10	16-20	16-20		16-20	Multiply by complexity direction		HIGHLY COMPLEX	31-42
	11-15	7-8	11-15	11-15	>25	11-15	number for final score.		COMPLEX	19-30
5	9-10	5-6	9-10	9-10	16-25	9-10			MODERATE	13-18
	7-8	4	7-8	7-8	11-15	7-8	Increasing Rapidly	x 1.5	SIMPLE	6-12
	5-6	3	5-6	5-6	6-10	5-6	Increasing	x 1.2		
2	3-4	2	3-4	3-4	3-5	3-4	Remaining Constant	x 1	Sample Raw Total	24
	1-2	1	1-2	1-2	1-2	1-2	Decreasing	x 0.75	(3 + 2 + 5 + 6 + 4 + 4	= 24)
	SOURCES OF DATA (BANKS)	SOURCES OF DATA (EXTERNAL INFORMATION)	SOURCES OF DATA (INTERNAL)	FORMATS OF DATA	RECEIPT / DELIVERY ENDPOINTS	TRANSFORMATIONS REQUIRED (INTERNAL)	COMPLEXITY DIRECTION		With Factor Applied	36

**Calculate Your Complexity:** The complexity calculators above show the factors that typically contribute most to complexity on a scale, allowing you to calculate your overall complexity in payments and data. The lefthand column numbers in blue are your score for each of the following columns (e.g., 3-4 Payment Origination Areas = score of 2; 5-6 Sources of Data = score of 3; etc.). Your "Complexity Direction" should be multiplied by the sum of your score for the other columns, yielding your final result. The bold, shaded cells show sample selections, with the corresponding sample results shown below the "Final Score Ranges."

visibility TAs provide helps to clarify not only what accounts are there, but also exactly what is happening in them on a daily basis.

#### Compliance

Treasury's regulatory burden shows no sign of diminishing, but technology can often be leveraged to reduce the effort staff must put into their compliance. TAs play into this in three main ways:

 Technical Requirements: Some standards, including PCI-DSS and the rules and guidelines

#### In the near future (1-2 years), I expect the following to be true of the regulatory environment: 18



Increase in regulations



Decreased regulations



Approximately the same level of regulations



Large decrease in regulations, regulatory relief



from Nacha, specify technical requirements for

data or payments security that companies may

compliance burden involves the need to compile

data for certain reports, such as FBAR. Some TAs

provide specific assistance with bank account and

Regardless, the ease of visibility they provide into

signer tracking to support FBAR requirements.

need to meet. Typically well reinforced in all relevant security areas, TAs can help meet these

Visibility and Reporting: Much of treasury's

requirements.

Large increase in regulations



Unsure

bank account information may support many compliance areas.

Sanctions Screening: Screening payments against current lists of sanctioned parties is a tedious process, and many corporations leave this duty to their banks. However, the regulatory bodies that publish and enforce sanctions (e.g., OFAC) do sometimes hold corporations directly responsible for negligence in sanctions screening. TAs typically screen all payments they process for potential sanctions violations, automating this process and ensuring compliance without burdening staff.

#### **Global Expansion and Acquisitions**

As companies grow, expand geographically, or acquire subsidiaries, all of the challenges discussed above can become more difficult to manage. Treasury may have to quickly learn to cope with new banks, currencies, accounts, payment rails, networks, formats, and regulations, all of which make visibility more difficult and efficiency more necessary.

A TA's connectivity and translation capabilities are ideal for these global and rapid-growth situations, specializing in automating complexity and handling the details of the data and payments landscape. Standard regional and some proprietary formats are already built into TAs, and if a small regional bank uses a proprietary format that the TA does not already have a connection built for, most aggregators will build it.

#### Efficiency

At the end of the day, most benefits of treasury technology come down to efficiency. The TA is no exception, automating a set of tasks that can otherwise E>

take up an outsized portion of staff time and providing accurate, timely data for staff to use in more strategic tasks.

### Emerging Technologies Impacting

A variety of innovations continue to impact the TA in different ways, with some enhancing its functionality and others changing the landscape surrounding it in ways that could potentially affect its use. The following are some of the major areas of change that treasury should keep in mind when considering the future of aggregators.

#### Faster Payments, Enriched Data

Payments have been an area of excitement and rapid development in the financial space recently. Most payment innovations offer increased speed, enriched data, or both. TAs gain value from faster and better payments, as they are a means of leveraging them with relative ease and far easier adoption. In addition, the security features of a TA may be reassuring to the significant number of payment professionals who are concerned that faster payments might lead to faster fraud.<sup>19</sup>

#### Networks

TAs provide a way of leveraging various payment networks, meaning that as those networks enhance their functionality or reach, the TA's functionality and reach is indirectly enhanced as well. Swift's innovative messaging platform, which allows for greater visibility throughout the life of the payment and reduces the chances of information loss, is one example of network updates that can be leveraged through a TA. Fraud is also a vital area here, as many payment networks

### ?) What do you view as the most important requirement for treasury aggregators in the next year? <sup>20</sup>



of various types are finding new ways of validating payment information and identifying fraudulent transactions early.

#### Data Management

Data strategy is becoming a more prominent factor in organizational technology considerations, and rightly so. As its importance increases, it becomes more of a priority to have data in digital form with clear, efficient internal connectivity that supports BI tools. TAs help with each part of this, pulling data into the organization digitally and providing it in formats that can be used by other internal systems.

#### **APIs**

APIs must be mentioned here not so much because they have an enormous impact on the need for TAs, but because they might be expected to do so. After all, they are another popular method of connecting to banks and drawing in data, and their use has seen

Emerging Technologies Impacting the TA

a significant uptick in recent years. As a result, they might be seen as likely to compete with TAs. However, at the levels of complexity where treasury groups tend to leverage TAs, solely relying on APIs does not tend to be as good of an option. APIs are extremely useful, but they tend to result in paying for data multiple times over in complex situations, and they lack the flexible functionality of a TA. Some TA vendors may offer APIs as one of their connectivity methods, and treasury professionals are eager to see this as an option, but it is not the only option.<sup>21</sup>

#### **AI Anomaly Detection**

Al tools excel at identifying anomalous activity and anomalous transactions, making them particularly useful for battling payment fraud. As fraud increasingly challenges payment processes, systems that offer a way to leverage strong security measures, such as Al anomaly detection, become more desirable. This use of Al in various payment systems, including aggregators, is expected to proliferate in coming years.

#### **Capabilities Expanding and Lines Blurring**

Several related innovations, including microservices, PaaS, APIs, and the overall cloud-native shift are serving to blur the lines between some technology categories. These innovations are enhancing integration capabilities, speeding up development, and creating more modularity that allows for companies to choose the exact set of functionalities they need. The TA is still an important and distinct technology type, but more TMS and other offerings may bleed over into TA territory as vendors provide them on a more cloudnative basis and allow for increased modularity and customization.

#### Implementation: TA Tips

Since TAs are designed to assist with specific areas of high complexity in treasury, a certain amount of complexity must be anticipated in the implementation process. This complexity largely revolves around setting up and testing the extensive external and internal connectivity the TA will provide and training staff at the right time.

#### **External Integrations**

The companies who need a TA often have many banks in many regions and countries. Setting up connections to all of these banks through a TA will pay off in the long run, but it requires a fairly substantial time investment on the front end. This is not a process that can be rushed, especially as certain steps rely on the banks to take action, and when they will do so is not within treasury's control.

To handle this as well as possible, you should combine detailed planning for everything you can anticipate with ample margin for everything you cannot. The details to work out ahead of time include the following:

- Identify critical path items and place tasks in a logical order.
- Identify whom you will need to contact at each bank and have their contact information ready.
- Mark out where bank holidays will fall during your bank onboarding process and consider how they may impact your plans.

No matter how carefully you plan, however, avoid deceiving yourself into thinking you will be able to prevent any delays. Build in the margin. There may be delays on the banking side that you cannot control, KYC compliance issues, or any number of other delays that cannot be sped up no matter how many internal resources you allocate to the project.

#### Internal Integrations

Your TA will likely need to integrate with many internal systems, as well, and how smoothly those connections are set up will make a significant difference to how useful your solution will be in the long run. Consult with your IT department throughout the process. During the planning stages, discuss how the TA will fit into the broader ecosystem, what integrations will need to be put in place, and how this process will need to work. Keep IT in the loop as you progress through your project, and pay attention to any counsel or concerns they may have.

Testing will be another vital factor in your internal integrations' success. Do not wait until the end to perform testing, as this can result in significant backtracking and rework when problems are discovered. Test each connection immediately when it is put in place, and address any problems the test uncovers before moving on.

#### Training

Since a TA's high connectivity needs may cause the implementation process to be somewhat lengthy, training at the right time is important. Training too early can mean that staff have forgotten what they learned by the time they are actually using the system, but training too late can mean staff have already developed non-ideal processes from trying to figure it out on their own. Train before the go-live, but not long before. E>

CONTENTS

# Supply Chain Finance and Cash Conversion Cycle Solutions

#### | SCF: Snapshot Basic Functionality:

 Facilitates win-win solutions between buyers and suppliers via methods such as third-party funding or sophisticated discount options.

#### Who Needs It:

- Buyers looking to infuse resilience into their supply chains.
- Companies seeking more ways of optimizing working capital.
- Companies experiencing liquidity fluctuations.

#### | CCC Automation: Snapshot Basic Functionality:

• Streamlines one or more processes within the cash conversion cycle.

#### Who Needs It:

- Companies looking to improve working capital management.
- Companies struggling with inefficiency in portions of their CCC.

#### | Introduction

Up until now, the solutions discussed have been distinctly treasury-related, with treasury staff as primary users. However, not every technology that is important to treasury has its chief use within the department. The treasurer's responsibility for corporate cash requires a broad interest in any solutions that impact it, from security solutions to AR systems.

In this sub-report, we will cover some solutions whose primary users are in areas other than treasury but that support cash efficiency and working capital management. Broadly grouped into two categories, these solutions include SCF offerings and solutions that automate portions of the CCC, including AP and AR. While diverse in what part of the process they apply to, each solution that falls into these categories improves efficiency, working capital, and/or liquidity management.

### | Understanding Working Capital, SCF, and the CCC

As these solutions have wide-ranging impacts, their implementation and use require collaboration across departmental lines. Treasury's role in these situations is often a leadership one, spearheading efforts and keeping the focus on the larger corporate goals of liquidity and working capital management. In this position, it is vital that treasury be able to facilitate clear communication among all groups involved. Some terms mean different things to different areas, and treasury must be able to identify where semantic issues are arising and help pull things back on track.

Because of this, we are beginning this section by defining the main terms that can be sources of confusion when discussing SCF and CCC solutions. We will also be covering the different perspectives and goals treasury is likely to encounter across the departments involved.

#### **Working Capital**

Optimizing working capital management is a significant part of what makes every solution in this section important to treasury. However, what is meant by "working capital" must be clarified, as different areas in finance use the term differently.

If you come from an accounting background, you may think of working capital as a way of calculating the organization's ability to meet current obligations. This "traditional" definition of working capital is calculated entirely from numbers found on the balance sheet:

#### **Traditional accounting definition** Working capital = current assets – current liabilities

This is useful and serves an important purpose. However, it is not what treasury typically means by working capital. For treasury, "working capital" is usually shorthand for "net adjusted working capital," which is essentially the cash available for running the business and is calculated somewhat differently:

### Treasury definition: net adjusted working capital

Working capital = AR + inventory – AP

It is this type of working capital that treasury is seeking to optimize and that the solutions in this sub-report can improve. This type of working capital often composes much of an organization's total liquidity at any given time, making it a vital part of what treasury is entrusted with managing.

Treasury's goal here is not to maximize or minimize this portion of liquidity, but to optimize it for the company's specific needs. Too much working capital can trigger a chain reaction that leads to lower organizational value, but too little working capital strains liquidity. Striking the right balance requires thoughtfulness, ongoing attention, and the flexibility to make adjustments to the various operational details that push and pull at working capital. Technology comes into the picture as a way of infusing flexibility.

We will be assuming the treasury net adjusted definition of working capital throughout the rest of the text, but as they seek to communicate, treasury staff must bear in mind that those from other areas may think of working capital differently. Care should be used in explaining what is meant, why it matters, and that neither definition is superior or inferior, but that they serve different purposes.

#### **Supply Chain Finance**

SCF is another term that is defined differently depending on whom you ask. Some define it fairly narrowly, encompassing only one or two types of programs, but we use the somewhat broader definition given by the Euro Banking Association: "The use of financial instruments, practices, and technologies to optimize the management of the working capital and liquidity tied up in supply chain processes for collaborating business partners." Later in this sub-report, we will delve into two common SCF methodologies, reverse factoring and dynamic discounting.

#### **Cash Conversion Cycle**

Unlike working capital and SCF, defining the cash conversion cycle is fairly straightforward. It is the time, measured in days, that it takes for a company to convert resources into cashflow. In more specific terms, this is the number of days it takes from when cash is invested into inventory to when that cash is collected back from the sale of inventory and is available to be reinvested into inventory again. The formula for calculating this is as follows:

#### Cash conversion cycle CCC = days sales outstanding (DSO) + days inventory outstanding (DIO) - days payables outstanding (DPO)

Every department and process from procurement to collection is involved in the CCC, and the efficiency of each part of the cycle has an impact on working capital. As a result, any tool that helps improve efficiency in any part of these processes creates flexibility that can be used to optimize working capital. This makes these tools important to treasury.

Poes your organization place a heavy emphasis on working capital optimization and associated operations (inventory, receivables, payables)?<sup>22</sup>



With the terms defined, we can dive into more details about CCC automation solutions and, afterwards, SCF programs and the technologies that support them.

#### | Cash Conversion Cycle Solutions: AP & AR Automation and Beyond Understanding the Areas Involved

CCC automation is a broad area of technology, encompassing solutions that streamline entire processes, parts of processes, and transitions between processes anywhere in the cycle. They may be situated in any of the several departments involved, and their implementation and use often require collaboration across departments.

Despite all being part of the same cycle, each of these areas has its own distinctive set of concerns and goals. Their perspectives often differ and sometimes directly conflict with one another, with different departments ending up playing tug-of-war to try and achieve some kind of overall balance. Competing KPIs are often a major part of this. With each department often entrenched in its own mindset and narrowed goals, treasury's outside perspective and overarching liquidity focus can be useful here in identifying the proper goals and helping departments work together.

To properly help these areas, treasury needs to understand where each group is coming from in terms of goals and concerns, what their efficiency issues may be, and how technology may improve their operations and power more optimal working capital. While reading a quick paragraph about each area's perspective is no replacement for careful, ongoing listening, it may serve as a starting point in seeking to understand. Depending on your industry, size, and other factors, the departments involved in your cash conversion cycle may differ some from this list, but the list below describes common areas, divided up into three overarching processes: procure-to-pay, inventory, and order-to-collect:

- Procure-to-Pay: The process of obtaining and paying for inventory.
  - Procurement: The procurement department is concerned with balancing several aspects of the supply chain, including stability, diversification, and inventory quality.
  - > Accounts Payable: AP is a vital area for working capital efficiency, but it is often a small, thinly staffed department. Its main points of focus are maintaining adequate controls and balancing discount opportunities with holding onto cash and keeping DPO above minimum levels.
- Inventory: Right at the core of the CCC, inventory sits alone and distinct. With just one department, its concerns revolve around maintaining adequate inventory, but not too much, as inventory ties up space and cash. The philosophy of inventory changes with the economic environment, with prepandemic "just-in-time" approaches rapidly giving way to "just-in-case." While few of the solutions discussed in this section directly address inventory, inventory's core position in the CCC and its impact on liquidity give it an important seat at the table in discussing working capital initiatives of any kind, including technological ones.
- Order-to-Collect: The process of selling inventory and collecting payment.
  - > Credit: This area's task is to extend enough credit to boost sales while keeping losses on

unpaid credit to a minimum. Typically, there is more incentive to avoid over-extension than there is to avoid under-extension. This can lead to suboptimal outcomes, as sales may be lost unnecessarily if care is not exercised in keeping the levels optimal, not just minimal.

- > Sales: Sales tends to have the opposite problem, with incentives to maximize sales and often insufficient incentive to balance this against the "quality" of the sale, including issues such as creditworthiness.
- Fulfillment: The fulfillment department's focus is fairly straightforward: delivering orders in a timely fashion.
- Invoicing or Billing: This department must balance getting invoices out rapidly without compromising accuracy, as errors can create costly delays in collection. This is a prime area for automation.
- > Collection and Credit Application: The final step of the CCC, collection and credit application focus on relieving AR and holding DSO to promised terms.

While there are not many inventory automation tools that impact working capital, there are quite a number for procure-to-pay and order-to-collect. These solutions typically improve working capital by improving efficiency.

#### Automation Tools: Procure-to-Pay

AP is a major component of the procure-to-pay process, and it is also one of the most popular areas for automation. Achieving fully electronic processes for their AP departments was already a common corporate goal prior to 2020, but the pandemic gave the industry a sizable nudge, transforming the goal from long-term to short-term in a matter of days for many, as manual processes broke down and caused security lapses during lockdowns.

Automating AP, however, does not just enable remote work and more secure processes. It also improves speed and reduces errors, cutting down on the amount of time it takes to approve and pay invoices. This reduces late payments and opens up the possibility of paying early. While AP usually wants to hold onto payment until due, having the option to pay early sometimes allows the company to take advantage of discounts. Efficiency produces flexibility, and flexibility gives the company more levers to adjust in its efforts to optimize working capital. While AP is a dominant area for automation, it is not the only part of the procure-to-pay process that can be automated for greater efficiency, flexibility, and working capital benefit. A wide variety of tools address inefficiency across the process, such as procurement platforms and tools for vendor management, compliance management, receiving goods and services, and receiving invoices.. Some are standalone, while others integrate with an ERP, SCF solution, etc. Some are industry-specific, while others are not. Some are interdepartmental, some are outsourced, and so forth. All of them, however, automate a set of tasks and improve the overall efficiency of procure-to-pay and the CCC.

#### Automation Tools: Order-to-Collect

The dominant portion of the order-to-collect process

is AR. As with AP, digitizing and automating AR has been a goal for many companies for some time, but lockdowns jolted the industry to substantially accelerate the shift. Here, the link to working capital optimization is easy to find, as the more efficient the AR process, the faster the company can convert its receivables to cash. Manual invoicing processes, for example, are prone to errors, and erroneous invoices lead to time-consuming back-and-forth, reissuance, and a significant delay in receiving the payment. Automation reduces errors, resulting in faster payment, improved customer relationships, and often reduced costs.

Invoicing and payment receipt are not the only parts of AR or the order-to-collect process that can be automated. Automation tools are available for



#### Cash Conversion Cycle: Automation Opportunities

31

CONTENTS

credit rating and scoring, shipping/fulfillment, cash application, and more, and it should be kept in mind that a meaningful improvement to efficiency in any part of the CCC can help the company improve its working capital and, thus, its liquidity situation.

### Innovations Impacting CCC Automation Solutions

Innovations in areas such as AI/ML and networks are contributing to the effectiveness of many CCC automation tools.

#### AI/ML

The predictive and anomaly detection capabilities of AI and ML have proven useful across several portions of the CCC, including collections, cash application, payment security, and fraud detection. As rapid strides continue to be made in these technologies, the ability to leverage them in CCC automation tools is likely to become more impactful.

#### Networks

Networks have become an important part of the payments infrastructure, from payment messaging

### What specific areas or challenges do you expect AI to address in treasury and finance? <sup>23</sup>



networks like Swift to provider networks that help validate payees and assist with vendor management to prevent fraud. Networks may also support compliance, payment tracking, and even finding suppliers. Many payment solutions are leaning into the usefulness of networks, and as the functionality of their networks improves, the overall value of their offering improves.

#### Optical Character Recognition

Optical character recognition (OCR) software scans and digitizes written text. This technology has existed for many years now, but as it continues to improve, it becomes increasingly useful in streamlining certain portions of the CCC. OCR may be used in AP automation solutions, for example, to read PDF-based invoices and import their contents to the system.

#### | Supply Chain Finance Solutions

SCF solutions run alongside the CCC. They may not directly automate a specific internal part of it, but they leverage technology to help achieve win-win situations for buyers and suppliers. While there are many kinds of SCF (as we and the Euro Banking Association define it), we will be specifically focusing on two of the most prominent buyer-led methods (as opposed to supplierled and bank-led). These two methods are reverse factoring, which works by breaking the lockstep of traditional payment terms, and dynamic discounting, which adds flexibility into the incentive structure of discounts. Before exploring how each of these methods work in detail, we will first discuss where traditional payment terms can become challenging, making alternatives attractive.

#### Traditional Payment Terms and Their Limitations

Classic payment terms like 2/10 net 30 have their advantages. They aim to benefit both parties. They allow a certain amount of time for the buyer to pay, which increases the number of sales the supplier is able to make. They limit that amount of time to what the supplier's DSO can endure, and they offer a discount for early payment if the buyer is amenable.

Despite these attempts to serve the needs of both parties, traditional payment terms often lead to a compromise that is far from ideal for either. This is intensified during economic environments that strain both the buyer's and supplier's liquidity. At these times, the buyer may try to hold onto liquidity longer by delaying payment, but this may be at precisely the same time that the supplier is desperate for funds. Suppliers are often smaller companies than their buyers, with less margin in their liquidity, so failing to pay suppliers in a timely manner can sometimes result in a breakdown of the supply chain, harming the buyer as well. The intended win-win of the original payment terms turns into a win-lose, which then turns into a lose-lose situation.

Supply chain finance addresses this issue by offering alternatives to traditional payment terms. SCF programs build win-wins that allow the buyer to support their own liquidity needs while simultaneously bolstering their supply chain. This can spur growth in good times or help create stability in turbulent times.

#### SCF Models and Methods

As noted earlier, the definition of SCF we prefer encompasses a number of approaches. Some are initiated by the supplier, and others by banks, but we will be focusing on those that the buyer initiates. Keep in mind, however, that regardless of who leads or initiates the program, these methods are designed to benefit all parties involved. The two buyer-led approaches covered in the following paragraphs are reverse factoring, which leverages the buyer's superior credit to gain financing for the supplier, and dynamic discounting, which leverages a buyer's superior liquidity. A third category, "hybrid," describes offerings that allow buyers to use either reverse factoring or dynamic discounting as needed.

#### **Reverse Factoring**

Buyers tend to have better credit than their suppliers. For suppliers, their lower credit on top of their tighter liquidity can make them especially vulnerable to economic fluctuations, making it difficult for them to obtain financing when they need it most. SCF solutions that offer reverse factoring enable the buyer to leverage their own superior credit to obtain financing for their suppliers.

The process works as follows: The supplier first submits an invoice, and the buyer approves it. At that point, the buyer can log into the digital SCF platform and notify the third-party financial institution that is providing the financing. This third party can then pay the supplier early at a discount. The buyer pays the financial institution at a later, negotiated time.

By breaking the lockstep of traditional payment terms, reverse factoring allows the buyer to hold onto cash for longer, while the supplier can collect payment early. Since this method leverages the buyer's credit rather than their liquidity, it can help supply chains stay afloat during times when both parties' liquidity is strained.

#### **Dynamic Discounting**

Instead of leveraging the buyer's superior credit, dynamic discounting leverages a buyer's excess

#### Reverse Factoring



CONTENTS

SE VENDOR

liquidity. Discounts for early payment are often available with traditional payment terms, and this helps to create potential for a win-win solution. However, this potential is small, as the discount terms are fairly rigid.

For example, with 2/10 net 30 payment terms, the supplier is seeking an advantageous early payment by offering a 2% discount if the buyer pays by day 10. This, however, only creates a narrow window where the buyer is actually incentivized to pay early. If they are unable to pay until day 11, it is then in their best interest to wait until day 30, erasing 19 days' worth of opportunity for the supplier to work with that liquidity. In addition, there is no incentive to pay early up until day 10, again erasing a potential window of opportunity.

Dynamic discounting uses technology to extend the window of opportunity by creating a sliding scale of discounts that can be extended from day 1 until the day before payment is due. These solutions allow suppliers to set the scale of discounts, determining what the extra liquidity would be worth to them at each point. The buyer can then log in and see what their options are throughout the process, choosing whatever payment date and associated discount would constitute a win on their end as well. No third-party funding is involved, and the terms remain in lockstep, but the increased options and flexibility of this method dramatically increase the odds of finding a win-win solution.

#### Hybrid SCF Solutions

Since dynamic discounting leverages the buyer's own liquidity and assumes that paying early might be a good option, it is not well suited to situations where the buyer's liquidity is strained, and no discount would be worth the early payment. For those scenarios, reverse factoring shines. On the other hand, for a buyer seeking to optimize their use of excess liquidity, reverse factoring may not be as appealing as dynamic discounting.

For companies that are almost always in one of these positions or another, it may be clear enough which type of SCF program suits them best, but a quarter of companies polled in 2024 stated that their working capital position varied between having excess cash and having to borrow funds.<sup>24</sup> Hybrid SCF solutions support

these types of companies, offering both dynamic discounting and reverse factoring. This allows the organization to toggle between methods as needed, continuing to maintain a healthy supply chain while also optimizing their own working capital regardless of their cash position.

#### The Future of SCF

The need for SCF and the benefits of SCF are influenced by several factors. Some of those factors are changing steadily and predictably over the years, while others are always in a state of some flux.

#### **Dynamic Discounting**

| The lighter shaded areas represent opportunities that traditional discounting methods don't provide. With dynamic discounting, the seller is more likely to receive an early payment because the buyer has ongoing incentive through the sliding scale of discounts.



#### Interest Rates

Interest rates are among the most variable factors, as well as one of the most impactful. The higher interest rates are, the more suppliers are likely to struggle with obtaining funding, making alternative forms of financing like SCF important for keeping the supply chain healthy. As interest rates fluctuate over the years in response to other economic factors, the urgency in the need for SCF solutions may see fluctuation as well.

#### Compliance

Compliance and SCF have a complicated relationship, with some regulatory issues impeding SCF, while others are made easier through the use of these solutions. In the challenge category, banks that have their own SCF offerings have reported that KYC compliance is a notable impediment to their programs. Fintech-provided SCF offerings, while still subject to KYC regulations, are usually able to manage it with somewhat less overhead. On the other hand, crossborder and regional compliance issues benefit from the strong visibility and document management capabilities that many SCF solutions provide, which make disputes easier to resolve.

#### Emerging Technology

*Networks*: With functionality that connects buyers with their suppliers, SCF solutions inherently make

#### ?) Please indicate your most common working capital position.<sup>25</sup>



use of some level of network functionality. With ongoing growth in the overarching network space, new functionality is constantly being developed. Any developments that add to the functionality of networks may increase the value of SCF solutions.

Artificial Intelligence: SCF solutions use AI to analyze factors such as current rates, historical transaction data, and industry vertical averages for DSO, DIO, and DPO to predict the likelihood of specific suppliers accepting certain terms. This helps buyers plan better and optimize their payment and discount strategies. In addition, fintechs and banks are now able to address a larger percentage of the population in lending activity by leveraging AI to move more rapidly at lower cost through applications. This is also improving what can be done through reverse factoring solutions.

#### Blockchain & Distributed Ledger Technology:

Distributed ledger technology is the primary means through which SCF offerings address cross-border documentation issues. Its use improves efficiency in documentation processes and boosts transparency, allowing for disputes to be resolved far more quickly and easily.

### Selection and Implementation: SCF Solution Tips

In addition to the leading practices for selection and implementation discussed in the Overview section of this report, there are two specific areas where more detailed guidance is in order for SCF solutions. One of these, due diligence, relates to the selection process. The other, supplier participation, is a part of implementation, but it should also be considered during selection.

#### **Due Diligence**

SCF programs are designed to support your liquidity, as well as that of your suppliers. While this can be highly beneficial, organizations must keep in mind that any counterparty they rely on for capital and that can impact their liquidity can also be a source of risk. When deciding to partner with any SCF provider, companies must be cautious and perform due diligence. The provider's business model and level of diversification are particularly important to confirm rather than simply relying on their stated practices.

#### Supplier Participation

For any of the SCF programs discussed in this report to succeed, suppliers must participate. We

#### A CASE STUDY ON THE NEED FOR DUE DILIGENCE

Greensill Capital was an SCF provider of reverse factoring and similar financial services. In 2021, the company declared bankruptcy, leading to some heightened scrutiny and concern regarding SCF programs. It is important to note that what caused Greensill's failure was not any inherent risk in SCF, but the organization's inadequate diversification and other risky and questionable business practices. This case study should highlight to the industry not that SCF is unsafe, but that due diligence in engaging an SCF provider is absolutely vital.

have discussed how these programs are designed to support supplier liquidity and should be highly beneficial to them. However, it is important to remember that your suppliers may be unfamiliar with these types of programs. To them, it may simply seem that one of their buyers is suddenly asking them to jump through multiple hoops and potentially pay fees for onboarding, use, or training on a new platform. Even if the fees or inconveniences seem minimal to the buyer, they could discourage many smaller suppliers from using the platform. To maximize the success of your SCF program, you must maximize the participation of your suppliers. The following steps can help you do so.

*Clear Communication*: Suppliers need to understand exactly how the new program will benefit them. This requires ongoing clear communication on the buyer's part. Take the time to discuss the benefits in detail with them, address any concerns they have, and also make sure that the other departments most frequently in contact with suppliers (AP and procurement, for example) can and will reinforce these explanations as needed.

Minimize Cost and Inconvenience: Red tape and onboarding fees that may seem small to the buyer can prove a strong deterrent to some suppliers. This can be mitigated in two ways: First, some solutions may have more convenient onboarding and no or minimal fees, so considering that during your selection process can help maximize participation. Second, if the solution you choose does have fees for the suppliers, consider covering them. The boost to participation may be well worth it.

#### | Leading Practices for Working Capital Initiatives

Since so many departments impact or are impacted by working capital, optimizing it is a deeply collaborative effort. With treasury's responsibility to safeguard and manage corporate cash and liquidity, it falls to them to orchestrate this collaboration. The following leading practices can help make this process more straightforward and successful.

#### **Building the Working Capital Council**

In order to efficiently address working capital issues when so many groups are involved, all relevant parties must come together to discuss problems, concerns, goals, and initiatives. This is typically achieved through a working capital council, a group that meets once per month or quarter specifically to discuss working capital and how it can be improved.

Working capital councils are a leading practice, and if your company does not have one, starting one is prerequisite to the following steps of optimizing working capital. Each main group that has an interest in or impact on working capital should have a voice at the council. While this will vary somewhat from company to company, the areas typically represented include accounting, AR, AP, procurement, legal, tax, and often more. Treasury chairs the council and leads them in carrying out the following steps.

#### Eliminating Competing KPIs

As we have seen when describing the different areas involved in the CCC, their points of focus and objectives differ significantly. This can unfortunately result in a proliferation of competing key performance indicators (KPIs) across these departments. These KPIs seem

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CONTENTS

reasonable to the departments that hold them, but they are not calibrated to overarching organizational goals. This can lead to inefficiency, suboptimal working capital, and poor interdepartmental relationships. Before attempting to implement any initiatives, the working capital council must identify and drive out competing KPIs. In leading this process, the treasurer must take certain steps:

- 1. Listen: Competing KPIs arise from real needs, goals, and concerns. In order to identify where the problems lie and how to solve them, treasury must listen carefully to each group to understand their perspective. Next, treasury must help them understand each other and why each group's concerns matter.
- 2. Consider the Absent: In addition to making sure that all the voices present are heard by one another, it is also treasury's role to make sure that any relevant but absent voices are considered by the council. This may include external partners such as customers and suppliers, or there may occasionally be internal departments that are impacted by a specific issue but are not present. Treasury must ensure that the concerns of those parties are considered by the council.
- 3. Explain the Need to Change: In addition to making sure all relevant viewpoints are considered, treasury must help the council understand that any competing KPIs are not only inconveniencing other departments. They are ultimately harmful to the organization as a whole, including the departments they were originally built to help. Communicating this clearly and explaining the need to eliminate any and all competing KPIs is an important part of treasury's role in the council.

?) Over the past two years, our working capital has: <sup>26</sup>





Improved through internally driven initiatives (automation, reduced processing costs, etc.)

Improved through external financing (reverse factoring, strategic borrowing/investing, etc.)



Improved through both internal initiatives and external financing



Stayed approximately the same

While competing and suboptimal KPIs are harmful,

has identified and removed any competing KPIs,

for specific working capital projects.

**Monitor and Update** 

its next task is to create a new set of KPIs that are

good KPIs are helpful and necessary. After the council

calibrated to overarching organizational goals and that

do not impede one another. Objectives can also be set

Optimizing working capital is far from a one-and-done

task. It requires ongoing adjustments as external and

**Integrated KPIs** 



Deteriorated

Unsure

internal factors shift and evolve. Acquisitions, seasonal sales fluctuations, and economic changes

will all change what your company's working capital needs and situation are. As your council continues to meet, discuss how your initiatives are going, what is changing, and what needs to be recalibrated to keep your working capital optimal.

# **frustmi**

# Get your business payments right.

#### trustmi.ai | Contact@trustmi.ai

Trustmi offers an end-to-end solution that helps businesses protect their bottom line by eliminating losses from cyberattacks, internal collusion, and human error, ensuring business payments go to the right place. Trustmi's flexible platform seamlessly integrates into existing organizational payment workflows and connects all the data across the B2B payment process to detect and eliminate fraud and errors. Trustmi's unique Trust Network unites powerful crowd-sourced data from thousands of vendors and businesses, further detecting suspicious signals to maximize protection for business payments.

- Connecting the dots with data: Trustmi's solution takes a holistic approach to securing invoice payments and fund-transfers by connecting information and activity across siloed financial systems. The solution captures a full view of the payment data flow and analyzes hundreds of data points to uncover vulnerabilities and eliminate threats.
- A rapid road to value: Trustmi takes a highly quantitative approach to preventing payment losses to deliver immediate value to customers The Trustmi team can set up, calibrate, and deploy

the platform within one week to start protecting business payments at lightning speed.

- No changes to the payment process: Trustmi's flexible solution layers seamlessly onto existing ERPs and other financial systems, and folds easily into finance teams' current processes to boost efficiency and reduce manual work. Trustmi customers have full control so they can run their payment process their way without any changes or interruptions.
- A true partner for winning: Trustmi is not just a platform but also a partner. The team has deep expertise and experience in all aspects of cybersecurity, fintech, and payments tech, and combines best practices from all these disciplines to create a unique approach to securing business payments and supporting our customers' success.

By conducting an initial assessment of past payments, Trustmi shows how the platform can deliver rapid value to finance teams and effectively secure B2B payments, mitigate losses, and drive bottom-line growth immediately after a simple deployment.



Ownership: **Privately Held** 

#### **Solutions & Services**

- ✓ Payment Security Solution
- ✓ Payment Approval Workflow
- ✓ SOX Compliance
- ✓ Vendor Onboarding
- ✓ Vendor Lifecycle Management
- ✓ Claim Fraud Engine
- Bank Account Validation

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#### **Top Statistics**



#### Customers

Trustmi has already saved millions of dollars each year for our customers

Our platform has processed tens of billions of dollars' worth of transactions

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#### Trust Network

The Trust Network has millions of vendors already onboarded for an added layer of protection

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#### Trusted by Enterprise Businesses

Trustmi emerged from stealth mode in July 2023 with a customer list including several Fortune 500 companies

#### **Market Position**



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#### Problem Validation

Hundreds of interviews with enterprise organizations validated the need for an advanced payment security software

Over \$32 billion reported as lost to payment fraud in 2020

#### Well Funded

Secured \$17MM in a Series A round in 2023 from leading investors, including Cyberstarts and Zeev Ventures, totaling \$21M in funding

#### Innovation

Trustmi is leveraging AI to combat fraud and safeguarding finance teams against the use of AI by threat actors and fraudsters

#### **Clients/Partners**



## News & Happenings

### Trustmi lands \$17M to scale its payments fraud prevention tech (TechCrunch)

Shai Gabay and Eli Ben Nun founded Trustmi in Israel in 2021, and announced their Series A round of \$17 million dollars from leading investors.

### Full list of Israeli high-tech funding rounds in 2023 (CTECH by Calcalist)

The financial crisis is taking its toll on Israeli high-tech, but numerous startups are still managing to raise funding for their innovative ventures.

### Trustmi aims to stamp out B2B payment fraud with global launch (FinTech Futures)

Cybersecurity fintech start-up Trustmi has announced its global launch as it bids to become a leading force in business payments security.

#### Trustmi launches SOX Compliance Solution

Trustmi has launched its Sarbanes-Oxley (SOX) Compliance solution for business payments. This Al-powered solution intends to empower organisations to take a proactive, automated approach to compliance audits, enforcing business controls in real-time across the entire payment flow. Most businesses struggle to protect their business payments from cyberattacks, internal collusion and human error, resulting in severe financial losses. 78% of companies in the U.S. today are already losing money, and \$32 billion was lost to payment fraud in 2020 alone. This number continues to grow every year. Generative AI technologies like ChatGPT and deepfake are accelerating the problem by arming threat actors with better tools to execute their scams.

Trustmi's platform leverages advanced technology to combat fraud, internal collusion and human error and enables enterprises to protect their businesses payments. The solution provides full payment security with additional modules for added protection and vendor management that Finance teams can choose to use depending on their needs.

#### A Solution for Finance Teams

Finance teams are highly susceptible to scams by fraudsters that utilize a number of different tactics. Teams that leverage Trustmi's solution gain confidence in their business payments process knowing they are successfully minimizing fraud and protecting their bottom line. Trustmi can provide a number of benefits to Finance teams everywhere:

- Visibility across the entire payment process
- Increased efficiency and reduced manual effort
- Risk assessment for each transaction in the



payment flow

- Verification of vendor updates in contact and financial details
- Validation of financial documents and details

#### | A Self-Learning Cycle

Trustmi's platform is powered by AI and built on a self-learning cycle. It can detect abnormal activities that indicate fraud, human errors, and processes violations, and it prevents fraud and eliminates human errors in the payment process. The solution identifies a clear risk for each object in the payment flow to predict future issues and it accelerates the payment flow by removing manual work, from onboarding to approval and funds release. Through this self-learning cycle, businesses can leverage Trustmi's AI automation to secure their fund transfers.

#### | A Full Payment Security Solution

Trustmi's flexible and modular platform offers finance teams the ability to use only the tools they need for securing their payment processes and managing their vendors. Companies using Trustmi attest to receiving immediate value to their business with no impact on their current payment process.

#### | Platform Modules Payment Approval Workflow

This module gives teams transparency across the payment process. It uncovers vulnerabilities, detects suspicious signals, and secures payments. The module integrates into the current processes without producing any interruptions, and it provides automation to reduce manual work.

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#### **SOX Compliance**

Navigating SOX compliance is time-consuming and challenging. This module helps finance teams to comply with SOX regulations effortlessly. By leveraging this feature, finance teams can efficiently establish financial reporting standards, protect their data, monitor attempted breaches, avoid violations, and prove compliance.

#### Vendor Onboarding

This module provides an easy way for businesses to onboard their vendors to the Trustmi platform. The module offers a safe and secure process for vendors to enter sensitive banking details, tax information, and security information to ensure the vendor meets our customers' security requirements.

#### Vendor Lifecycle Management

Businesses can use this module to manage vendors in one place, easily update vendor information, and to manage their profile updates and changes. Businesses can configure and manage access levels, vendor payments and timing for payment cycles.

#### **Claim Fraud Engine**

For healthcare and insurance companies, avoiding claims fraud and errors is challenging. This module secures payments for insurance claims and reimbursements. Finance teams gain transparency into claims workflows and can manage claims and claimants in one central location.

#### Trust Network

Trustmi's unique Trust Network unites powerful crowd-sourced data across thousands of vendors and businesses to maximize protection for business payments. Trustmi monitors and validates changes in vendor profiles and automatically alerts businesses if a fraudster is impersonating their vendor or attempting to hijack payments. This added layer of protection for businesses sets Trustmi apart as a full-stack solution for not simply detecting but also predictively eliminating future fraud incidents.

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