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Navigating Tomorrow's Treasury landscape

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Tomorrow's Treasury

The treasury function as we know it is evolving. While the central role of treasurers – managing an organisation's financial risks, liquidity, and investments – remains critical, how these functions are performed, as well as the added value treasurers can bring to their role, is shifting. Today, the foundations – in the form of centralisation and automation – are being laid such that the treasurer of tomorrow can begin to unlock real-time treasury operations and new evolving technologies such as artificial intelligence (AI). Our Tomorrow's Treasury white paper explores this changing dynamic by looking into the topics high on the treasury agenda – from macroeconomic uncertainty and data to application programming interfaces (APIs) and digital assets.

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Foreword

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Today's treasurer faces a myriad of macroeconomic and geopolitical challenges, as they try to balance their traditional treasury competencies with an ever changing and expanding role. This increasingly incorporates aspects of business strategy, change management, technological advances and cybersecurity.

Underpinning the trend has been the arrival of new business models, from the rise of e-commerce to the emergence of marketplace solutions that require a new skill and mindset. Many treasurers are using this as an opportunity to enhance their existing setups, such that they can act as a business enabler – leading the change, not following it.

While transformation is, for these reasons, in full swing, the nature of treasury – where stability and careful risk management remain key – means that a full-blown revolution of operations and processes is unlikely. Instead, an ongoing evolution is being observed across the industry. The scale and speed at which such a process is taking place is by no means homogeneous. Treasurers are approaching the transformation from different levels of maturity, and with differing scale, budget and appetite.

The direction of travel is towards laying the foundations for Tomorrow's Treasury. This includes centralising operations, leveraging now well-established solutions such as in-house banking and virtual accounts, as well as driving automation through the use of technologies, including machine learning, AI and robotics process automation.

From here, treasurers can begin to fine-tune their setups to ready them for a real-time treasury world, where they have access to the right information at the right time for taking decisions quickly and effectively. Accomplishing this is far from easy. For most treasurers, consuming information, such as instant payment notifications, in real-time requires significant upgrades to existing IT infrastructure, treasury tools, policies and processes.

While the road to this real-time destination is long – and with various obstacles – if treasurers are able to reach it they can unlock instant visibility and control over cash, faster decision-making and improved liquidity management. The technology to get there is already available and continues to improve.

In the decade ahead, treasury of (the day after) tomorrow might even be able to count on currently emerging technologies, like tokenised deposits and stablecoins, to expedite certain parts of their transformation. Automated clearing house (ACH) systems in selected markets could be decommissioned and replaced with instant payments. APIs are expected to become a standard integration in treasury. Certain elements of generative AI (GenAI) will have found their way into the treasurer's day-to-day activity, allowing for more automation. Ultimately however, different treasury departments will be at different maturity levels, just as they are today. The evolution will continue.

In this white paper we explore the changing dynamics we are seeing in treasury today, setting out a vision for what tomorrow's treasurer might come to expect as the world of real-time treasury moves from theory to reality.

1

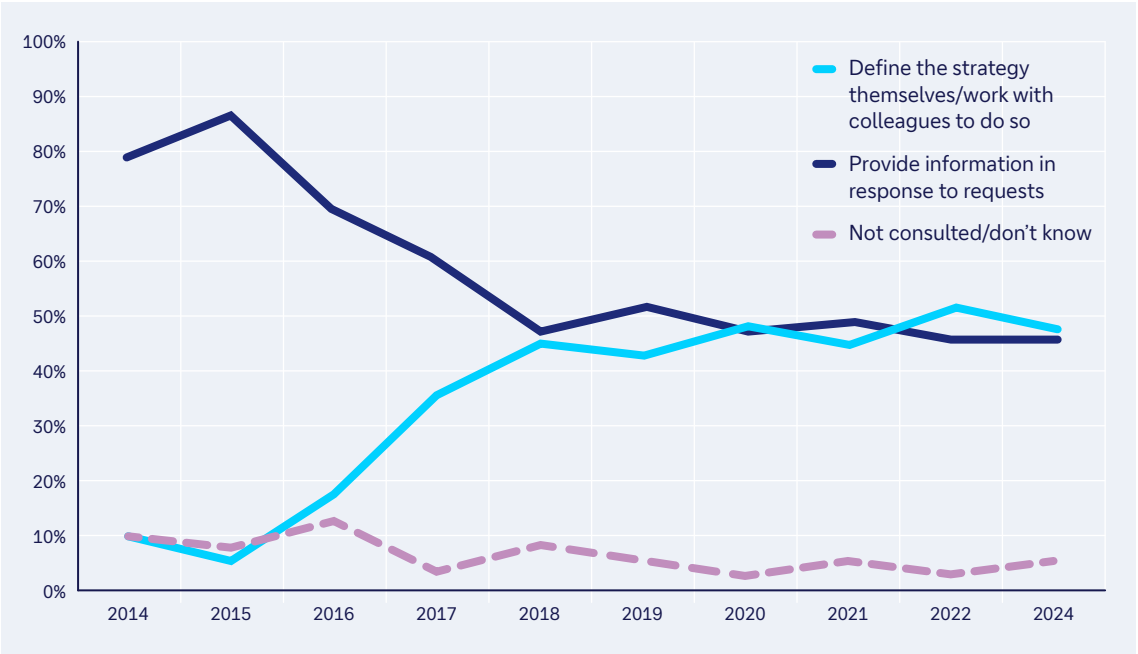
How treasury is changing

Consensus has grown steadily over the years that the increasing complexity and global presence of many companies means that treasury can no longer exist in a silo. While the traditional treasury functions of managing cash, liquidity and working capital and handling foreign exchange as well as interest rate risk continue to be core, how these functions are performed and the additional value that can be added around them, is continually evolving – often at speed.

As part of this shift, treasurers have been able to take on a range of additional duties and responsibilities. For example, some treasury departments are becoming centres of excellence for the business, with proven competencies that can extend to supporting business strategy, change management and technological advances.[1]

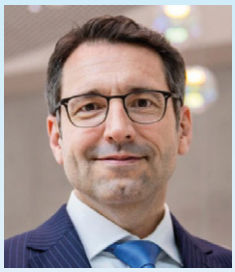
According to the Association of Corporate Treasury's (ACT) *Business of Treasury 2024* report, treasurers increasingly see themselves as a strategic partner for their organisation – with 60% of members polled strongly agreeing with this sentiment; the highest level on record. The evolution of treasury's role in business strategy over the past decade is shown in Figure 1 below.[2]

Figure 1. How treasurers have become more involved in business strategy



Source: ACT – The Business of Treasury 2024, 11th edition

> "Setting up robust processes is a prerequisite to being prepared for the unexpected. At the same time, our set-up needs to be flexible – especially when it comes to unexpected market distortions for financing and payment methods. Flexibility and adaptability need to be part of a treasurer's DNA"
>
> **Jörg B. Bermüller,** Head of Cash and Risk Management, Merck KGaA



In return for their greater duties and responsibilities, some treasurers have started to occupy a seat at the boardroom table – and with it, their role has begun to shift from being a back-office procurer within the organisation to an important business enabler, working directly with both CFOs and IT departments. For example, according to the ACT report, 78% of treasury professionals say their boards have shown an interest in capital and liquidity over the previous six months, and only slightly fewer (75%) engaged with risk management.[3]

In Tomorrow's Treasury, this role will become even more strategic – rather than waiting for change, treasurers will increasingly take the initiative in facilitating change within their organisation to enable business growth.

This change in mindset is being driven by three key factors: the ongoing disruption caused by geopolitical uncertainty; the introduction of new corporate business models; and the need to effectively manage the risk of cybercrime.

1.1 Macroeconomic drivers shaping priorities

Economies around the world face a myriad of challenges, including rising energy and food prices, fiscal instability in the wake of the pandemic, and ongoing global conflicts – with these black swan events giving way to a "black swan era". The challenges demand a more proactive and adaptive approach to risk management, with a focus on strengthening liquidity buffers, diversifying investments, and stress-testing financial strategies to withstand potential shocks. Against this backdrop, the need for real-time data analysis and scenario planning becomes critical as treasurers strive to safeguard their companies' financial health in an increasingly volatile and complex global environment. Put simply, agility and preparedness are now paramount for treasury teams.

Treasurers are, however, no strangers to changing or unusual macroeconomic conditions. The 2010s were bookended by more than a decade of low, zero and even negative interest rates following the global financial crisis of 2007–2009, quantitative easing (QE) policies by central banks and subdued inflation. That era was unexpectedly extended in early 2020 when the shock of a global pandemic forced governments to temporarily abandon financial discipline and cushion the impact on their economies via stimulus packages.

This period ended abruptly in late 2021/early 2022, with central banks applying a rapid succession of interest rate increases. The result was levels of inflation not seen globally since the 1980s, with the rate estimated to have reached 6.78% in 2023.[4] In the *Corporate Debt and Treasury Report 2023* published by the ACT, treasurers cited repaying debt, hedging and inflation clauses as among the steps they had taken in response to the new environment (*see* Figure 2).[5]

Figure 2: What treasury related steps have you taken to address higher inflation?

Source: ACT Corporate Debt and Treasury Report 2023

In addition to inflation, geopolitical concerns continue to weigh on the treasury agenda – with companies having already initiated major changes in areas such as supply chain management, from revised shipping routes to avoid conflict zones to companies sourcing their supplies nearer to home.

For example, the war between Russia and Ukraine since March 2022 has impacted corporates in several ways, ranging from the sharp spike in energy costs as Europe seeks alternative sources to Russia for its oil and gas supplies, to the pressure on Western companies supplying goods and services to Russia to make a complete exit from the country. As banks are ensuring compliance to the sanction regime imposed by the US, the European Union (EU) and others, this makes it more difficult for companies to fulfil contractual obligations or to repatriate funds from Russia.

In addition, trade tensions between the US and China, the world's two biggest economies, have already seen the imposition of tariffs by both countries on imported goods. With this, supply chains are shifting – in 2023, for example, Mexico overtook China to become the biggest exporter of goods to the US for the first time in two decades.[6] Much will be contingent on two factors; first, the result of the November 2024 US presidential election; second, how political uncertainty surrounding Chinese Taipei develops.

Elsewhere, since October 2023, traffic in the Suez Canal has sharply reduced due to attacks by Houthi rebels on vessels using the Red Sea,[7] with much of the traffic having been diverted to the Cape of Good Hope. The results have included three to four weeks of extra sailing time for vessels travelling from China to Europe, an increase from US$2,500 to US$6,500 in the typical cost of shipping a container from China to the US East Coast and higher marine insurance rates.[8] Moreover, since June 2023, the Panama Canal Authority has been restricting both the number and size of ships passing through the Panama Canal due to historically low water levels.[9]

"Treasurers need to invest in the right people, processes and systems so that they can understand and monitor exposures around market, counterparty and liquidity risks in times of stress"

Can Balcioglu, Vice President, Global Treasurer, PayPal

Together, these compounding issues have had a knock-on effect as treasurers try to manage their company's cash, liquidity and working capital. Treasurers recognise the difficulties introduced by macroeconomic and geopolitical development, with 43% of treasury participants in the *2023 AFP Risk Survey report* (Association for Financial Professionals) citing macroeconomic risk as one of the most challenging risks to manage.[10]

These developments are changing several of treasury's priorities and its views of how corporate capital is deployed in certain countries, how country risk is evaluated and how the company's subsidiaries are financed. This has necessitated a change or evolution in approach for treasurers across several financial risk categories (*see* Figure 3).[11]

Figure 3: Financial risks arising due to current geopolitical tensions

Risks	Description	Considerations
Regulatory/ country risk	**Changes in trade agreements, introduction of capital controls or sanctions can affect a company's ability to manage its cross-border cash flows and access funding**	—Review legal organisational structure and consolidate legal entities to enable an efficient capital allocation —Reducing trapped cash by dividend upstreaming —Create strategies to stop increasing trapped cash —Net-investment hedging: protect the asset value
Liquidity risk	**Treasury departments may need to diversify their funding sources or hold more cash reserves to mitigate liquidity risk for local operations**	—Review capital allocation model [debt/ equity mix] and capital expenditure (CAPEX) plan —Consider funding subsidiaries in local currency while accessing more liquid onshore markets
FX risk	**FX volatilities are likely to increase when geopolitical risk is heightened. The increased FX volatility would inevitably translate into negative impact on corporate earnings. Treasury departments may need to adapt hedging strategies**	—Revisit unhedged FX exposures in emerging markets including balance sheet exposures, indirect FX exposures on account of supplier/ sales contracts and forecast cash flow/dividend payments —Update hedging policy by adding more tools. For example, exploring accessing onshore or offshore curve to reduce hedge cost or hedging FX tail risk using option strategy
Credit risk	**As companies broaden their supply chain to minimise the impact of any concentrated market, this may mean either increased funding needs in some markets, managing new supplier/customer risks, or even entering into new markets where it was not operating before**	—Review supply chain dependencies —Insurance and traditional letter of credit conformations can help manage such risks

Source: Deutsche Bank

1.2 New business models

The growth of e-commerce has transformed the business-to-consumer (B2C) landscape and, increasingly, the business-to-business (B2B) one. The rapid shift in sales from traditional to digital channels has given rise to new business models, which directly impact treasury teams. For example, in a KPMG survey of treasurers, 60% of respondents cited e-commerce as a business model they expect to gain significant traction over the next five years.[12] This is backed by data from FTX Intelligence, which predicts the B2B e-commerce segment is set to grow by 120% to 2030, when it will represent a US$22trn market.[13]

In order to facilitate these sales, digital payments have become a central part of the equation, and treasurers have to ensure those are efficiently integrated into existing processes. Back-end operations are required to provide efficient reconciliation and react to changing cash intake patterns. In these fast-paced ecosystems, the need for efficient cash management is high from day one – and it gains importance as a company's e-commerce sales grow internationally.

Given that new digital business models impact treasury activities, treasurers need to keep an open mind and take ownership of the change. Within the context of e-commerce, for example, there is an opportunity for treasury to take a more strategic approach to owning the full suite of enterprise liquidity. This not only means bringing digital payments, which currently often sit within the business divisions operating the respective e-commerce business, into their remit – but also managing counterparty, credit, and FX risks which are associated with the introduction of these new business models.[14]

As treasurers look to take on this new role, some KPIs they should bear in mind are:

— **Working capital.** Treasury has always played a key role in ensuring that it measures the company's ability to meet its short-term financial obligations and fund its day-to-day operations. However, as e-commerce usually accompanies shorter and/or accelerated business cycles, treasurers need more information than before about the upcoming week to support a well-balanced working capital management.

— **Cost control.** Another key focus now involves measuring the cost of maintaining the various sales channels, the payment methods each supports, and the volume that goes through each of these channels. Treasurers ideally want to have access to the same FX rates that apply for their usual treasury flows instead of overpaying due to conditions embedded in local collection methods.

— **Risk acceptance.** As more transactions are conducted online, the risk of fraud and security breaches has increased. Treasurers must now prioritise security and fraud prevention as key metrics for success. Moreover, they need to deal with new players such as payment service providers (PSPs), credit card programmes etc which all originate new risks that a traditional treasury organisation is not used to dealing with.

— **ERP reconciliation.** Digital payments and the wide range of methods offered are causing significant challenges for the back-end – especially as it relates to enterprise resource planning (ERP) reconciliation. While this is not a new function for the treasury, the changed landscape has made it increasingly important.

— **Webshop integration.** Another new key area for treasury is its ability to facilitate online sales transactions by seamlessly integrating its webshop with its payment systems and cash management tools. This challenge becomes particularly evident when a multitude of smaller local payment service providers (PSPs) are employed to establish a presence across various countries instead of implementing an overarching, optimised cash management system.

— **Regulatory environment.** There are regional variations associated with payment processing, Know Your Customer (KYC), Anti-Money Laundering (AML), and data protection regulations. Navigating these technical and regulatory requirements within e-commerce target markets is a new challenge for corporate treasurers. According to an experienced treasurer, data privacy is very often overlooked by businesses when setting up digital payment channels – yet a thorough assessment is absolutely key and can be coordinated by treasury in combination with legal and the collection channel provider.

And change does not stop with the extension of sales channels to online. Increasingly, companies are building digital marketplaces around their original product offering to generate new revenue streams through third-party reseller commissions. These platforms connect buyers and sellers in a particular sector and facilitate the exchange of goods, services, or information among a diverse array of participants.[15]

How treasury can and should support a marketplace-based business model was examined in detail in *Treasury's Role in Creating and Supporting a New Business Model*, a joint white paper from Treasury Management International and Deutsche Bank published in January 2024.[16]

1.3 Guarding against cybercrime and other financial crime

In today's increasingly digital world, consumers and companies alike are connected via many different systems and devices – each of which can, if managed improperly, be exploited by cybercriminals. Cybercrime encompasses a wide range of criminal behaviours conducted through or targeted at digital devices and online systems. Cyber-dependent crimes fall broadly into two main categories:[17]

—Illicit intrusions into computer networks, such as hacking;

—The disruption or downgrading of computer functionality and network space, such as malware.

Cybercrime is also often an enabler for fraud, as it targets – or even produces – technical weaknesses, which in turn can be exploited for fraudulent purposes. For example, a cybercriminal might use a Trojan – a virus containing malware that is made to impersonate a legitimate programme – to gain access to personal data. The act of using this personal data for financial gain would be an example of fraud.[18] The encrypted or stolen data is used by criminals to extract ransom from the respective company or to carry out subsequent payment fraud.

While cybercrime and other forms of financial crime are not new problems, the scale and ambition of the money laundering, fraud, bribery and corruption, terrorist financing and cybercrime now accounts annually for an estimated 3.6% of global gross domestic product (GDP).[19] Responses are not yet robust enough either, with the World Economic Forum (WEF) reporting that efforts to fight cybercriminal activities worldwide are often uncoordinated and fragmented.[20]

Due to its key role in financial oversight and handling of sensitive financial transactions, the treasury department is a prime target for cybercriminals whose top treasury targets include payment transactions, via phishing attacks, AI-supported identity theft and malware infections; data security compromised by hackers; and attempted fraud through fake invoices and payment orders. Attacks will not always come from outside the company, with inadequate vetting of employees opening up the possibility of insider jobs.

According to a survey for the ACT's *The Business of Treasury 2024* report, the treasury community is fully aware of this threat, with the issue consistently topping the list of external concerns. In 2024, close to 100% of treasurers cited cyber security as a concern.

With these concerns high on the agenda, there are various initiatives that can play a pivotal role in mitigating cyber risk exposures. For example, the adoption of account pre-validation and payer validation processes can help to enhance security protocols (*see* Section 3.2.1: Role of API connectivity), while the strategic reduction of bank accounts can decrease the administrative burden associated with managing signature authorisations and minimise potential vulnerabilities. While the company's exposure to cyberattacks can be reduced, eliminating the risk entirely is not possible. In fact, the ACT reports that organisations regard cyberattacks as a "when" not "if" scenario.[21] Among treasury's tasks is therefore having a contingency plan in place, developed in partnership with the IT department, should the company be targeted so that recovery can be expedited, and any reputational damage is minimised.

2

Today's treasury: Getting the foundation right

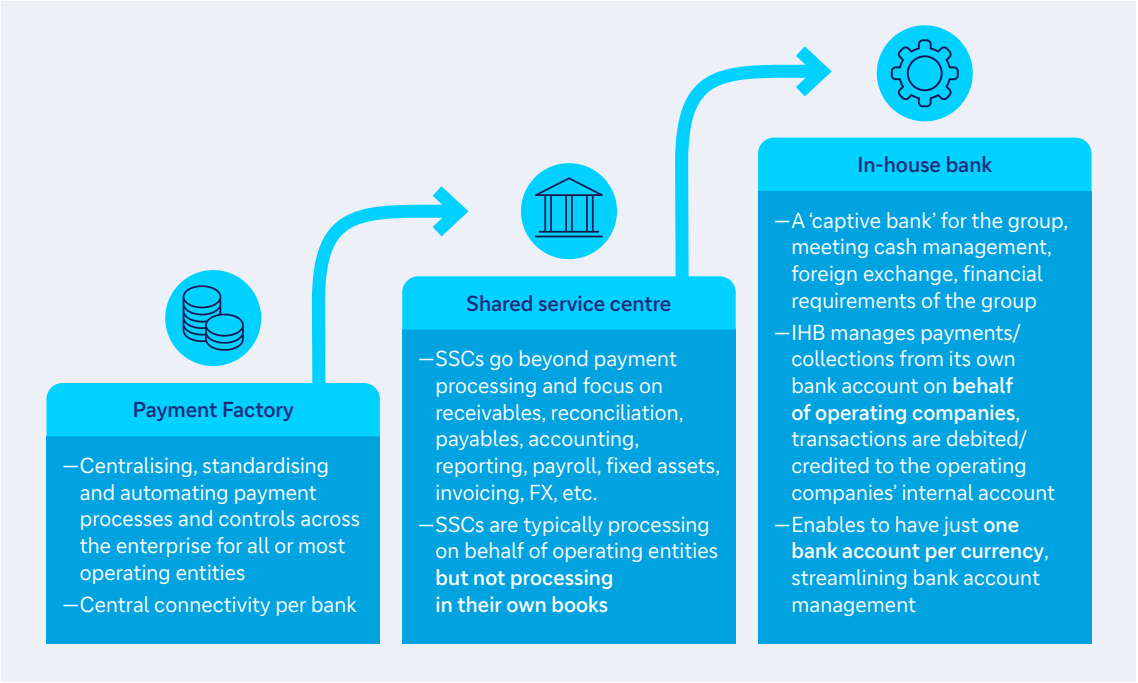
In the 2023 *PwC Global Treasury Survey* among treasurers from 375 corporates in 33 countries, 52% of the respondents indicated that market factors, such as volatility in interest rates (IR), commodity and FX prices, and cyber fraud as well as company-specific factors, such as mergers and acquisitions (M&As) and a renewed focus on cash are leading treasury functions to undertake significant digital transformations.[22]

But what does digital transformation mean? The truth is that the treasury technology landscape tends to be incredibly diverse and today's treasury departments are often still using legacy systems, which can impact their ability to swiftly exploit new technology innovations such as big data or AI. While some of the larger players are forging ahead and shaping Tomorrow's Treasury, others are still focused on driving incremental efficiency gains through centralisation and automation.

Centralisation involves consolidating core financial management activities, such as cash and liquidity management, under a single, unified department. In the past, centralisation was often somewhat narrowly defined as centralising processes. Today, it extends to consolidating data to enhance visibility into the risk exposures across the company. As a strategy, centralisation not only caters for efficiency and cost reduction, but it also enhances visibility and control over cashflows globally – which in turn improves decision making and helps treasurers to effectively deal with crisis or stress situations.

Automation builds on this to drive efficiency and accuracy. By integrating these two elements, organisations can create a treasury function that is not only more agile and makes informed decisions, but also better equipped to implement new technologies such as APIs or AI and handle regulatory changes, such as ISO 20022 or the 2024 European Instant Payments regulation (*see* Section 3.3.1: EU Instant Payment Regulation) and deal with the ever-increasing demands and expectations placed on treasury in the future. In this way, centralisation and automation might be seen as foundational for creating Tomorrow's Treasury.

Figure 4. A commonly found trajectory for centralisation of treasury activities



Source: Deutsche Bank

2.1 Building a centralised treasury

Creating a successful route towards centralisation will depend on the maturity of the organisation in question – in particular, the sophistication of its technology infrastructure. The more decentralised, heterogenous and diverse the existing infrastructure is, the greater and more work intensive any change undertaking is likely to be. This increases exponentially in highly acquisitive companies, which often involves the integration of multiple treasury functions into the existing treasury model.

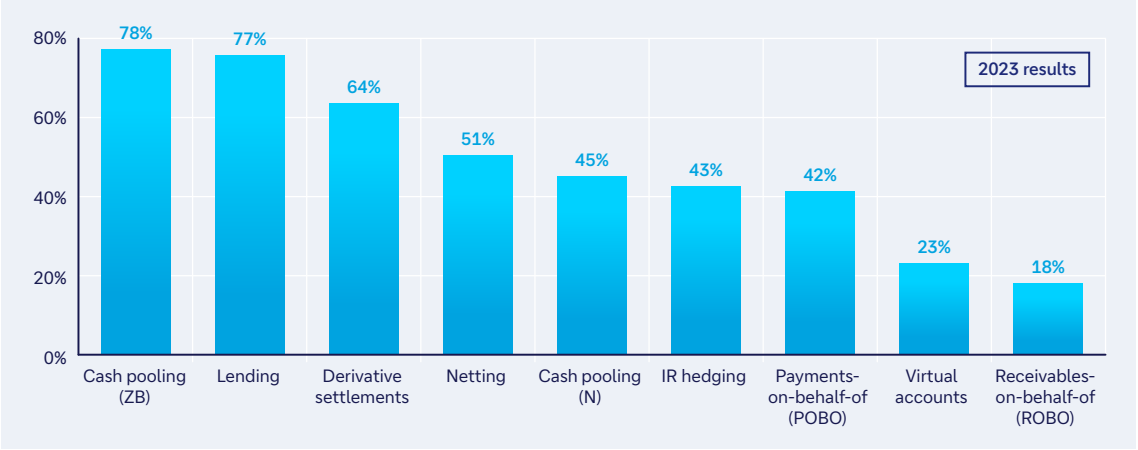
For any centralisation strategy – regardless of the complexity involved – it is important to "walk before you can run". One commonly found approach is that treasuries have initially sought to centralise payment execution and get cash visibility through a payment factory, before they have subsequently started to leverage more bespoke and increasingly automated solutions, such as in-house banking, data analytics tools and virtual account solutions to manage cash and FX exposure. In some cases, treasury departments also rely on shared service centres (SSCs), which usually starts with centralising IT and HR services and then expands to accounts receivable and accounts payable processes (*see* Figure 4 above).

2.1.1 In-house banking

At its core, an in-house bank (IHB) represents a beacon of financial efficiency. It empowers treasurers to most effectively deploy on-balance sheet capital, whether sourced from cash receipts or procured at favourable borrowing rates, directly to their business units, subsidiaries, and even suppliers.

The focus is, first, on exploiting benefits to the best extent possible by fine tuning what the corporate treasury team is doing; and secondly, becoming the centre of competence for new and additional activities: supporting business units to develop new business models.

Figure 5: In-house banking services



Source: *PwC 2023 Global Treasury Survey*

In this way, in-house banking enables the efficient use of available cash throughout the company, standardising payment and collection processes, netting of FX exposures and beyond these core activities, acting as a catalyst for enabling a real-time treasury.[23] Through the in-house bank function, treasurers can perform a range of services that would otherwise likely be performed by a banking partner (*see* Figure 5).

For many years, IHBs were regarded as requiring the funding and resources that only larger organisations could provide. Nowadays, thanks to technological advances and comparably easier access to the required tools, they have steadily become a viable option for smaller organisations as more treasurers have begun using an IHB to centralise payments, collections and loans, and to optimise liquidity and risk management.

That said, the term 'in-house bank' will mean different things to different companies, and in each case for the treasurer will be contingent on the mandate that they have been given by their CFO. For example, some companies may just want to unlock liquidity benefits, while for others efficient payments processes and controls are the focus.

The need for a tailored approach was one of the key drivers behind the launch in 2021 of In-house Banking-as-a-Service (IHBaaS), Deutsche Bank's cloud-based IHB solution. With its modular design, IHBaaS allows companies to customise their IHB projects by selecting only the specific features they need. As their needs and priorities change, companies can easily add other modules – providing them with the flexibility to expand the solution over time.[24]

2.1.2 Virtual accounts

Virtual accounts are an enabler for rationalising an organisation's existing bank account footprint and can serve as a precursor to centralising other activities – such as payments collections, liquidity investments and FX risk. They allow treasurers to consolidate payment transactions, and thus cash flow, pertaining to their affiliated group companies in one or more physical bank accounts. Subsequently, treasurers can create and maintain a sub-ledger with the required number of virtual accounts for segregated reporting at an individual entity level. These virtual accounts can be internally referenced to individual customers, projects or business units, thereby providing the desired level of reporting with the required level of detail.

Mirroring the flows going through a single physical account into several virtual accounts also means clients can close some of their physical accounts. This not only helps to reduce cost and effort with account opening and maintenance: as cash flow is automatically consolidated into fewer, or even just one bank account per currency, the need for maintaining cash concentration structures is significantly reduced, if not eliminated. Moreover, virtual accounts are a step towards real-time treasury as liquidity is concentrated in real time on the main bank account (*see* Section 2.1.3: Case study: Siemens – taking virtual accounts to the next level). Implementing virtual account solutions can provide treasurers with immediate results. There is a growing realisation that the efficiency with which a corporate can ultimately run their treasury function is very often directly correlated with the number of bank accounts they are maintaining across markets, currencies and counterparties. This is because a rationalised bank account structure can make information and data available and easier to distribute within the client organisation, which drives efficiency gains.

Bank account rationalisation can also save companies time and money. For example, Deutsche Bank proprietary research as well as studies from treasury consultants consistently indicate that the fully loaded cost of a physical bank account amounts to €5,000–6,000 per account per year, which includes all direct and indirect cost elements, including bank expenses, but most relevantly, savings in person hours spent on administrative tasks, documentation, reconciliation, system cost, auditor efforts etc.

In addition, by giving treasurers better control over account access and improved transparency over payments that are not instructed centrally, virtual accounts can also help to mitigate payment risks, which, in turn, helps improve the business case for these solutions.

Constructing a business case

Among the polls of members included in the European Association of Corporate Treasurers' *EACT Treasury Survey 2024*, respondents were asked to identify the greatest challenges faced in centralising further treasury organisation. Those cited most often were difficulties in standardising processes, followed by getting the budget signed off.[25]

Treasury's task when securing budgetary approval to finance an automation or tech project is to present a realistic business case that clearly identifies the potential efficiencies and savings. That old adage "if it ain't broke, don't fix it" is still prevalent, which might be plausible in the short term but hinders any organisation keen to future proof its activities. This requires a two-stage approach. Treasurers must first identify the key challenges they face, and secondly match each challenge to an appropriate technology that can give support in solving it.

This is where banks can support and provide tailored advice, backed by specific and concrete data insights that are derived from their customers' existing transactional pattern. In response to the growing demand for exploring and assessing the benefits for virtual account solutions, Deutsche Bank has created analytical capabilities to provide clients with actionable data insights about their individual transactional activity: the data analytic tool processes more than a year of transaction data, in order to provide accurate and client-specific advice about both the achievable benefits: in building their business case, clients can now immediately see the extent of possible quick wins, as well as the overall potential for rationalising their existing bank account footprint.

Case study

2.1.3 Siemens – taking virtual accounts to the next level

For German multinational technology conglomerate Siemens, complexity is the enemy of speed. To stay ahead of the curve – and reap the full benefits of key technological trends, such as API connectivity and the emergence of real-time and 24x7 treasury operations – they are focused on reducing the payment infrastructure complexity. To this end, Siemens, in collaboration with Deutsche Bank, has undertaken a virtualisation of its corporate bank account structure by converting its traditional IBANs with Deutsche Bank into virtual IBANs. Unlike many corporate treasury projects of this size, this was approached not from the perspective of meeting particular challenges, but as part of an ongoing effort to build the foundation for future opportunities – and, ultimately, create a real-time transactional infrastructure that could only have been dreamed of until recently.

Typically, bank account virtualisation involves the creation and communication of new virtual account numbers, informing customers of the change in IBAN, and then – often after a long, drawn-out transition period – the actual closure of the physical accounts. For a company the size of Siemens, with its extensive base of customers, this change would be a considerable task.

Siemens' pioneering approach alongside Deutsche Bank has been to convert physical accounts into virtual accounts that carry the same IBAN – simplifying the steps involved and eliminating the key challenges. By retaining the IBANs but using them as virtual IBANs instead, Deutsche Bank enabled Siemens to enjoy the best of both worlds – Siemens could close the related physical bank accounts, while simultaneously preserving their account numbers for payment purposes.

As part of a planned wider roll-out, the underlying structure that the partners have created prepares the ground for further automation and simplification of Siemens' cash, FX and liquidity management processes.

"You cannot do business with customers without the necessary bank account infrastructure; we need to be able to provide an instant processing, and virtual accounts are one essential part that enables us to offer just that"

Heiko Nix, Head of Cash Management and Payments, Siemens

2.2 Enhancing automation

For treasurers, centralisation and automation are not approached individually. Rather, the two strategic aims are intertwined – and it is often the case that by centralising a process, treasurers can then look to automate it.

Like centralisation, automation also remains top of the agenda for treasurers. In the PwC survey[26], cash and liquidity management was named as a top priority by an impressive 100% of participants – with a particular focus on automation.

The reason for this is simple: many treasurers still spend much of their time focused on manual, day-to-day processes. As corporate treasury teams are typically "lean and mean", freeing up time to concentrate on more strategic activities and business partnering is an important area of focus for many.

In this respect automation priorities are typically driven by a problem statement such as:

—What tasks take up the most time or resources?

—Which processes are most prone to error, omission or at risk of fraud?

—What activities is treasury seeking to undertake that it cannot support through its existing resource base?

New technology has proven to be a game changer, including, most recently, the progress of tangible use cases for robotic process automation (RPA) and – in some first instances for AI – within treasury. According to the PwC survey, RPA tools are now being adopted by 48% of respondents to optimise processes and eliminate manual, repetitive actions. In 2021, the respective figure was 34%. This shows that while automation is a building block of a modern treasury, it is a never-ending task and new technologies can help to reap further efficiency gains as will be discussed in the following sections of this paper.

3

Tomorrow's Treasury: the role of real-time

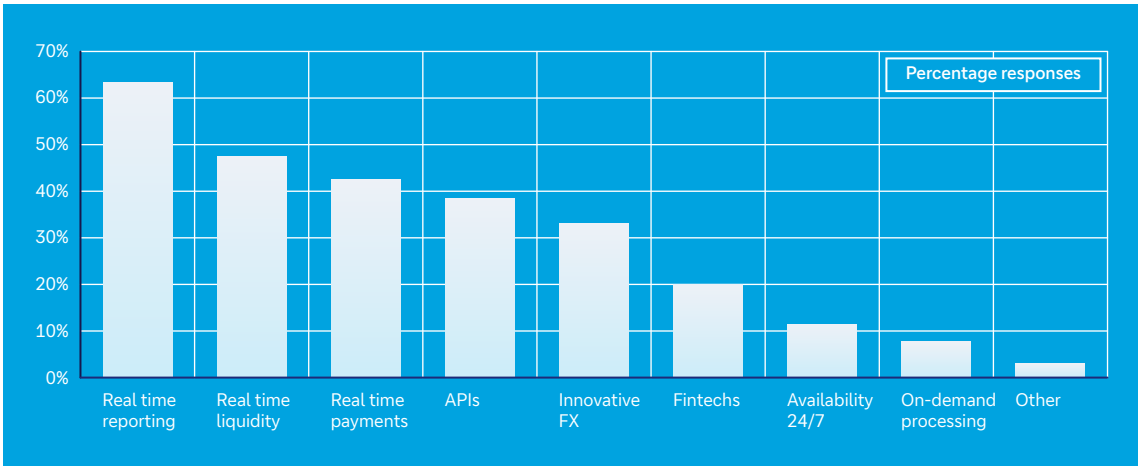
If today's priority for treasurers is all about putting the right foundations in place, what exactly is tomorrow's treasurer looking to build? Having centralised and automated operations and processes, the next logical step is considering the role of real-time. By embracing real-time capabilities, treasurers can enhance decision-making, improve cash flow visibility, reduce risks, and respond more swiftly to market changes – as described in Section 1: How treasury is changing – ultimately leading to more efficient and resilient treasury operations.

To achieve this goal, treasurers must harness the core elements of a real-time treasury: seamless integration of data, access to real-time information, instantaneous payments, real-time liquidity management and automated investment processes. Once seen as a vision for the future, the concept of a real-time treasury is no longer as aspirational as it once was.

While there is no universal definition of the term 'real-time treasury', it can be understood as having access to the right information at the right time to take decisions quickly and effectively. In essence, real-time treasury means moving away from end of day/MT940-based batch processes to an intraday and transaction-based management of cash and risk.

While the building blocks – in terms of the enabling solutions and technologies – have been available for several years, uptake among treasurers remains limited despite being high on their agenda. This is borne out in the results of the *EACT Treasury Survey 2024*, which found that real-time reporting, real-time liquidity, real-time payments and APIs – that each support real-time treasury objectives – were areas of the greatest interest over the next 12 to 24 months for treasurers surveyed (*see* Figure 6).

Figure 6: Topics of the greatest interest to treasury over the next 12 to 24 months



Source: *EACT Treasury Survey 2024*

3.1 The role of data

Before digging into real-time treasury, we must first consider one of its key enablers – data. High-quality data serves as the foundation that enables informed decision-making, as well as the visibility needed to monitor cash positions and optimise liquidity. For example, in cash flow forecasting, data analysis allows treasurers to predict future cash inflows and outflows – helping the treasurer to maintain optimal liquidity. With this in mind, it is no surprise that according to the PwC survey,[27] 78% of treasurers view data analytics as highly relevant or relevant for the next two to three years.

Getting access to high-quality data is, however, one of the challenges faced by treasurers. Often there are inefficiencies in the data gathering process, with either poor quality, unstructured or outdated items or information that has not been captured or shared – all of which dilutes the value of what is available.

As corporates look to put data at the heart of their operations, there are several questions they should ask:

—as an organisation, are we working in a transparent, collaborative way to ensure all data is available for the treasury function?

—is the data strategy deployed by treasury aligned with the needs of the various operating business units – ensuring they also get the data they need?

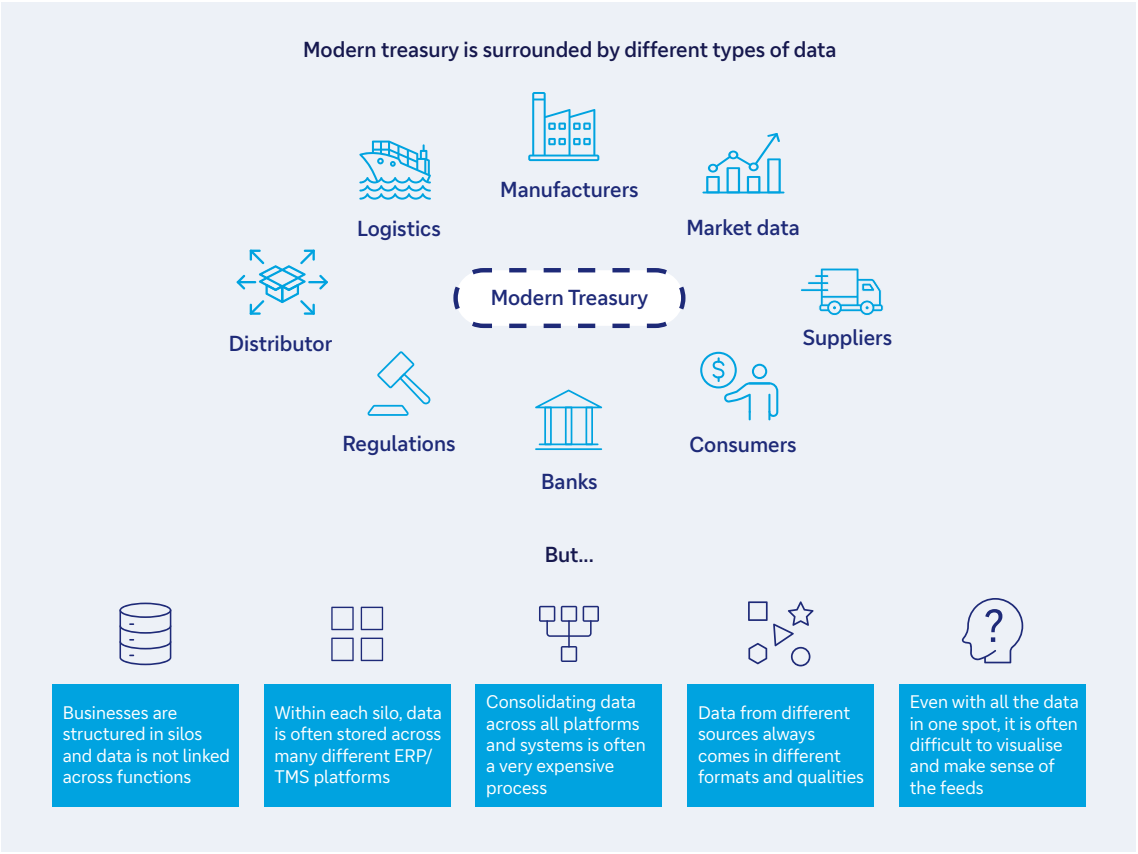
—are our treasury processes and technologies up to speed with the new real-time world?

—is our data of sufficient quality to provide effective, reliable insights?

—are we able to aggregate and visualise unstructured data to improve our analysis?

For example, where treasury, finance and procurement are not joined up, data is often created and maintained in corporate silos – meaning that certain pieces of information may be out of reach for treasurers (*see* Figure 7). Where data from different internal and external systems – owned and operated by different teams – is pooled, it is often standardised so that the different business departments can analyse it. For treasury, this standardisation runs counter to the data-driven approach, as it conceals important nuances in the data.

Figure 7: Biggest obstacle to profit from data



Source: Deutsche Bank

Given that companies rarely have a 'holy grail' of data all in one place – but rather they sit in different ERP and business systems, retrieving actionable data– especially within larger organisations – it often requires considerable integration with disparate internal systems to overcome fragmentation. According to the EACT, "the more IT solutions in use, the more difficult it becomes to consolidate data and allow systems to interact with each other, or to exchange data".[28]

When compiling this data, treasurers should remain open minded to the types of data they look to for insights. For example, many treasurers, cornered in their more traditional view of what does or doesn't constitute treasury data, often miss out on the bigger picture provided by corporate data, which ultimately contains all relevant business risks.

Some treasurers are taking their data strategy one step further by creating repositories of unstructured data from outside of their organisation to perform more nuanced analysis. For example, for certain business models, whether the day is sunny or not can correlate with seasonal sales – and factoring in external data, such as weather reports, can help to improve cash forecasting. This is where new concepts such as Big Data, and tools such as AI and analytics, have a role to play – though, even with these advancements, there is still a long way to go to reliably manage and consume this type of data.

ISO 20022 and data quality

ISO 20022, first introduced in 2004 as the new global standard for financial messaging, allows for the introduction of new data components – meaning far richer, structured and non-truncated information can be transmitted alongside the transaction in comparison to existing formats. This allows treasury teams to speed up the reconciliation of payments which – if prepayment was agreed with the customer – could accelerate the release of goods.

Corporates are already familiar with the ISO 20022 format as it is used in many of the batch-based or instant clearings (e.g. SEPA or SEPA Instant). Even the Corporate-to-Bank message exchange of cross-border payments and reporting offers both the legacy Swift MT messages and their ISO 20022 equivalents: the MT101 and the pain.001 for payment initiation, and the MT940 and the camt.053 for end-of-day reporting.

However, these ISO 20022 messages are not yet used to their full benefit as the clearing or interbank processing in the middle limits the information that can be exchanged this way. The ISO 20022 migration for cross-border payments in the correspondent banking space, which began in March 2023 and is set to be completed by November 2025, as well as high-value, domestic payments in jurisdictions around the world, removes this bottleneck. The greater granularity of information contained in the messages will unlock benefits for corporates, with fewer delays and better data-driven insights.

While the migration of Swift messages is only mandatory in the interbank space, the introduction of structured addresses will impact corporates. This is because to create a valid interbank payment message, banks rely heavily on corporates to provide details of their payment counterparties since banks' static data only capture details of their customers.

Today, the majority of ERP and treasury management systems (TMS) used by corporates do not currently maintain counterparty data in a way that meets the structured address requirements outlined by Swift. To give corporates time to make the necessary changes to their systems and processes, structured addresses and hybrid options will only be mandatory from November 2026 onwards (moved from the original November 2025 deadline to assist industry readiness).

Providing correct and full information is a prerequisite for frictionless and efficient (cross-border) payments. Therefore, as corporates improve the quality of their payee data, this will reduce operational errors and fraud in payment processing, which, in turn, will benefit the industry as a whole.

3.2 Real-time information

As illustrated in the previous section, treasurers are keen to better utilise their data to unlock insights and enhance financial decision making. Having access to high quality data is, however, just one part of the puzzle. For it to be leveraged effectively in a real-time treasury setup, this data needs to be available in real time as well.

In a world which is characterised by volatility, uncertainty, complexity and ambiguity, there is a growing need for treasurers to react quickly to changing conditions – and access to real-time information allows treasury to do just that. For example, delays in receiving bank balance and transaction information risk compromising the treasurer's ability to manage liquidity effectively, which can lead to higher borrowing costs or lower investment returns, and potentially create counterparty risk by leaving cash in an account overnight.[29]

Many companies, however, face the challenge of processing the information they receive in real-time. To do so, ERP and TMSs must consume the information instantaneously – yet many incumbent systems are currently still running on a night-batch and the move to real-time processing is only gradually making progress. In addition, corporate treasurers have to put the necessary processes in place to make decisions on funding, hedging or investing quickly based on this information.

At the moment, many treasurers lack visibility over what is happening today. They do cash positioning based on T-1, i.e. yesterday's information, and forecast how much they need tomorrow. To start using real-time information requires a major change in their processes and policies. This suggests there is a steep learning curve that treasurers need to undergo before using real-time.

"There are so many innovations out there which allow us to manage treasury more efficiently and make better decisions, but they all depend on real-time information exchange – whether it's the programming of payment flows or improving cashflow forecasting"

Dirk Schreiber, Head of Treasury, BioNTech

3.2.1 Role of API connectivity

The need for speed is where APIs come in. Through the dynamic exchange of data and transactions across systems, API-connectivity can provide treasurers with real-time access to information and a 24/7 service – reducing the limitations of traditional banking business hours.

By enabling the consumption of real-time information, APIs can unlock new services that would not be possible through traditional connectivity channels such as Swift, Host-to-Host and the Electronic Banking Internet Communication Standard (Ebics), which is available in several European markets. The use of APIs also extends to a range of value-added services – such as account pre-validation – that would have previously been enabled through electronic banking portals.

The ease of integration of APIs has increased for corporates as banks, TMS providers and fintechs are now providing solutions proactively (*see* Section 3.2.2: Case study: BioNTech) which means that implementing APIs is no longer a huge change initiative for corporates. What's more, more advanced banks are gradually making this easier by working with ERP and TMS providers, asking them to integrate APIs into their standard set-up as much as possible to ensure it is no longer a bespoke – and therefore more costly and time-consuming – set-up for the individual company.

Banks have a motivation for investing heavily in this area. Treasurers still look to their banks as trusted providers and, when it comes to APIs, the advantage is that banks are not just offering a service, they are providing the end product as well. For example, once a treasurer knows their cash positions through the bank's API, they can look to strategically invest it through the bank's offering as well.

To date Deutsche Bank has noted few cases where treasurers are choosing to replace existing bank connectivity with APIs. In some cases, they move straight to APIs if implementing digital bank connectivity for the first time. Many companies, however, have already built robust and reliable mechanisms to exchange data and transactions with their banks that are fit for purpose for daily activities. In these situations, API complements existing connectivity for specific activities where getting additional information in real-time is required (*see* Figure 8).[30]

> "We are constantly monitoring the progress, but we wouldn't use APIs to replace solid and robust processes, and rather look at them for add-ons to our set-up. These could be applications that increase transparency and mitigate risks with respect to bank account management. However, for us it's always important to have an agnostic approach to bank connectivity and to roll out new applications to 400 entities in 70 countries"
>
> **Jörg B. Bermüller,** Head of Cash and Risk Management, Merck KGaA

Figure 8: Use cases for API connectivity in treasury processes

- Real-time cash visibility through instant account balance retrieval
- Instant notifications for credits and debits*
- Instant payouts and refunds
- Real-time FX rates
- Payment tracking information
- Beneficiary pre-validation**
- Payouts on weekends and outside of the standard banking business hours
- Digital wallet services

* Note: In some use cases, this will also require the ERP system to be capable of real-time processing. Otherwise, the business will continue to learn from incoming payments as part of the batch reporting.

** Before corporates press send a payment, they can confirm that their beneficiary is who they say they are as well as ensure that the account details they have on record are correct, reducing time spent on payments reconciliation for incorrect or inaccurate details and helping fraud prevention.

Source: Deutsche Bank

However, APIs are not restricted just to steering treasury-processes in real-time, the technology is also an enabler for new business models described in Section 1.2: New business models. The key term here is "embedded finance", which enables companies to seamlessly integrate banking, lending, insurance, and investment services with their customer offerings through APIs.

For example, corporates could integrate a receivables financing option in their webshop or digital marketplace to allow for an early settlement of standard-term invoices. APIs allow the combination of data from various sources to evaluate risks and facilitate programme orchestration.

Case study

3.2.2 BioNTech – APIs as an enabler for real-time treasury

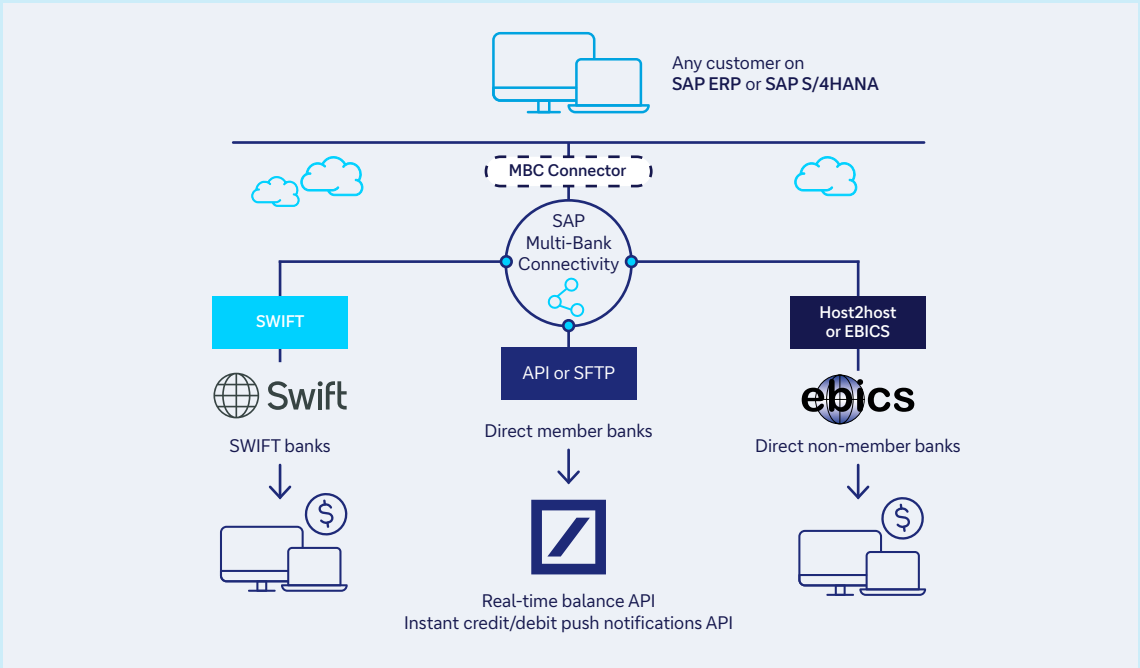
In 2023, the treasury department of BioNTech – a German biotechnology company that develops and manufactures active immunotherapies – teamed up with SAP and two of its core banking partners, Deutsche Bank and J.P. Morgan. Together, they built a connection via API though SAP's Multi-Bank Connectivity (MBC) solution.

In general, this solution provides corporates with a cloud-based channel to exchange all types of payment and cash management messages between their TMS and their banks. Traditionally, this connection was possible via Swift, Host-to-Host or Ebics. Now, BioNTech, SAP and the two banks have implemented a fourth channel, i.e. API.

Since June 2024, Deutsche Bank has provided BioNTech with real-time account balances and push notifications for credits and debits via API, which allows the treasury team to have real-time data at every point in time via its standard treasury application (*see* Figure 9). The treasury team uses this information to invest incoming funds as quickly and efficiently as possible, reports Dirk Schreiber, Head of Treasury, BioNTech. "As we are moving money between several bank accounts due to hedging and investing requirements, we sometimes have up to five settlements for three-digit million incoming payments," he explains. "In the past, we had to call the banks to see where the money had got to." Now this information is provided in real-time via BioNTech's SAP treasury system.

Going forward, the BioNTech team would like to expand the usage of the API channel to initiate instant payments and to track payment transactions via Swift gpi. Another use case via API technology that the company is considering is the pre-validation of payments to ramp up fraud prevention and improve straight-through-processing. In this case, the BioNTech treasury would be able to confirm the existence of their payment's beneficiary in real-time, ensuring key account details such as IBAN, name and account number match as well as include a sanction screening.

Figure 9: API-based communication between BioNTech and Deutsche Bank

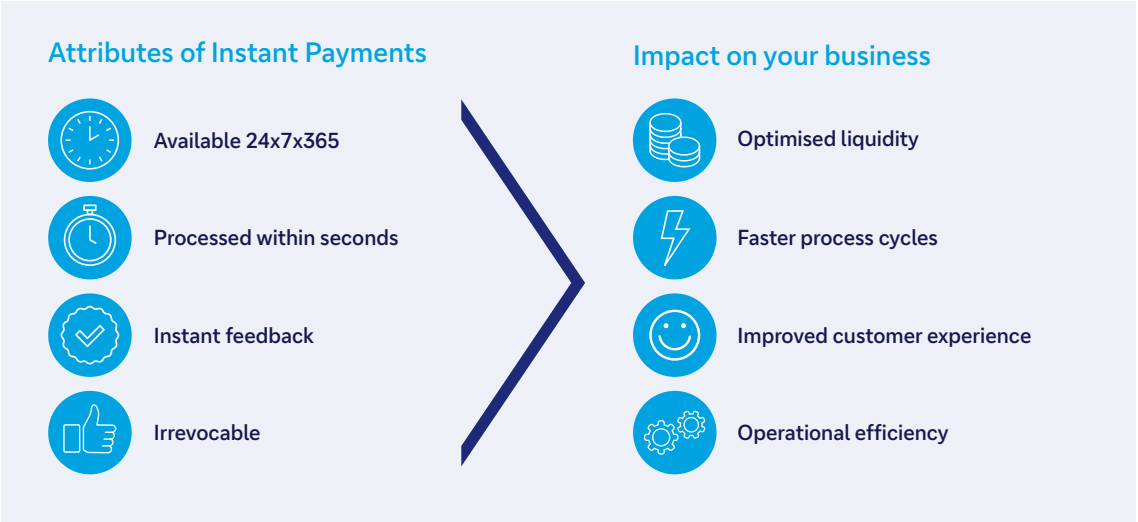


Source: Deutsche Bank

3.3 Instant payments

A major development in recent years has been the rise of instant payments, which allows users to transfer funds instantly, around the clock. This has been made possible by the introduction of regional instant payment schemes such as the UK's Faster Payments scheme and SEPA Instant Credit Transfer (SCT Inst) in the EU. Instant payment services can bring clear benefits for both businesses and consumers in terms of both efficiency and costs saved (*see* Figure 10).

Figure 10: Attributes and business impact of instant payments



Source: Deutsche Bank

There are several challenges alongside the benefits. While integrating instant payments into corporate processes is relatively easy (with reporting provided through MT940 messages), the downside is that current treasury systems, processes and policies often limits the ability of treasurers to implement real-time applications that fully leverage the benefits of instant payments (*see* Section 3.2: Real-time information).

Moreover, real-time payments offer potential for fraud. Indeed, data from the European Banking Authority reveals that fraud rates in value for instant credit transfers are about 10 times higher on average than conventional credit transfers in Europe.[31] However, it should be noted that the payment type itself is not supporting fraud. If fraud attempts – which usually address the account holder (*see* Section 1.3: Guarding against cybercrime and other financial crime) – are successful, fraudsters often use instant payments as they are settled within seconds and irrevocable, EBA states. This is why fraud prevention measures need to implement in seconds within the interfaces.

To address this issue, regulators are strengthening legislation. For example, from October 2025 onwards, financial institutions will be mandated to offer solutions that allow customers to verify the account details of the payee before initiating a transaction. Although this is part of the EU Instant Payment Regulation (*see* Section 3.3.1: EU Instant Payment Regulation), it will also be required for all SEPA credit transfers going forward.

Despite these challenges, the benefits are nevertheless driving growth. Globally, *the 2024 Prime Time for Real-Time report*, published by ACI Worldwide, found that 266.2 billion real-time payments transactions were recorded in 2023 – a year-over-year (YoY) growth of 42.2%. By 2028, real-time payments are expected to account for 27.1% of all electronic payments globally,[32] from less than 20% in 2023.

This has put significant pressure on treasury functions – especially those operating in the B2C e-commerce space – to implement the back-end capabilities needed to support incoming and outgoing payments 24/7, 365 days a year. For example, channels originally built for batch payment processing will no longer be fast enough – and systems will need to be updated with newer technologies, which can come with significant costs.

The story is slightly different for B2B companies. While instant payments have become associated with the concept of a real-time treasury, B2B business models, which often involve long payment terms, make this trend less relevant.

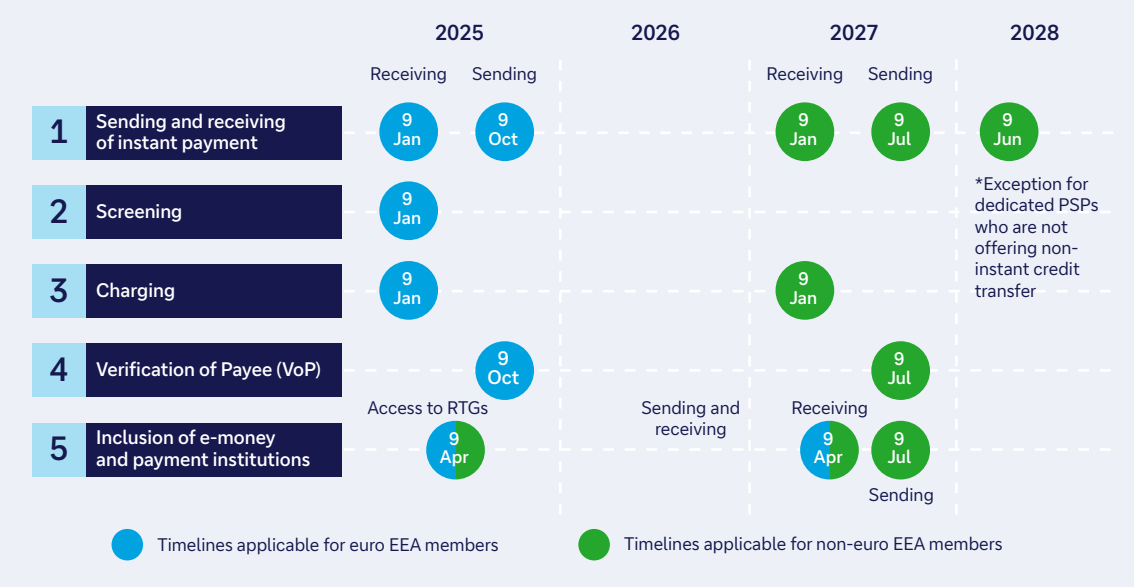
But that is not to say there are not use cases for these companies. For example, instant payments could help B2B companies avoid the early cut-off times of most ACH systems. Instant payments allow treasury to pay later in the day, move liquidity quicker and reduce the effort for short-term forecasting. The obstacle to this – and uptake among corporates in general – is that instant payment thresholds around the world generally remain relatively low. This will soon no longer be the case in Europe, where thresholds are set to be eliminated entirely by October 2025 (*see* Section 3.3.1: EU Instant Payment Regulation).

To help clients avoid the early cut-off times, Deutsche Bank enables instant payments between branches for up to €250m. But, if there is to be wider uptake of instant payments within the broader corporate ecosystem, the thresholds will need to increase or be removed entirely – as is being seen in Europe.

"If we look at real-time payments, those are hardly relevant for us as a B2B company. We have payment terms of 60 to 90 days, so it's not necessary to pay within seconds. For us, real-time payments may play a role for certain type of transactions such as M&A deals, royalty or tax payments"

Jörg B. Bermüller, Head of Cash and Risk Management, Merck KGaA

Figure 11: IPR timeline



Source: Deutsche Bank

3.3.1 EU Instant Payment Regulation

The European Union's Instant Payments Regulation (IPR), which was adopted by the European Parliament and the Council on 13 March 2024 and took effect on 8 April, is one of the biggest changes that the European payment system has ever seen. The legislation aims to address the uneven gap of access and reachability for instant payments across the EU. In Europe today, SCT Inst in euro account for about 14% of all conventional SEPA credit transfers (SCT).[33]

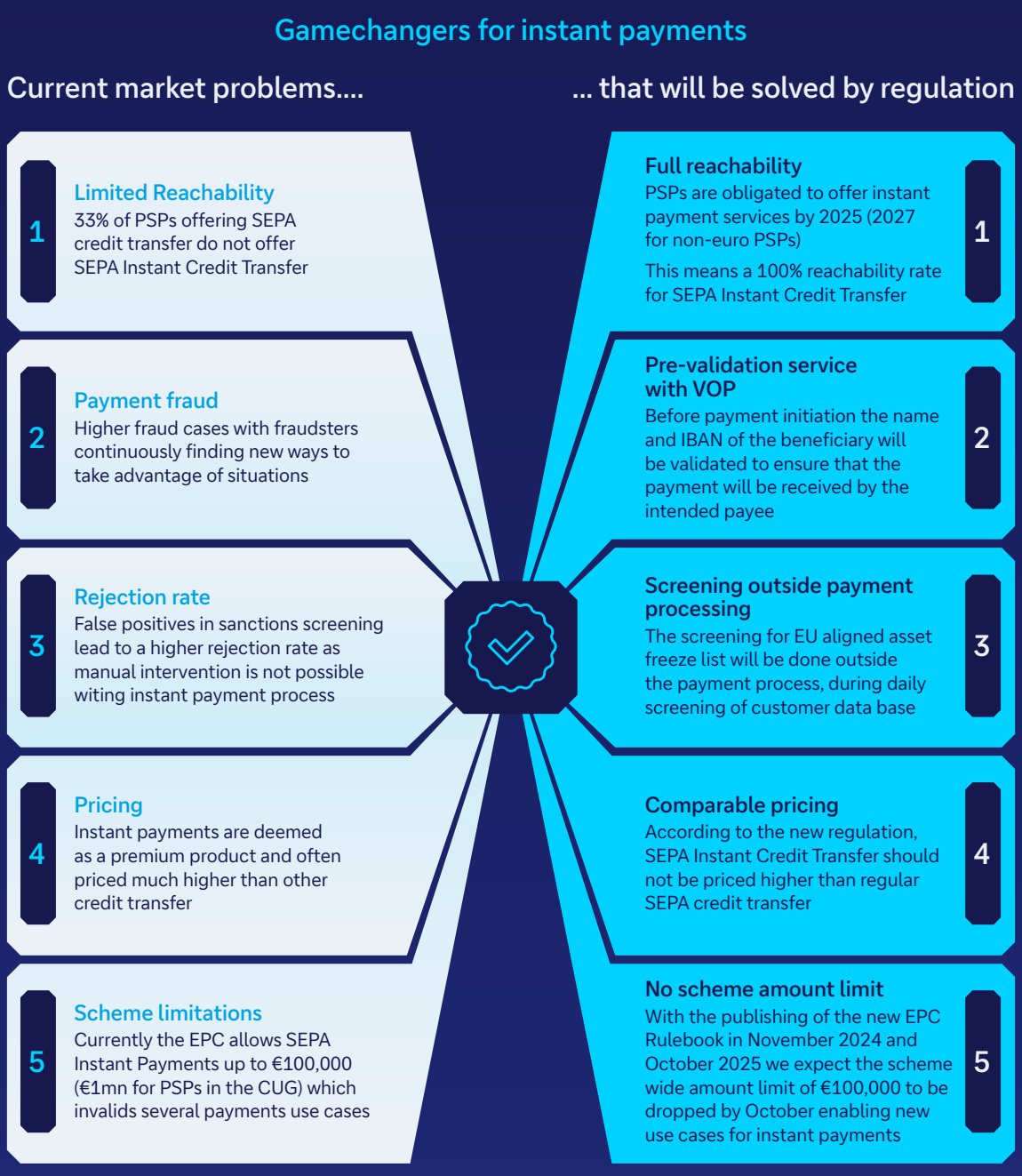
The IPR will require all PSPs to offer the option of sending and receiving payments in euro within seconds, 24/7, 365 days a year, both within the same country and also across other EU member states. The timeline for implementation is outlined in Figure 11.

The regulation will have significant implications for PSPs, as well as their customers – and while implementation will undoubtedly come with challenges, the regulation aims to fix several longstanding issues (*see* Figure 12).

Notably, the regulation makes SCT Inst the first scheme to completely lift the threshold (previously set at €100,000), which is likely to make instant payments very relevant for treasury payments within Europe. The IPR also harmonises rules and standards for instant payments, ensuring interoperability and security among different payment schemes and systems. It clarifies various consumer protection measures, such as the right to a refund in the case of an unauthorised or incorrect payment, and the obligation to inform both payer and the payee of the success or failure of the payment in real-time.

The EU's aim with this legislation is to establish instant payments as the new normal. Should it become the standard, this would also have an impact on liquidity. With an instant payment, liquidity is instantly available to a customer any time of day. While treasurers can control outgoing liquidity, they cannot avoid receiving money instantly. Therefore, corporates should prepare to conduct cash positioning over the weekend or after business hours.

Figure 12: Implications of the Instant Payment Regulation



Source: Deutsche Bank

3.3.2 Instant payments in Asia-Pacific

The Asia-Pacific (APAC) region might be seen as a pioneer in the field of instant payments. According to data from ACI Worldwide, APAC represents the biggest real-time payments market, with 185.8 billion transactions in 2023 – 24% of all electronic payments in the area. The region also has an impressive growth trajectory – and is projected to see more than 351.5 billion real-time transactions by 2028, a compound annual growth rate (CAGR) of 13.6%.[34]

There are many drivers behind this trend, including a lack of legacy infrastructure, rising smartphone penetration, favourable financial regulations and the growth of e-commerce services across the region. As a result, there are several instant payment schemes across APAC (*see* Figure 13).

Figure 13: Real-time payment schemes in Asia-Pacific

Source: Volt Real-Time Payment Map[35]

One standout example in APAC is India's real-time digital payment system, known as Unified Payment Interface (UPI). With the full backing of the Reserve Bank of India (RBI) UPI was introduced in 2016 to enable instant money transfers between bank accounts. Underlying the scheme was the aim to both modernise India's payment infrastructure and improve the country's financial inclusion. The scheme achieves this by providing a simple, cost-effective digital payment solution to anyone with a basic smartphone and bank account. The success of UPI is evidenced by data. From July 2023 to July 2024, the volume of UPI transactions rose to 14.44 billion from 9.96 billion in 2022-23 – an increase of approximately 45%.[36] Research from the World Economic Forum also estimates that UPI has saved the Indian economy approximately US$67bn since its inception.[37]

Financial regulators in the region have also started connecting instant payment networks to meet APAC-specific use cases, such as the high volume of remittance payments across certain corridors. In late 2023, for example, Singapore's PayNow linked with Malaysia's DuitNow network, after earlier forging linkages with India's UPI and Thailand's PromptPay. Around the same time, Hong Kong SAR's FPS also linked with Thailand's PromptPay.[38] These efforts also tally with the objectives of the G20 Roadmap for Enhancing Cross-border payments (*see* Section 3.3.3: Instant cross-border payments and the G20 Roadmap).

3.3.3 Instant cross-border payments and the G20 Roadmap

As of June 2023, according to World Bank research, around 100 jurisdictions already had a live faster payment system.[39] However, there are no real-time cross-currency schemes due to the complexity associated with those cross-border schemes, in particular arising from:

—Diverging regulations;

—Fragmented payment formats;

—Lack of technological alignment or standardised protocols in payment systems; and

—Unavailability of a 24/7 FX market.

Recognising the importance of efficient payment systems for global economic growth and financial inclusion, the G20 developed a Roadmap for Enhancing Cross-Border Payments (the Roadmap) – a comprehensive framework aimed at addressing the challenges associated with moving money across borders. Enhancing cross-border payments across four priority areas – improved speed, enhanced transparency, greater access and lower costs – is the aim of the Roadmap.[40]

In October 2022, the Financial Stability Board (FSB) published a prioritisation plan and engagement model for taking the Roadmap forward – identifying three interconnected themes for orienting and focusing the next phase of the Roadmap: payment system interoperability and extension (*see* Section 3.3.2: Instant payments in Asia-Pacific), legal, regulatory and supervisory frameworks and data exchange and message standards.

The implementation of the Roadmap has the potential to bring significant benefits for corporate treasurers. According to a recent survey by the European Banking Association, the top priority for corporate and commercial customers is transparency (81%), followed by cost (63%), speed (47%) and access (38%).[41]

The cross-border payments industry has often been criticised for a lack of transparency and speed, as well as high costs. However, for corporate treasurers, Swift gpi in particular, has made great strides in addressing these challenges by providing a real-time, end-to-end view of cross-border payment flows, which, in turn, is helping treasurers to improve their cash forecasting and optimise their liquidity.[42]

In terms of speed, 50% of Swift gpi payments are now credited to the end beneficiary within 30 minutes.[43] In terms of transparency, the tracker offers corporates visibility on processing fees, exchange rate costs and processing times, which allow treasurers to potentially shift cross-border payment flows to banks that offer the best service.

Despite the introduction of Swift gpi, the payment status is not consistently made available to all end clients and a small percentage of payments still encounter delays. The industry is, therefore, continuing with its transformation journey to overcome the remaining pain points and respond to changing client demands.[44]

Case study

3.3.4 How real-time treasury is changing liquidity management for PayPal

As payment transactions are moving to 24/7 and 365 days a year, liquidity management practices of corporates need to change accordingly. The business model of the long-established money transfer fintech PayPal requires receiving payments from its banking or processing partners, and then settling with its customers. The difference in settlement timelines of inflows and outflows is consequently a key factor that drives the company's liquidity management.

"Instant payments change this equation meaningfully. As they become more prevalent globally, we don't need to accommodate the traditional constraints of the legacy financial infrastructure, where banks process payments in blocks and only during workdays," explains Can Balcioglu, Vice President, Global Treasurer, PayPal. "However, in practice, we are still seeing those constraints today, and this impacts our work in treasury."

The company, for example, sees its customers requesting more real-time access to their funds – which increases liquidity outflows. So, to the extent that there is no corresponding change in settlement timelines for inflows into the PayPal platform, its liquidity needs may actually increase.

"At corporate treasury, we need to evaluate and design new processes to ensure our accounts are always funded properly," confirms Balcioglu. As a first step, his team implement changes in its liquidity forecasting models to ensure it accounts for the increased velocity of real-time payments. Secondly, as PayPal connects with domestic instant payment rails, the treasury team may in some cases need to pre-fund the bank accounts enabling payouts. "Thirdly, we are working with our banking partners to ensure that the accounts used for instant payments get access to appropriate credit lines."

4

Innovations on the horizon

With the right foundations in place, treasurers may look to build the treasury of tomorrow. But experience has taught them never to assume that the work on this front is ever complete. There will never be a revolution in treasury, only an evolution – with innovations constantly on the horizon. This section explores topics that should be on a treasurer's radar today, to enable the treasury of the day after tomorrow.

4.1 Artificial intelligence

AI is technology that allows computers and machines to replicate human intelligence and problem-solving abilities.[45] Within AI, machine learning (ML) represents a critical subset, focusing on enabling systems to learn from data and improve their performance over time without being explicitly programmed.

For several years, AI has been deployed across industries, often leveraging ML capabilities, to automate and improve specific tasks by processing large amounts of data, recognising patterns, and making decisions based on predefined rules or algorithms. For example, organisations use machine learning algorithms to work to find hidden correlations or anomalies in business processes.[46]

"The term 'AI' is used pretty freely these days, but if we are speaking about machine learning, which essentially means using statistical techniques to analyse structured data, we at PayPal have been doing that for a long time – for example, when it comes to fraud detection in our payments platform"

Can Balcioglu, Vice President, Global Treasurer, PayPal

With advancements in AI, including generative AI (GenAI), machines can now not only simulate human thought processes but also learn from existing data to generate new creations that reflect the characteristics of their source – without replicating it.[47] A popular – and now well known – example of GenAI is ChatGPT, a language model-based chatbot that gives users the ability to determine the length, format, style, level of detail and language of a conversation to match their personal requirements.[48]

Nascent uses for GenAI in financial services centre on three areas: data analysis, generating content, and customer service and support. Each of these can be utilised to improve the company's front office, operations and risk management (*see* Figure 14).

Figure 14: Nascent uses for generative AI in financial services

	1. Data analysis	2. Content generation	3. Customer service, support
Front office	**Investment analysis, research** —Evaluating patterns for active thematic investing	**Research, communications, investor relations, sales notes** —Personalised products, services and marketing —Tailored products, e.g. robo-advisers, customised reports	**Automated/augmented support** —Filtering unstructured calls, emails, chats etc, reviewing and responding directly in a human-like way (self service) or via human agents —"Autonomous finance" to anticipate and meet customers' needs and notify them of potential issues —Enhanced by including emotion recognition tools
Operations	**Process optimisation** —Analysing and optimising processes and costs —Analysing customer data, e.g. creditworthiness and loan applications by analysing multiple sources	**Coding support** —Producing sample code for prototypes (e.g. of payment systems) and testing, that developers can then refine —Streamlining extensive IT systems in multiple legacy languages	**Data retrieval** —Chatbots for employees and customers to quickly access data embedded in CRMs, policy/HR systems, databases
Risk management	**Pattern detection** —Dynamic risk assessment and prediction, e.g. non-performing loans —Spotting anomalies in data to assist with fraud detection, AML, KYC and regulatory compliance —Detecting sophisticated payment, sign-up and log-in fraud that eludes traditional rules-based systems	**Compliance reporting** —Extracting relevant information and generating compliance reports —Enhancing capabilities by creating synthetic data to refine underlying algorithms	**Monitoring** —Real-time transaction (eg settlement) monitoring —Ensuring interactions with customers are compliant

Source: Deutsche Bank Research Report – *Where's my AI revolution?*[49]

One of the most significant applications of AI in treasury management is cash flow forecasting, particularly direct forecasting. AI-driven models can analyse past client behaviour and various market variables to accurately predict when clients are likely to make payments, or predict revenues based on external factors or the upcoming sales pipeline. This feature can constantly be adapted based on data to improve the quality of forecasts over time. The advanced forecasting capability allows businesses to optimise their liquidity management, ensuring that they have the necessary funds available when needed.[50]

Take this one step further and combine it with API technology, a treasury could apply AI to process real-time data and visualise data on the timing of payment runs, analyse customer payment behaviour, automate in-house banking and virtual accounts, and create dynamic accurate cash and liquidity forecasting based on current and historic data.

Beyond improving cash flow predictions, AI can then offer treasurers valuable tools for enhancing decision-making across several key areas. For instance, AI can power sophisticated recommendation models that help treasurers make more informed and efficient funding, hedging, and investment decisions. Again, when combined with APIs, AI could help to automate the execution of these decisions. For example, within a cash pooling structure, pooled funds can be automatically invested in line with company policy into deposits or money market funds (MMFs), or FX exposures hedged.[51] These models are designed to align with a company's specific risk appetite and policy parameters, providing tailored recommendations that cater to the unique needs of the organisation.

While AI has been on the radar for a while, this has not translated into widespread implementation. So far, AI use cases are still in experimentation mode and not yet deeply integrated into treasury processes. The reason for this is twofold:

- **The nature of treasury.** The risk-adverse nature of treasury often leads to cautious adoption. For example, any model used by treasury should not be restricted to suggested actions only, but be supplemented with deep-dive explanations into what exactly drove that outcome.

- **Getting the foundations right.** It comes back to the need to have the right foundations in place first. Any AI model is only as good as the data that it is based on – so the starting point is automation, which can help to improve efficiency and data accessibility and quality.

"Treasury first needs to focus on the next level of process automation to improve efficiency, get a better grip on the data and strengthen internal controls. Without good quality financial data lakes, an AI solution is not conceivable"

François Masquelier,
Chair of the European Association of Corporate Treasurers (EACT)[52]

4.2 Digital currencies and tokenisation

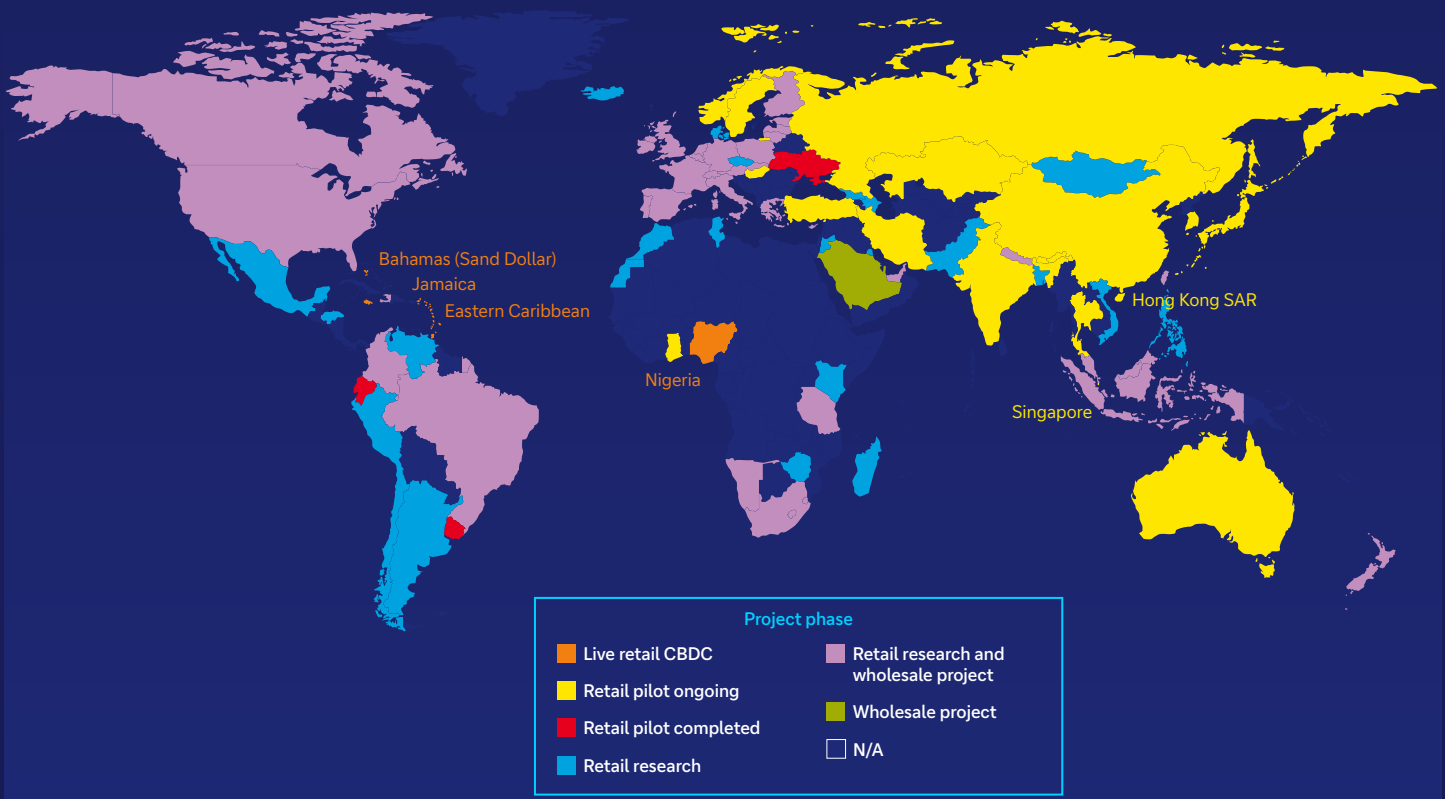
There are multiple developments underway in the digital currencies and tokenisation space. While many of these developments will likely not introduce direct impacts to treasurers in the near-term, there is considerable potential for the future.

4.2.1 Central bank digital currencies (CBDCs)

Most of the world's central banks are involved in the development of a central bank digital currency (CBDC), with individual progress varying from the actual launch of a CBDC to a feasibility study by some countries on whether to embark on a CBDC initiative.

The World Economic Forum (WEF) reported in April 2024 that globally, more than 98% of central banks are "researching, experimenting, piloting or deploying" a CBDC and by 2030 the number that have launched and gone live could reach 24.[53] A subsequent survey from the Bank for International Settlements (BIS) that covered 86 central banks found that 94% of the respondents confirmed that they were involved in some form of CBDC work in 2023.[54]

Figure 15: CBDC global heat map



Source: Deutsche Bank

There are two types of CBDC – retail (used by consumers and households in everyday transactions) and wholesale (used by financial institutions and central banks). While retail CBDC projects are far ahead of wholesale projects when it comes to actual deployments, central banks are now speeding up wholesale research. The BIS survey also found that most respondents are now working on both retail and wholesale CBDCs but the likelihood that central banks will issue a wholesale CBDC by 2030 now exceeds the likelihood that they will issue a retail CBDC.

Figure 16: The two types of CBDCs

	Retail CBDC	Wholesale CBDC
Who would use it?	A retail CBDC is intended to be used by households, firms and customers in their day-to-day transactions	A wholesale CBDC is intended to be used for transactions between financial institutions, such as banks and central banks
What is the aim of this type of CBDC?	The aim of retail CBDC is to create a digital form of central bank money that can be used by every household	The aim of wholesale projects is to make digital interbank transactions safer and more efficient
What are the primary use cases?	The primary use cases would include retail transactions and peer-to-peer transactions	The primary use cases would include interbank settlements and wholesale transactions, as well as cross-currency payments and security settlements
What would payments look like using this CBDC?	The size of retail payments would be relatively small, used in everyday transactions	This type of CBDC would serve a very similar role as reserves or settlement balances held with the relevant central bank
Who are the stakeholders?	A retail CBDC concerns consumers, firms, other forms of merchants, financial institutions as well as the central bank	It concerns a narrower set of stakeholders that already use digital central bank settlement infrastructure
Are there live examples of the CBDC?	There are currently four central banks that have issued a live retail CBDC	There are currently no live wholesale CBDCs, but there are numerous projects and experiments

Source: BIS Papers, No. 136[55]

So, what will be the impact of CBDCs on corporate treasurers? For the time being it will likely be an indirect impact given that wholesale CBDCs will be limited to the interbanking space, and retail CBDCs are generally focused on consumer payments, rather than business payments.

For example, the digital euro, which the European Central Bank (ECB) is currently exploring, will have a €3,000 limit for natural persons along with a zero-holding limit for merchants and governments.[56] Companies that accept digital euro transactions as an additional payment option, will therefore immediately and automatically, have these funds 'defunded' to their regular bank accounts at a commercial bank. "The digital euro cannot be held and used as a form of payment for corporates and merchants", explains Manuel Klein, Product Manager Blockchain Solutions and Digital Currencies, Deutsche Bank. The bank or payment service provider (PSP) that helps them to accept digital payments also needs to provide them with solutions that give the capability to accept digital euros.

In the space of wholesale CBDCs, the Eurosystem is currently exploring three different approaches to provide blockchain-based central bank money for wholesale settlement.[57] Two of those are looking into so-called 'trigger solutions' which connect existing payment systems – such as TARGET2 and Instant Payment Settlement (TIPS) – to a blockchain. They are driven by the Bundesbank and the Bank of Italy.[58] A third project would permit the Banque de France to connect its blockchain – on which wholesale CBDC tokens are issued – to other blockchain-networks that are used by market participants e.g. for bond issuances and settlements.

These projects are still in the exploration phase as of mid-2024 and the goal is to understand the benefits, risks and mechanisms. If implemented, the hope is that these solutions could help increase settlement efficiency in capital market transactions as they would allow for a Delivery-versus-Payment (DvP) approach, i.e. the simultaneous exchange of securities and cash between two parties. While this could benefit corporates in their bond transactions, the bigger lever lies in the interbank sphere. The same holds true for cross-border payments orchestrated on blockchain systems where corporates could benefit indirectly via interbank efficiency gains.

4.2.2 Tokenised deposits

Leveraging tokenised deposits – traditional bank deposits represented as digital "tokens" – banks might offer their corporate customers a more efficient way to move money via book-to-book transfers. Existing bank-centric blockchain-systems are essentially closed loop systems that can be used to move money between accounts of clients of the same bank. By using blockchain technology, restrictions of legacy payment systems, such as downtimes that prevent 24/7 availability can be overcome which enhances liquidity management for corporate treasurers. Next to 24/7 availability, the programmability features using smart contracts on blockchain infrastructures are currently in development by several banks that allow for automating cash pooling and cash sweeping based on client-defined events and triggers. Yet, this is still in the early stages of experimentation.

However, 24/7 payment processes as well as programmability capabilities are not a unique feature of blockchain technology and can also be provided by other new payment processing systems. The race is still on to determine whether banks really require blockchain-based payment infrastructures or if new, cloud- and API-based systems can also provide similar benefits.

"Tokenised deposits issued on blockchains and 24/7 payments are not as intrinsically linked as many people assume. The focus for most treasurers is not whether payment solutions are blockchain-based, it is whether they can support the concrete demand of more automated movement of liquidity on a 24/7 basis"

Manuel Klein,
Market Manager Payments and Digital Currencies, Deutsche Bank

A downside to bank-centric blockchain-systems is that the money cannot move outside of the bank's network without the support of traditional payment and settlement rails. These systems would therefore need to be connected to central bank money in some form – either via traditional real-time gross settlement systems (RTGSs) or a blockchain-based version of them that moves central bank money in tokenised form – to create a broader and more connected ecosystem for these types of transfers. Until these connections are in place, defunding from the blockchain-based accounts into regular accounts and a subsequent transfer via existing payment systems is still needed.

Hence, the success of blockchain-based payment systems also depends on whether solutions like the 'trigger solutions' from the Bundesbank or the Bank of Italy, or the wholesale CBDC token of the Banque de France – as described in the section above – will be implemented.

4.2.3 Stablecoins

Stablecoins are a digital asset that can be used to make payments. Unlike cryptoassets – a more volatile form of digital asset – the value of a stablecoin is tied to other, more stable assets.[59] However, risks remain that are associated with the adoption of stablecoins, most pressingly the need for greater transparency and regulation within the cryptocurrency and stablecoin industry.[60]

There are a number of different types of stablecoin. Notable examples include fiat-backed stablecoins, such as the USD coin, which are centralised and backed by financial assets like treasuries, bank deposits, and other high quality liquid assets (HQLA); crypto-backed stablecoins, such as dai, where crypto coins or tokens are held as collateral; and algorithmic stablecoins, such as Terra USD, which are not backed by assets (*see* Figure 17).[61]

In the context of the corporate treasury, stablecoins have the potential to provide a more efficient way to move money around the world. They can be transferred between two wallets without the need for the intermediaries that are typically involved in a cross-border transaction – helping to facilitate quick and cost-effective transactions. Stablecoins can also offer real-time settlement and 24/7 access to funds, which could support treasurers in improving the management of their cash and liquidity on multiple fronts.

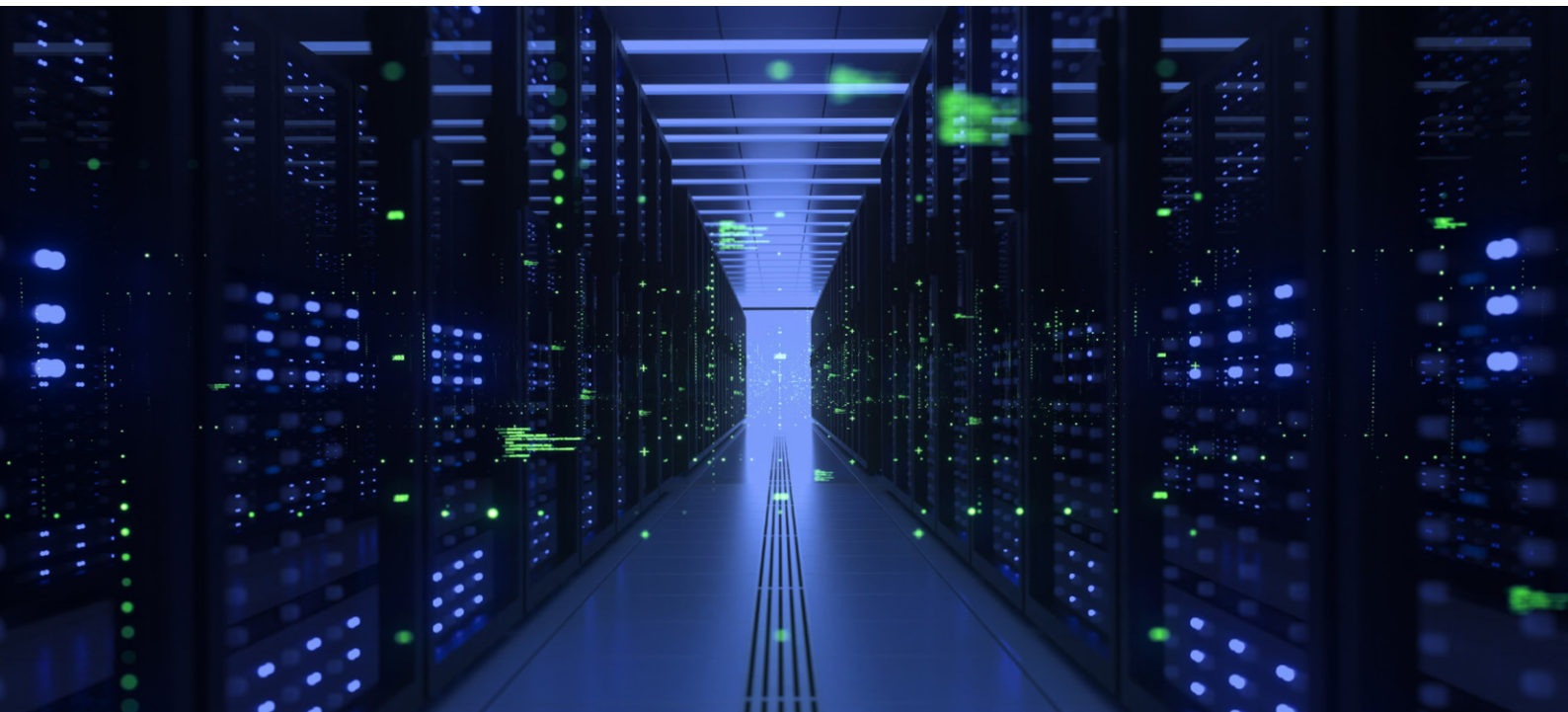
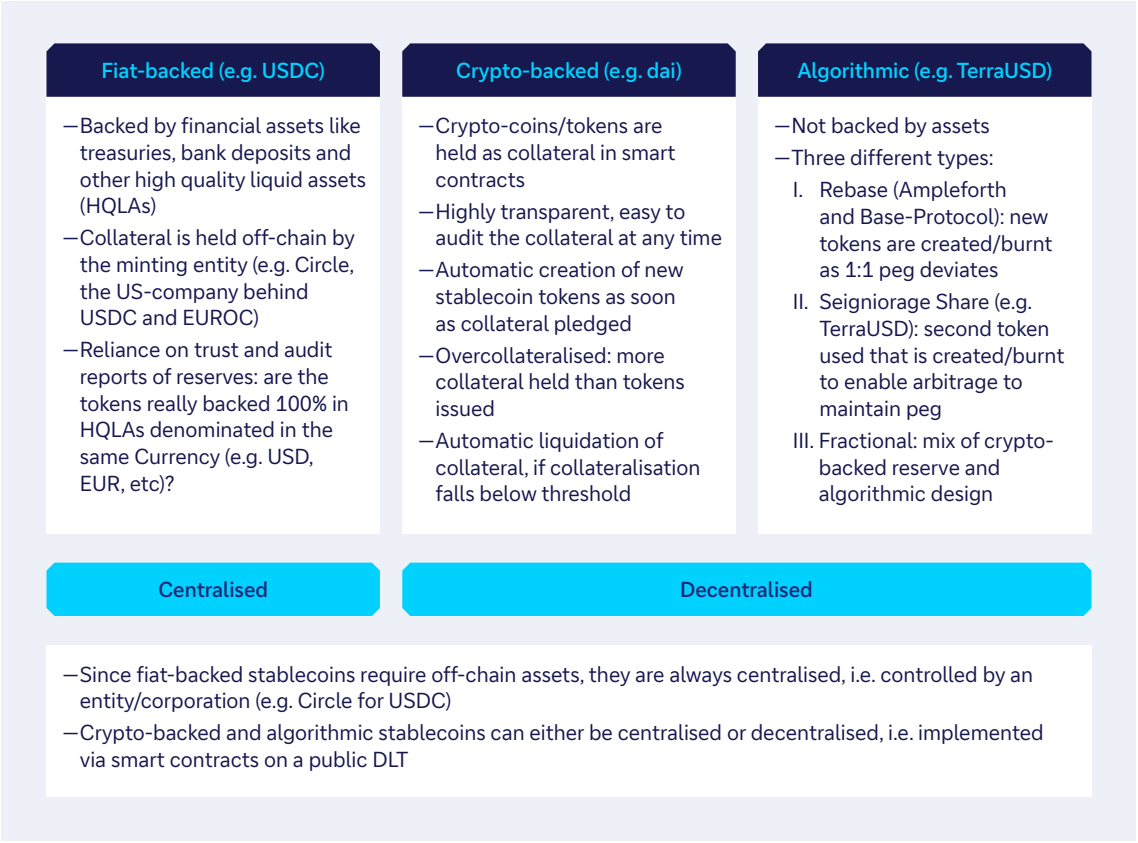


Figure 17: Different types of stablecoin[62]



Source: Deutsche Bank

However, given the lack of regulation, coupled with several high-profile examples of depegs (where a stablecoin decreases or increases in value relative to the asset it is pegged to) and crashes in recent years, the use of stablecoins is yet to be explored by corporate treasury departments at any real scale. It is likely that a level of trust will have to be built – potentially through regulatory oversight – before this form of value transfer can be used in a meaningful way.

Europe currently leads the regulatory developments of stablecoins globally by already having implemented the Markets in Crypto Asset Regulation (MiCAR) during 2024, which allows for the issuance of Euros on blockchains as electronic money tokens.[63] DWS, a separately listed subsidiary of Deutsche Bank, has entered into a joint venture with Flow Traders and Galaxy Digital to issue a fully regulated EUR-denominated e-money token.[64] It remains to be seen if this new type of money will also be used by corporate treasurers as alternative to deposits held with a bank.

5

The way forward for today's treasurer

It is clear that there is no single route forward for today's treasurer. Treasury departments are incredibly diverse, with sizes and budgets varying enormously across the industry. Where some have already implemented expansive in-house banking setups, others are yet to set up a payment factory.

Regardless of their degree of maturity, what all treasury departments have in common is a desire to improve existing processes and drive efficiencies – with one eye on the priorities of today, and the other on those of tomorrow. It means that wherever treasurers are on the journey, the following checklist can help to inform their progress:

- ✓ **Prepare, prepare, prepare.** Ensure you are fully abreast of the latest and upcoming macroeconomic trends impacting treasury priorities, with robust strategies in place to deal with the fallout of unexpected events.
- ✓ **Be a leader, not a follower.** Work with the relevant teams internally to support or lead on the evaluation and integration of new business models relevant to your business into treasury operations.
- ✓ **Centralise, automate.** Audit existing setup and processes, with a view to identifying ways that new solutions or technologies can be used to centralise treasury operations and automate routine tasks to improve operational efficiency.
- ✓ **Robust defences.** Work with relevant internal teams – such as IT, audit and shared services centres – to create robust cybersecurity defences and responses, and regularly update fraud prevention strategies.
- ✓ **Get your data in order.** Perform an audit of existing data lakes across the enterprise, identify what information would be relevant for treasury and invest in the requisite improvements to IT and treasury infrastructure to unlock access to more and higher quality data.
- ✓ **Real-time information.** Explore how technologies, such as API connectivity, can be used to get the data not only to the right place, but also at the right time.
- ✓ **Instant payments.** Review treasury's front-to-back payment flows as well as your commercial payment flows to understand where instant payments fit in today and Tomorrow's Treasury, and how this might impact the company's liquidity.
- ✓ **Eye on the future.** Investigate how GenAI and digital currencies could fundamentally change the workflows of (the day after) Tomorrow's Treasury.

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