
ACT
LEADING TREASURY PROFESSIONALS
AFP
ASSOCIATION FOR FINANCIAL PROFESSIONALS
GUIDE TO TREASURY TECHNOLOGY
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GUIDE TO TREASURY TECHNOLOGY

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Bloomberg

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Foreword

Welcome to The ACT & AFP *Guide to Treasury Technology* sponsored by Bloomberg.

Since the first AFP edition in 2011, managing treasury has become more complex in the face of global change and an increasingly uncertain market. Treasury practitioners face magnified challenges, as they try to gain more visibility and exercise more control over group activities. Treasury technology helps them to operate more efficiently and also to demonstrate compliance with ever more stringent regulation. In these more complex environments, one of the biggest challenges is to automate processes, for efficiency but also in response to the requirements of financial regulation. This helps treasury departments demonstrate control and shows they are meeting internal corporate and external rules and regulations with full security and all controls in place. At the same time, it helps to avoid treasury spending too much time on daily activity, freeing time to take on a more strategic role adding value for their companies.

Technology can help treasury play a more strategic role, automate routines and be compliant within the growing regulatory environment, all while delivering a framework within which the agreed treasury policies and procedures of the organization are embodied

This is the first joint AFP/ACT publication and it reflects the volume of technical enquiries we receive from our members. Treasury and finance professionals recognize that technology offers the opportunity to manage treasury more efficiently and effectively; and they are concerned about how to identify the most appropriate solutions for their organizations. This Guide is focused squarely on helping practitioners navigate this process to identify a cost-efficient solution. We hope this is the first of many joint initiatives between our two Associations.

We are pleased a new entrant into the TMS market has sponsored this Treasury Technology guide.

Foreword

Bloomberg is very excited to sponsor this guide for treasury and finance professionals. We believe a well-informed market place facilitates sound decision-making and empowers treasury departments to be most efficient in the specification, selection and implementation process of treasury technology.

We hope treasury and financial professionals are able to make good use of this reference book as they select the optimal technology for their companies.

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A vital contribution has been made by the sponsors of the book, Bloomberg. The unstinting support, co-ordination and advice provided by Brandon Harris and his colleagues at Bloomberg has been a crucial part of the production process.

On behalf of The ACT, The AFP and WWCP, I would like to extend our thanks to all of the above.

Guy Voizey, editor, WWCP

August 2016

Introduction

One of the biggest challenges facing today's treasurers is identifying and implementing the most appropriate technology solution to meet their organizations' needs. As in many spheres, the range of technology available to corporate treasurers has become increasingly sophisticated in recent years. Levels of functionality that were unimaginable a few years ago are now standard. As a result, understanding the most appropriate options for a treasury has become significantly more difficult.

The purpose of this book is to provide corporate treasurers, finance directors, cash managers and other treasury practitioners with an analysis of the full range of technology available to support their work. In this book, the term "treasurer" is used to refer generally to the person responsible for that task – recognizing that people with a similar role can have different job titles, depending on their employer.

The analysis has been designed to support treasury practitioners through the process of evaluating their companies' existing use of treasury technology and to identify solutions to suit their particular requirements. It does not prescribe a single "best" solution: instead the book provides a framework to support best practice in decision-making.

The book has been written to provide support to treasury practitioners to make a decision both from the perspective of someone who has never had this responsibility before and as an aide to someone who has greater experience. It is also designed to help those with oversight responsibility for treasury to understand the actual and potential role of technology in the department and in the wider business.

Structure of the book

The book is organized into two main parts: the first includes the nine main analytical chapters of the book; and the second consists of a series of reference materials to support treasurers during the selection and implementation of their preferred treasury solution.

Chapter One discusses the development of treasury technology available to corporate treasury practitioners around the world today and explains why treasurers are faced with a wide array of different technologies which can be used to support their activities.

Chapter Two identifies the key drivers which prompt treasury practitioners to review their use of technology.

Chapter Three examines the ways in which corporate treasury practitioners use technology, including an explanation of how developments in technology have allowed treasurers to alter treasury management structures. It includes an assessment of the importance of communications between the treasury and other internal departments and business units, and also between the treasury and external partners, including banks and other providers. It also assesses how technology supports the adoption of structures, including regional treasury centers and in-house banks and the provision of services such as "payment-on-behalf-of".

Chapter Four examines the different types of system and software which are available in the market. Recognizing that all systems (even within the same "category") are different, the chapters explores the core functions of types of system, how they perform their tasks and the limits to their effectiveness. The objective of this chapter is not to examine every different type of system and software. Instead, it outlines the core functions of each different type so the reader can be in a better position to evaluate a system or software against its core competitors, as well as to identify how such a solution might fit with other systems or software that may also be under consideration.

Chapter Five outlines the first stage in any technology project: an evaluation of the organization's existing technology and how it is used. It then guides the reader through the process of evaluating what the organization needs and would like a treasury solution to provide, through the development of a requirements definition.

Chapter Six reviews the key stages in any selection process. It outlines the key decisions that need to be taken during selection, and explains the key processes which can be used to help. It is drafted to reflect the requirements of a treasurer wanting to pursue a major technology project, such as the introduction of a new treasury management system, but recognizes that the stages in selection are the same (albeit simpler) for any smaller project, too.

Chapter Seven discusses the process of implementation, from agreeing the schedule of works and the contract, through detailed project planning to final implementation. It identifies the key relationships, both within and outside the organization, which need to be managed throughout the process.

Chapter Eight provides a strategy to ensure that the implemented technology continues to be used effectively. It also identifies how and when treasurers can determine whether amendments are necessary over time.

Chapter Nine identifies some of the most likely market developments over the coming years and outlines ways in which treasurers can evaluate their future suitability.

In the second part of the book, there are three main components:

- The appendix is a standalone guide to drafting a request for proposal (RFP) document, including the key elements that need to be incorporated in any such document.
- A series of country reports provide information on the use of banking standards, domestic payment systems and the use of payment and collection instruments. This section is designed to support decision-making when identifying core functionality requirements in these countries.
- Finally, there is a glossary of commonly used treasury technology terms.

Chapter One

The Development of Treasury Technology.

SUMMARY

This chapter illustrates how the technology available to treasurers has developed over the last 15 years. It starts with a brief explanation of how dedicated treasury technology was first developed and then explains how a series of factors have molded the treasury technology market into the one we see today. It highlights three points. First, the treasury technology market has matured such that many systems have similar levels of functionality. Second, it recognizes that there have been tremendous improvements in the quality of connectivity available to corporate treasury departments, notably between companies and their banks. Third, it shows how these changes enable corporate treasurers who want to take advantage of improved technology and relaxed regulatory environments to manage cash and treasury on a regional or global basis.

EXPECTATIONS OF TECHNOLOGY

There have been some dramatic changes in the use of technology over the last ten years, most notably in the consumer environment. Few areas have been untouched by the march of technology. There is an "app" for every conceivable purpose and, if there isn't, there are legions of developers capable of quickly creating one. As consumers, we have become ever more reliant on smartphones and tablets to meet a range of needs, from home entertainment to grocery shopping and making travel plans. Yet, while we have become accustomed to changing our smartphones every year or two, the hardware we use at work may be updated less frequently. This apparent gulf between our experience of technology at work and at home suggests that the development of technology in the corporate space has not kept pace.

It is certainly the case that there are some significant hurdles facing both the development and deployment of new technology in the corporate environment.

Companies are forced to have very strict technology protocols and policies to help in the battle against error and fraud, notably in the face of the growing cyberrisk. This does mean that vendors servicing the corporate market cannot always respond as quickly as developers in the consumer market. More generally, the budget constraints that continue to affect many companies mean that any deployment of new technology has to be carefully considered. The budgetary process needs to evaluate all potential benefits in the context of the resources required to achieve them. It is this process that brings the differences between the consumer and corporate experience into sharpest relief. Consumers can afford to experiment with a number of different low-cost apps to achieve their optimal solution. Corporate practitioners, especially in treasury and finance, simply cannot replicate that experience, as even a minor change to the use of technology can have widespread implications for the company as a whole. It takes time to research and build a business case for any new technology, with project planning and implementation often both time and resource-consuming.

Although there is this sharp distinction between technology deployments at work and at home, it is perhaps truer to say that developments in the consumer arena have made treasurers aware of the potential for enhancing their use of technology at work. For example, we are used to consuming technology on a variety of different platforms, such as starting a movie on a TV at home and finishing watching it on a tablet. We are also used to accessing a wide range of functions from a single device. These expectations are mirrored in the corporate world, where treasurers want the freedom to perform more of their core daily tasks from wherever they are, using whichever hardware is at hand.

Globalization and the expansion in international trade have also indirectly led to treasurers demanding greater functionality from their technology. Companies are better able to trade internationally than ever before. Many formal barriers to trade have been removed by regulators and improvements in technology have eased the challenges of cross-border communication. As companies continue to take advantage of the resulting opportunities, their financial risk profile changes. For instance, most international trade requires increased numbers of foreign exchange transactions. Therefore, treasurers need tools which can collate positions so that they can take appropriate action to measure and manage these new exposures. Operationally, risk increases, too, as companies seek out new customers and suppliers. The burden of “knowing your customer” is shifting from bank to corporation, with treasurers demanding solutions to support best practice and to demonstrate compliance with ever more stringent anti-money laundering regulations. Treasurers want solutions that can help their companies take advantage of these opportunities, while ensuring that they remain compliant with all relevant regulation.

At the same time, the treasury department is under the same budgetary pressure as the rest of the company. The opportunity to automate and centralize processes offers treasurers the chance to “do more, with less”. With careful selection of technology, treasurers can standardize processes and concentrate expertise in a small number of treasury centers. In turn, this makes it easier

for treasurers to achieve visibility over cash positions and risk exposures and to demonstrate the level of control required to satisfy corporate leadership, investors and regulators.

THE EMERGENCE OF TREASURY TECHNOLOGY

To understand the opportunities available to treasurers today, it is useful to trace the development of treasury technology. Initially, it developed in a piecemeal format, as individual developers identified ways in which a new tool could support the evolving treasury department. The treasurer's initial role was that of a record keeper, responsible, as is still the case, for managing cash so that the company could meet its various obligations as they fell due. Due to the limited technology available, it was a very time-consuming role, offering few opportunities to act in a more proactive, strategic way.

Gradually, the role of the treasurer began to change as banks and other providers started to provide different services to their corporate clients. Case in point was the provision by banks of lockbox services in the USA as a tool for their corporate clients to support the faster collection of checks. Regulatory changes have had similar impacts on the treasurer's role. The abandonment of the fixed exchange rate system by the mid-1970s required treasurers to understand and manage the company's exposure to foreign exchange risk. In different ways, these developments added complexity to the treasurer's role, as they permitted new solutions for managing cash both domestically and internationally. Changes in the global economy have also forced treasurers to explore new strategies and techniques. High inflation in the 1970s put pressure on treasurers to ensure any surplus cash was invested carefully. More recently, the removal of exchange controls allowed treasurers to manage cash realistically on a cross-border basis. The gradual reduction in trade barriers since then and the growth in emerging markets has encouraged companies to expand internationally. It is the treasurer's role to support the implementation of these strategic decisions.

There have been significant changes in terms of available technology, too. By providing clients with proprietary electronic banking terminals, banks enabled treasurers to communicate directly with them. Treasurers had the ability to initiate payments via these terminals and also the ability to collect end-of-day, and later intra-day, balance and transaction reports. As these systems were proprietary, treasurers had to manage a terminal for each cash management relationship. This resulted in better quality information being available to treasurers in their departments, but they lacked the ability to interrogate the data effectively. This was a more significant problem when a company used more than one cash management bank, as the treasurer received data on different terminals, which all had to be captured and then analyzed on paper.

Perhaps one of the most crucial developments in treasury technology was the development of spreadsheet software. Spreadsheets gave treasury practitioners the ability to interrogate and manipulate a range of data easily and inexpensively. However, because the data feeds came from different terminals and this information needed to be entered into the program manually, any use of

spreadsheets was, and remains, prone to error. The lack of an interface between the various electronic banking terminals meant that the underlying problem, of collating and analyzing data across bank accounts held with different banks, perhaps in different countries and denominated in different currencies, remained.

This early development of treasury technology set the pattern for the development of various treasury technology solutions. Much of the early functionality was developed by banks or specialist providers to meet their own requirements. Although electronic banking terminals did provide identifiable benefits for corporate users, the lack of a common standard or approach highlighted the importance of consolidating bank relationships. Other treasury solutions were developed by individuals or small companies to meet a particular need or set of needs. In the early stages, different technology providers were able to develop tools that performed some activities better than others, so there was only a limited list of core activities being provided by all system vendors. This variance in functionality reflected the difference in the nature of system providers; some were originally bank systems, while others were small systems set up by former bank employees to cover a particular treasury niche bank-provided systems concentrated on cash management, bank employees systems identified risk management as a potential gap in the market. The nature of the systems houses varied significantly, too. Some were small, niche players that concentrated on their core proposition, while others were a division of larger international systems houses with the corporate treasury division being one of a number.

The result was that, by the 1990s, there was a range of treasury technology solutions available on the market. In the USA, the market was dominated by treasury workstations, which were primarily strong on cash management. In Europe and Asia, there were a range of systems and solutions available, some with very strong risk management capabilities, for example, and others with a stronger liquidity management element. In general, though, no one system or solution was capable of providing top-quality services in all areas.

CHANGES IN THE LAST 15 YEARS

Since then, there has been a period of consolidation of the market, with larger organizations acquiring many small, one-product companies and others closing down. The fate of acquired systems varied. Some were incorporated into the portfolio of the new owner or merged into an existing product. The new owners of others tried, with varying levels of success, to migrate the acquired product's client base to an alternative product; the original product was then "closed down" and any support was withdrawn.

As a result of this period of consolidation, today's treasurers have a choice of a few global treasury management system suppliers (some of which have a single treasury management system, others have a full portfolio of systems targeted at different levels of treasury complexity), some regional suppliers (which provide the same range of products but without global support) and a small number of other vendors that provide specialist products into specific

markets. In general terms, the solutions available today can be described as "mature", in the sense that they have been well tried and tested.

As well as this consolidation, the wider market conditions have changed dramatically in three main areas: the functionality of the available technology has increased; the connectivity between banks, vendors and companies has improved markedly; and globalization has impacted companies both in terms of wanting to manage treasury (and other activity) from a small number of locations and demanding the same level of functionality for each business unit around the world.

This all has been taking place in an environment in which changing regulations continue to place extra demands on treasurers and treasury technology. Companies need to be able to demonstrate control of all their business units via auditable internal controls on system access and reporting. Changing accounting standards, notably for hedge accounting, have similarly placed significant extra demands on treasury technology. Regulations targeted at strengthening the financial system, such as EMIR and Dodd-Frank, have had significant implications for corporate treasurers. Together these developments have resulted in much higher volumes of transactions being routed through much more powerful treasury systems.

Functionality

The first major change is how the provision of services has matured across all of the major treasury technology vendors. The largest names in the industry have developed their propositions via a combination of acquisition and organic growth, such that all can now deliver the core functionality required by the corporate treasurer. Significantly, this full range of core functionality is now available to all companies. In the past, even core functionality was expensive and beyond the budget of many middle market corporations.

However, there is still room for the niche provider, with plenty of examples of software or solutions that can cope with a particular activity, such as eBAM or hedge accounting, and in a way required for specific user requirements. By focusing on a specific activity, these providers can deliver a better service than the broader-based, larger houses. These providers work hard to provide connectivity with the larger providers, with most able to "bolt on" the particular solution with limited effort, such that the niche product can effectively interface with other solutions.

Connectivity

The second major change is advancements in connectivity between corporation, vendor and banks. In the past, connectivity was perhaps the weak link. Companies could install a system or set of solutions locally and link to the banks via either a dial up or host-to-host link. Today, the development of the internet has allowed a much improved connection between these elements and made them more cost-effective to maintain. This has meant more companies have access to better information and, consequently, there is greater demand for sophisticated solutions which will support analysis.

This improved connectivity has been the key to supporting treasurers who are now under pressure to make really effective use of working capital via efficient use of cash and an appropriate acceptance of risk. It is primarily the development of the internet (and communications more generally) that has put the core functionality within reach of smaller corporations. Fifteen years ago, only the largest and best-resourced corporate treasury departments had the time and resource to buy and implement a locally hosted treasury management system. Today, technology solutions can be delivered online, with no requirement for a local installation. Companies can gain access to treasury solutions covering all their core activities within two to three months, at minimal internal resource cost.

However, this increased connectivity has exposed companies to new risks. For example, the threat posed by cyberrisk has risen quickly up corporate treasurers' agendas over the last couple of years as the implications have been better understood.

Globalization

Finally, the development of technology and the removal of many barriers to international cash management now mean it is both appropriate and advantageous to manage cash on a regional or even global basis. Regulation has changed what is permitted and technology has allowed treasurers to take advantage of this and provide full visibility of underlying data. As a result, treasurers are demanding the same level of technical functionality in all locations. For the international treasurer, domestic regulations also demand a demonstrable understanding of risk across all of the locations in which the company does business, so this functionality is a fundamental requirement.

Together, these three developments have had a significant impact on the choices available to corporate treasurers. In particular, even relative sophisticated treasury technology solutions are available without the requirement to go through a major project to install a locally hosted treasury management system. That said, companies can continue to choose an installed and hosted system, as long it is the appropriate solution for them.

At the same time, corporate treasury departments are also changing. Some have become highly centralized and operate as an in-house bank. Others have centralized policy, but continue to devolve execution to the operating companies. In almost all cases, the group treasurer needs greater visibility over cash for control and compliance reasons.

That a wide range of solutions is available to all companies is, undoubtedly, a positive development. Treasurers have greater opportunities than ever before to deploy technology that will improve the efficiency of their departments. However, the range of available solutions and the different methods of implementation mean that the challenge of making the right choice is much harder, too.

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The Evolution of the Corporate Treasurer.

The role of the corporate treasurer has evolved significantly in recent years. Where this role used to mean pure risk and cash management, especially as related to interest rate and FX risks, regulatory changes and the speed and volatility of global business today have transformed this role into something much bigger.

The corporate treasurer of today has a more strategic decision-making role and quite often a true "seat at the table", and with that increased ownership comes a long list of new tasks which fall into treasury's court.

With the more sophisticated platforms, risks, and regulations that are commonplace today, corporate treasurers are witnessing bigger demands and increasing expectations, and as a result are taking on more responsibility across a given organization.

Just how much has changed to get this seat at the table and what will the corporate treasurer role look like in the future?

Regulatory changes and volatile markets – the new normal?

Recent regulatory changes – including Basel III, Dodd-Frank, ISO Check 20022, and IRS Section 385 – have created a new and more complex environment in which corporate treasurers find themselves taking on more costs and responsibilities, especially vis a vis banks which historically took on many of these costs and tasks. This has been a result of regulations increasingly focusing on removing certain responsibilities (and asset ownership) from banks, albeit in an effort to deter future bank and broader economic crises.

Add to this the volatile markets of late and a picture of a rather taxing and complicated role for the corporate treasurer becomes quite clear.

Recent regulations have created a world where bank sales and structuring desks have reduced headcount dramatically. Whereas corporations used to be able to rely on banks having adequate manpower to support additional requests outside of dealing, today corporations can barely ask for more than simple dealing requests from banks. One prime example of the implication of this change can be seen in the fact that all hedging pre-trade analysis – a job typically conducted by the banks – now has to be conducted in-house. This dramatically increases the time needed to run a treasury team properly within a corporation.

Current regulations also stipulate against corporations being able to reward banks for their efforts. Where historically trades could be conducted "at best" as a reward for advisory work, this is no longer the case. This makes it more challenging for corporations to ask their banks to provide detailed market analysis and information as the price tag is now much higher without delivering the same value it once did.

In today's post-Dodd–Frank world, market transparency has increased significantly, creating many meaningful changes in the bank/corporate relationship. It is now possible for corporate treasury to have access to the same market pricing information as the banks – something that was never previously possible. In addition to this, trade details are publicly available for treasurers where they were previously only available to the banks. There is no doubt that corporates have been the true beneficiaries of this increased market transparency, with tighter dealing spreads and access to greater liquidity information. This does, however, add to the lengthy list of responsibilities within the corporate treasury group as corporations take on roles the banks used to play.

As it relates to credit, a monumental shift has taken place due to Basel III. Banks' appetite for financing – and ability to provide the same level of financing as in the past – has reduced significantly in recent years. This, coupled with an increased sophistication within corporate treasury and increased technology tools, has translated to widespread adoption of credit monitoring analysis by corporate treasurers – a role once reserved for credit departments within a bank. It is now possible for corporate treasurers to calculate CVA and DVA and consider this in your choice of counterparty with which to trade.

Outside factors, including the constantly changing FX markets and general market volatility, only add to the pressures felt by the corporate treasurer. As treasury's top priorities are liquidity, efficiency and controllership, this group has a true understanding of how standardization and centralization of the treasury group can lead to automation, which ultimately saves treasurers – and the company – both time and money. As treasurers are asked for more in-depth analytics and monitoring of cash and risk management, technology is helping this group adapt to all of these regulatory and external pressures.

Where do we go from here?

While there is no magic ball to tell the future, all signs point to a corporate treasurer of the future with even more responsibilities and costs. One example of this is when we will soon see banks charging for all asset class research, due to unbundling rules that are being implemented as part of MiFID II. The effect on corporate treasury departments will be that they either pay for research – increasing costs – or conduct the research themselves.

Conducting proper research internally is only a realistic option at the largest of corporates who have in-house economist departments – but where does this leave the vast majority of other corporate treasury departments? A careful combination of technology and human intelligence can help corporations remain on the front foot as the role of the corporate treasurer continues to evolve even further.

Drivers for Reviewing Technology.

SUMMARY

With the rapid changes in available technology, the increased opportunity for treasury centralization and the need for treasurers to be able to demonstrate control over activities, treasurers are reviewing how best to deploy technology in order to help them perform their various roles effectively. Given the different environments in which companies operate, the potential benefits from the deployment of a new technology solution can vary significantly. However, understanding that potential improvements such a deployment can help to deliver is an important early step in any technology project. This chapter outlines some of the key drivers that are encouraging treasury practitioners to review their use of technology.

BUDGETARY PRESSURE

One of the most powerful drivers to encourage treasurers to review how technology is used is being able to improve operational efficiency. As with all other departments, treasurers are under pressure to reduce their operational budgets. An effective deployment of technology can enable treasurers to reduce "headcount" within their departments, while simultaneously cutting the cost of processing transactions through both automation and the elimination of many manual errors. In treasury, there are three key areas where technology can improve operational efficiency: the capture and collation of information; the reduction of manual intervention; and providing the opportunity for proactive management.

To capture and collate information

Treasurers rely on accurate and timely data to make effective decisions. In any organization, obtaining good-quality information can be difficult, especially

when it has to be sourced from different locations. In the most complex treasury departments, this challenge can be even greater as there can be a need to capture data denominated in different currencies from hundreds of subsidiaries in different countries around the world.

There are many different ways technology can support this collation process:

- Collating data from internal systems
  Technology can allow treasurers to collate relevant data from different systems used within their organizations to help develop cash forecasting techniques. For example, subsidiaries will know how quickly their core customers pay, and they will also record whenever they offer a discount to customers for accelerated payment. Using technology to identify and collate such information will help to improve the accuracy of forecasts, with improved consequences for working capital requirements.

- Collating data from different banks
  Improvements in electronic banking capabilities mean that it has become easier for treasurers to collate data from different banks.

- Identify and manage financial risks
  Solutions are available that allow a treasurer to aggregate transaction and balance reports from multiple banks into a single position. This makes exposure measurement and risk management easier and more accurate, again, reducing operational costs.

  Treasurers can choose to automate certain hedging decisions; foreign exchange exposures can be managed this way.

- Price discovery
  Where a transaction is not automated, such as via the use of an overnight sweep of surplus cash, treasurers can employ technology to discover prices. For example, instead of having to phone a number of different counterparty banks and investment managers when placing overnight cash, treasury practitioners can discover prices simply by accessing a portal.

  This does not apply to all transactions. There are still circumstances where the personal intervention of a treasury practitioner is required, such as when a company has a large amount of surplus cash to place or a significant foreign exchange position to hedge.

To reduce manual intervention

As many financial products have become more commoditized over recent years, technology has been increasingly used to eliminate a significant degree of manual involvement in transaction processing. This comes from two developments. First, ever more transactions can be processed “straight through”, so there is no need to have manual intervention unless something goes wrong. Second, by eliminating manual intervention, companies are also reducing the risk of error and fraud, which is elevated at the point of manual intervention. Using technology does not eliminate the risk of error and fraud, so other checks need to be put in place to protect against that.

To allow treasurers to become proactive

Finally, because technology reduces the need to spend time on routine activities, it allows treasury practitioners to respond proactively to particular events and to focus on more strategic projects, which can add value to the company as a whole. For example, this additional time might allow the treasurer to review processes and practices and to make them more efficient. More generally, the adoption of new technology can be a catalyst to review business processes to ensure they are as efficient as possible. Some activities are done in a particular way because "that is how they have always been done" or because the functionality of an existing technology solution dictates it. Reviewing technology allows these processes to be changed.

CASE STUDY

Using Treasury Technology to Support the Wider Business

Fast-growing companies can often find themselves outgrowing their original technology solutions. Initially, they can cope by managing many activities in a number of different spreadsheets. As the companies expand, manipulation of the spreadsheets demands ever increasing levels of manual intervention and the risk of error rises. As the volume of transactions grows, these companies realize they need to process transactions more efficiently.

One such company is an alternative lender which sees significant variances in its clients' daily cash movements (both outgoing and incoming). Its management initiated a technology project with the aim of achieving more visibility of cash and better forecasts, especially immediate short-term forecasts, and, through them, obtaining greater visibility over the company's borrowers' needs.

The CFO decided to implement the Bloomberg solution as it met the company's primary objectives. One advantage is that the solution provides an automated workflow for a range of key daily processes, such as the generation of accounting entries. Because the company was adopting a treasury management system for the first time, it immediately achieved both better control of processes in cash management and a reduction in the risk associated with input errors. The solution also provides with more timely information, as the company's banks can now provide data in an available and accessible format by 4am each day.

There were few surprises during implementation, although some elements have taken slightly longer than expected. For example, the company had to coordinate with its banks to get them to deliver files in a particular format for the new solution. Because one of the banks was not providing information with sufficient detail in the description field (they were providing 20 rather than the necessary 40 to 50 characters), the CFO had to go back to the banking partner to ask them to make the change.

Having access to better information in treasury has also allowed the company to extend its services to its clients. As part of their loan applications, potential borrowers have to provide a detailed cash flow forecast. The lender's finance team can then use the functionality in the treasury solution to consolidate those forecasts and track borrower accuracy. In the past, each portfolio manager would

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have had this information, but the data is now available centrally, giving the CFO more visibility and transparency over borrowers' activities. In addition, the lender now has the ability and opportunity to discuss their clients' forecasting with them, in the same way a central treasury interacts with its group subsidiaries.

This has paid dividends. This transparency of information is critical as the CFO can track borrowers' forecasts against actuals on a consistent basis. This is valuable because, in any stress scenario, the financial side of a company isn't usually performing as well as it could be. This data is then shared with the borrowers, forcing them to think about their own cash flow and to effect internal changes.

Implementing a treasury management solution has allowed the lender to meet its objectives in a cost-effective way. In addition, having access to better customer data also gives the portfolio managers the opportunity to extend the level of the service they provide to their clients. This improves the customer experience while also allowing the CFO to understand and manage cash and risk more effectively.

THE NEED TO EXERCISE AND DEMONSTRATE CONTROL

Allied to this increased efficiency is the opportunity to exercise greater control over group activities. Most technology solutions support the segregation of duties and ensure individuals can only perform actions they are qualified and experienced to do. The solutions can embed limits and workflows in the systems so that authorities cannot be exceeded and so that transactions above specified limits must be separately initiated and approved. The technology can also capture the details of a transaction. This can include: the details of any quotes sought; the position being covered; the people who initiated, authorized and approved the deal; confirmation and matching; and post-trade reconciliations. This information will be recorded as an auditable trail and can then be reviewed when assessing individuals' performances and when checking for error and fraud. Finally, technology solutions will also generate reports in a format that can be captured by the group general ledger and accounting platforms.

THE ABILITY TO CENTRALIZE TREASURY

Together, these developments mean it is possible, and increasingly common, for treasury activity to be centralized to some degree. First, improved access to information and visibility of cash means group treasury can be more explicit in terms of the strategy, policy and procedure followed by all group entities. So, for example, treasury may insist on group entities adopting certain technologies and working with particular partner banks so that the data is captured locally in a format that permits the data to be collated and viewed centrally. Achieving a common standard is a key driver in many technology projects as companies have to move from a variety of platforms which might have been in place when control was exercised locally.

Second, treasurers may also take advantage of improved technology to centralize processing. The introduction of an in-house bank, for example, is only possible if a company has a treasury technology platform capable of recording and processing the types of transactions required.

It is important to recognize that there can be some major differences in technology installations as companies centralize control over a number of group entities. This clearly will apply when a company grows through acquisition, although it can also apply when the company includes several group entities that operate independently. Where a company has no previous experience of treasury-specific technology, any centralization project is likely to be complicated by the need to transform a variety of local processes which can often differ in small but significant ways. For example, processes to capture data will need to be standardized.

Where there is a more substantial merger, treasurers can find they need to integrate departments operating on different treasury management systems. This in itself is a significant project as it is likely to require a complete system selection process similar to those which will have taken place in each prior organization to choose the current installations. In most cases, the new integrated team will likely choose one or other of the installed systems – but there will be challenges to overcome when integrating. Even where a company has the same system, it is not unusual to find different instances installed and for these instances to be at least partially incompatible, possibly as a result of previous customizations.

This process of centralization is happening today in an increasingly globalized environment. Technology change is one of two key factors (the other being regulatory change) that has made it realistic for many companies to integrate operations into one global center or a series of regional treasury management centers. In the past, these twin barriers meant that much treasury activity was performed on an in-country level with only very specific activities managed from group headquarters. For example, liquidity management was often localized with central treasury only calling for the repatriation of operating surpluses perhaps via the operation of an overlay liquidity management structure. Similarly, group entities might have been funded from the center, but only where there were protections against the impact of exchange controls. Again, this might have taken place through the operation of an overlay structure.

Today, it is increasingly possible to manage much of the treasury activity remotely from a shared service center or via a regional treasury center. Using more than one regional center also allows the treasury to streamline processes and exercise greater control, while being able to operate with minimal downtime in closing out daily files (which can become a problem when operating from one global location).

As companies centralize, they also seek to take full advantage of their investments. So, for example, instead of treasury being focused solely on group

treasury payments and other transactions, the treasury team is increasingly involved along more of the financial supply chain. Due to the commoditization and the aggregation of payments, regular AP and AR payments are being treated more like treasury payments from the perspective of value and timing. Regulatory change also means it is easier to take advantage of opportunities to process payments centrally "on behalf of" group entities in a number of locations.

It would be a mistake, too, to think of centralization and globalization as something only large corporations can cope with. The development of the internet, the commoditization of payments and the reduction in trade barriers means that it is increasingly possible for even micro-businesses to trade internationally.

COPING WITH THE REPLACEMENT OF EXISTING TECHNOLOGIES

Some treasurers have to look for new technology solutions when their existing providers replace or stop supporting an existing product. In today's interconnected environment, having a software solution that is no longer updated with security patches represents a major risk for the company as a whole. In addition, where an organization uses a number of different technologies from different providers, there is a constant need to ensure patches and interfaces between systems work as they are designed to do. If one provider changes its solution, previously efficient interfaces may simply cease to work or cause errors. In these circumstances, treasurers have to review whether it continues to be cost-effective and operationally effective to build and maintain interfaces. If not, they may need to adopt a more appropriate solution.

> Just because one particular system is good at what it does, does not mean that system is the ideal one for the company. Individual systems have to be considered in the wider context of the company's overall technology provision. In many cases, the preferable technology solution will not be a series of best-of-breed systems, as there will be an over-reliance on the necessary interfaces to ensure they all work effectively together. Instead, the more appropriate deployment of technology might rely on one or two systems which provide sufficient, albeit not ideal, functionality across the board, minimizing the need for specialist interfaces.

COMPLIANCE WITH REGULATION

Changing regulation has become an increasing concern for treasurers, especially as their organizations expand into different jurisdictions. While the trend over the last 25 years in terms of regulation has been broadly positive, some of these benefits have not been realized as regulators and legislators focus on the prevention of terrorist financing and money laundering and on strengthening the financial system.

There are two competing impacts from regulation. First, the relaxation of trade regulations and barriers has made it easier to trade cross-border. When tariffs are lowered, it becomes easier to compete with local products. It also applies when countries apply fewer exchange controls so that, for example, it is easier to fund operations in a new country and there are fewer requirements to provide documentary support for payments. As companies seek to take advantage of these opportunities, banks and other third parties develop products to support them. For example, there has been a series of developments to support the delivery of cross-border multibank functionality cash and liquidity solutions, including SWIFT's decision to open its network to corporate access. In Europe, the SEPA project was specifically designed to make cross-border transactions easier.

At the same time, however, regulation has also placed a number of more stringent requirements on corporate treasurers. Domestically, many governments are under increasing budgetary pressure both as a result of the recent economic recession and also because of the impact of their ageing populations. As such, they have identified a number of different ways to ensure business pays the appropriate level of tax, which has increased the burden of regulation. Some countries rely on reporting and information sharing. For example, the US FATCA and FBAR legislation has been followed by a broader international agreement to share information between other governments. Technology can be deployed to help treasurers meet requirements. It can help with record-keeping: one of the ways companies can defend themselves against allegations of tax avoidance is by showing a consistent application of rules regarding interest and capital structure, such that interest rates are applied at arm's length. Solutions are available which not only record the payments, but also calculate the correct rates and automate their payment and collection. Where there is a reporting requirement, the technology can generate reports to ensure compliance.

Measures taken by governments to ensure financial stability beyond the formal banking system have also had an impact on corporate treasurers, especially in terms of derivatives trading. Again, technology can be deployed to ensure hedging policy is applied consistently and then to record all hedging transactions so that, for example, the company can ensure it can take advantage of any corporate hedging exemptions for reporting under EMIR or Dodd–Frank. Some solutions provide workflows to ensure that companies comply with the various rules and ensure reports are prepared and filed on time without the requirement for too much additional resource to be diverted towards compliance.

Finally, companies also need to be able to demonstrate that their businesses do not transact with criminals or terrorists. Regulations vary around the world but the principles follow international FATF rules, which place record-keeping at the center of all payment processing. Much of the burden of compliance with anti-money laundering regulations has historically fallen on banks, but, over recent years, corporates have been increasingly made responsible for demonstrating the legality of payments. For a centralized global treasury, in particular, this can

be a significant challenge because not only is central treasury responsible for more transactions, but also the counterparties can be more remotely located. Technology can help by collating information about counterparties and also creating an auditable trail of actions, so that companies can demonstrate compliance. Note that even where responsibility is decentralized, a central treasury team may still need to be able to demonstrate their knowledge of group entities' counterparties.

MANAGING CYBERRISK

Ensuring the treasury can take full advantage of the opportunities to achieve straight through processing and other efficiencies, while protecting the organization from the threat of cyberrisk, has become a major focus for corporate treasurers over recent years. A number of high-profile breaches in security have both highlighted the risks and hit the reputations of the affected companies.

Achieving a high level of security from existing or new technology solutions is an important objective for all treasury practitioners. As with other activities, ensuring a clear and appropriate segregation of duties is an important first step. Most technology solutions incorporate some form of workflow management which controls access to data and determines individual authorization limits. When interacting externally, treasurers also need to be confident that all inbound and outbound data flows are free from tampering via the use of digital signatures and encryption. System audit trails should always be used to reconcile activities as regularly and as frequently as possible.

REGULAR REVIEW PROCESS AS BEST PRACTICE

Finally, the deployment of existing treasury technology should be subject to a regular review process. Technology should be reviewed every two or three years to ensure its use and functionality remains appropriate. It should also be reviewed in concert with any key corporate events, such as mergers or divestments. This review process could be limited to ensuring any existing technology is being used as efficiently as possible so that, for example, all relevant available functionality is deployed. The company may have changed enough since the last review that a previously rejected module or solution might now be relevant. Similarly, the systems vendor will have enhanced their solutions. If circumstances permit, the review process could be wider in scope to encompass a review of the market as a whole.

What is the Purpose of Technology?

SUMMARY

This chapter identifies the core roles of the treasury department and illustrates how treasury structure can affect the use of technology. When assessing a deployment of technology, treasurers need to determine their requirements of the technology. This chapter includes a series of questions to help treasurers clarify their existing operations and also identify how structures and processes might change with the adoption of new technology.

WHAT TO EXPECT FROM TECHNOLOGY

In order to achieve an appropriate mix of treasury technology to support the company's treasury and wider finance operations, it requires a practitioner who understand the limits of that technology's functionality. No technology can be expected to do something that it has not been designed to do (although it is quite common for technology to be adapted to do so).

More importantly, technology cannot replace the strategic thinking, and policy and procedure design, which has to take place within the corporate treasury department in consultation with colleagues and superiors. Most treasury technology providers have already done so for their users; there will be workflows embedded in many systems, which can be amended by the company on installation or deployment. However, treasurers should think about the workflows and make sure that they are appropriate for their companies. In particular, they need to understand these workflows and ensure they match the desired workflows for their own companies, especially with respect to approvals and segregation of duties. It may well be appropriate to alter procedures to accommodate some of this workflow, often because some internal procedures become inappropriate or less than optimal over time as they are altered to reflect personnel or structural changes. The implementation of a new software solution

is a good opportunity to revisit certain procedures. That said, each company will have different requirements and the embedded workflows may not offer sufficient protection for those companies which choose to (or have the opportunity to) introduce greater levels of segregation or controls than the market benchmark (which treasury technology providers are going to try to match).

Given that, treasurers also need to understand where technology can sit within their organizations and how it can be used to improve the efficiency and effectiveness of the department's activities.

What is the role of treasury?

To be able to do this effectively, treasurers need to think carefully about:

- the roles treasury currently performs;
- how it might be changed as a result of a new technology installation; and
- how treasury might need to develop within the lifespan of any new technology installation (although it is not completely possible to anticipate future developments, as some anticipated changes will never materialize and some unanticipated changes will also appear). Whenever a treasurer is developing a business case for a technology project, it will be much stronger if the treasurer can be confident that the investment is going to be scalable and not need additional funds in the short term.

It is critical to understand the role of the treasury department before trying to identify the most appropriate technology solution to support its work. Although every treasury department is slightly different, most departments will have responsibility for at least the core areas of treasury.

The treasury department's core role is fourfold:

- to ensure the right amount of cash is in the right place, in the right currency, and at the right time to meet the company's obligations as they fall due. This will include ensuring an efficient liquidity management structure is in place, and access to adequate short-term and long-term funding;
- to measure and manage exposure to a wide range of financial and operational risks faced by the company. This might be direct responsibility to manage exposure to financial risk (for example, the impact of a change in interest rates on the group) or as a source of advice for group entities seeking to manage other sources of risk (for example, the impact of a change in commodity prices on sales figures). This will also include the provision of information and advice to senior management when they set group risk strategy;
- to achieve and demonstrate compliance with all relevant regulations in all jurisdictions in which the company operates and to ensure regular reporting to all internal and external stakeholders; and
- to add value to the company as a whole, through cost control and by giving strategic advice to senior management and as a source of advice to other group entities (perhaps by supporting hedging activities, capital structure or other risk management-related activities).

Functions

Generally, the treasury department has four main functions:

- **Front office**
  Broadly, the front office is responsible for internal and external dealing and for pricing and decision support.

- **Cash management**
  The cash management group will be responsible for all aspects of group cash management from forecasting, to liquidity management and bank account management. The degree to which the group is active in cash management will depend on the level of centralization of cash management within the group.

- **Risk and position management (sometimes referred to as middle office)**
  The group's risk management approach will vary but will typically include financial risk (including foreign exchange and interest rate risk) management. Depending on the approach to risk management, this may include scenario analysis and benchmarking. The middle office role may also be responsible for the management of counterparty risk and limits management.

- **Treasury operations**
  Sometimes also referred to as the back office, this section is concerned with the process of deals and transactions made by the department. It will include managing confirmations and settlement and, in some cases, accounting. It may also be responsible for managing communications with group entities, especially where treasury activity is performed locally.

The precise division of functions within treasury departments will vary according to the nature of the company, the level of centralization and the resources (most importantly, staff members) available to the treasurer. One or more of these functions may be combined (the first two and the second two often go together). At the same time, the treasurer will want to preserve the segregation of duties to protect against fraud and error. In some companies, smaller treasury may be supported by members of other departments to ensure appropriate segregation of duties.

The treasury may have additional responsibilities to the core functions highlighted above. These commonly include tax, but the division of responsibilities will depend on the nature of the company's activities and the resources available to it.

One of the most significant developments over the last 20 years has been the increased ability to manage activities across wider geographic areas. Until relatively recently, companies had little realistic choice about the way they structured international treasury activities. A combination of regulation and communications meant that managing cross-border treasury activity from one location was impractical. While companies may not have decided to maintain a full treasury operation in every location, the local finance manager or in-country treasurer would have had a significant amount of responsibility for managing day-to-day treasury activities.

Today's corporate treasurer has much greater flexibility over the way the international treasury department is structured and located. Regulation still plays an important role, especially in areas such as payment collection, liquidity management and profit repatriation. However, it is possible for companies to manage almost the full range of cash and treasury management activities from a single global treasury center or a series of regional treasury centers. The development of internet and mobile communications also means these activities can be managed from wherever the treasurer happens to be and from a range of different devices. The challenge for the corporate treasurer is to determine the extent to which that degree of centralization is appropriate given both the culture and the nature of the activities of the company and the legal structure of the entities for which the treasury department will manage cash.

Whether treasury activity is concentrated at the center or performed at regional or business unit level, the quality of communication between these various locations is critical to the efficient operation of the treasury function.

There is no single "perfect" treasury structure. The most common forms of treasury structure all pose different challenges in the pursuit of efficiency. A critical decision for any treasurer seeking to maximize efficiency is to determine whether to work to improve the operations of the existing structure or whether to try to change the underlying structure to achieve efficiency.

Group structure

Clearly, the overall group structure will have an impact on the provision of treasury services, but there are no hard and fast rules to be adopted. Even within the structure, there is a separate debate over the relative roles of a centralized treasury department and local treasury or cash management teams. Just because a company has a centralized treasury, it does not follow that the central treasury team has to perform every treasury function. Some corporations operate highly centralized group structures with decision-making tightly controlled at the center. Others operate highly decentralized structures with group entities determining the majority of the day-to-day decisions. In reality, most corporations operate somewhere between these two extremes, although there has been a tendency towards more centralized awareness (if not control) as groups have been required to demonstrate their control under a range of corporate governance legislation.

This group structure will have an impact on the existing deployment of technology. It is critical that, before embarking on any new technology project, the treasurer understands the actual functionality of all the relevant systems used by the wider business. Where there are multiple instances of different systems, the treasurer must also understand how data flows between them and who maintains any interfaces.

There are a number of key questions for the treasurer to consider. These will help clarify the existing operations (notably any differences between designed and actual procedures). They will also help the treasurer plan the policy objectives and ideal procedures to be in place after the deployment of new technology. When reviewing these questions, the treasurer should consider how

technology currently supports the treasury's activities and how improvements can be made. This applies whether the company currently uses a treasury management system, the treasury module of an ERP system or another solution.

- To what extent does central treasury set the policies and procedures for business units and other group entities to follow?
- Where treasury decisions are decentralized, and what role does central treasury play? Does it manage treasury activity at group level, act as a transaction center for the business units (where the business units are not required to transact with the center) or simply as a source of advice and expertise for the personnel within the business units seeking to manage their own affairs?
- Where are these policies and procedures executed? Where execution is centralized, to what extent do group entities have relationships with third parties? For example, are they permitted to open bank accounts locally and, if so, for what purpose?
- Where execution is centralized, how is this organized and where are any treasury centers located? Some companies manage all treasury activities from a group treasury located at corporate headquarters. Others have a single global treasury center to execute all treasury activity (or a single center for all entities based outside the company's home jurisdiction).

  Where companies have a series of regional treasury centers in various locations around the world (for example, one each in the Americas, Europe and Asia), managing communications between them, the business units and group treasury will be more complex.

  The range of functions performed by the global treasury center will depend on the nature of the group's activities, regulatory requirements, the location of the center and the degree of compulsion which the group can impose on the business units.
- Are there any locations where it is necessary or appropriate to maintain a local treasury team? It can be necessary if a country applies exchange controls. Sometimes, the corporate leadership decides to retain an in-country treasury presence, either to be able to make acquisitions or to prepare entities for divestment or to maintain a relationship with local regulators in a core strategic location.

  The group treasurer will still need to be able to demonstrate control, which requires access to information. A local cash management center may still require central approval for large size payments, investments or other transactions. The technology needs to be in place to permit this. A second challenge is for the central treasury to be able to provide support for other activities, such as risk management or external borrowing, which are not performed locally. Again, to be effective, the central treasury will need accurate and timely information.
- Are any treasury-related activities performed by the business units? Even in the most centralized companies, treasury will require some information from the business units to support activities such as cash forecasting.

Although some companies have fully automated cash flow forecasts, most require business units to enter data on a regular basis to keep the forecasts updated. The treasurer has to be able to evaluate the accuracy and completeness of the data before generating the enterprise-wide cash flow forecast. Technology plays an important role in this process, as the easier it is for the business units to submit the data and the more likely they are to use the tool for their own strategic purposes, the more complete and accurate that data will be.

In some locations, the business units may perform most or all of the treasury roles. In these circumstances, the central treasury may act as an outsourced provider of treasury services. This requires the business unit to be able to communicate clearly and in a timely fashion with central treasury, so that it can manage risk or perform the other tasks asked of it. The central treasury may also advise the entity how to manage its own exposures.

- Does the company operate shared services centers? If so, to what extent are they under the control, or influence, of group treasury? There is certainly a case for treasurers becoming more involved in both aspects (understanding the disbursement requirement and improving the collection of cash can both improve a company's use of working capital). Where a company operates shared services centers, the information generated by these entities needs to be captured by the treasury department.

- If the company does operate shared services centers, what treasury-related activities do they perform?

  - **Payment factory**

    One of the most common forms of shared services center is the payment factory. A payment factory acts as an agent for processing payments initiated by group entities. Participating group entities are able to initiate payments by sending instructions to the payments factory. These can be initiated in a variety of ways including via a dedicated module of a treasury management system, via a web or other interface or via an upload of a payment file. The payments factory will then ensure all submitted payments are valid (querying or repairing any invalid payments) before generating bulk payment files which it submits to the relevant banks for settlement. The payments factory manages the reconciliation messages received from the banks and generates the appropriate accounting entries for the participating entities.

  - **Payments and collections factory**

    A payments and collections factory (PCF) processes both outgoing and incoming payments on behalf of participating group entities. As well as performing the tasks outlined above, the PCF will aggregate collections data received from banks on behalf of participating group entities. As with payments, collections contain a range of additional information, such as the identity of the customer, the purchase order and other sales management information. It is vital that the collections element can capture this data and forward it to the group entities to support their sales activities.

- **"On behalf of" structure**
  More recently, some companies have started to use group treasury, or a new entity established by group treasury, to make payments and/or manage collections on behalf of group entities.

- Does the treasury operate as an in-house bank?
  The principle of the operation of an in-house bank is fairly straightforward. All participating group entities (some entities may not be able to participate because of local regulation, others may not be able to because of joint venture arrangements or preparations for divestment) hold bank accounts with the group treasury which arranges internal and external payments on behalf of those entities and uses these internal bank accounts to manage group liquidity as efficiently as possible.
  In the extreme position, group entities hold no external bank accounts at all – all payments are processed through bank accounts held in their name by the in-house bank. Whether this is practical depends on a range of issues, including the status of the bank accounts, their access to local clearing systems and, critically, the nature of any payments and collections which need to be managed on behalf of the group entity. Under this arrangement, all group entities will be funded from the center, which is responsible for raising all external finance for the group and for investing surplus cash on behalf of the group. In effect, the group entities will bank with the in-house bank. The in-house bank will operate a de facto internal cash concentration structure allowing group entities with a cash surplus to make intercompany loans to any entities with a cash requirement. Only if internal funds are not sufficient will the in-house bank raise external finance for the group as a whole.
  This development is only possible because of the development of software sufficiently robust to support in-house banking. There are a number of key issues which must be overcome:

  - The company needs to be able to demonstrate to auditors and, crucially, tax authorities that the service is being provided at arm's-length pricing. This especially applies when interest is charged on loans or earned on surplus cash, particularly on a cross-border basis;
  - The solution must be robust and secure. Although the in-house bank needs to be secure, it also must allow participating entities to interact with the system in a timely fashion; and
  - The in-house bank must be able to perform activities on behalf of the group entities. For example, the in-house bank must be capable of generating payment files which meet the requirements of all the relevant local payment systems and banks.

To meet these requirements, the treasury technology needs to be powerful enough to record transactions and positions, calculate interest and other payments and, critically, record data sufficiently robustly.

Record-keeping

Irrespective of the complexity of the treasury department, all treasury activity will need to be recorded in the company's general ledger. The method of doing so will depend on the technology used within the treasury department (all systems at a minimum will generate their own accounting entries for posting into a third-party accounting package, although many have more advanced accounting capability, including a full general ledger) and the accounting system used by the wider company (and how treasury detail can be captured by that system).

In addition, many international companies have to prepare accounts to meet multiple accounting standards and they need systems that can capture data in such a way that no additional manual effort is required to prepare, or input, different accounting entries. The treasury team may also be responsible for ensuring compliance with FASB and/or IASB requirements, especially on hedging activity (compliance with FAS 133 or IAS 39/IFRS 9 and association reporting regulations). (Note that other departments may also use the system and have a need for reporting. For example, in the USA, FATCA reporting is usually managed by Accounts Payable, with some support from the treasury department.) In these circumstances, the treasury solution will need to be able to create ledger entries that can support parallel accounting without the need for manual intervention. This powerful integrated treasury accounting functionality will also support the ever growing need for clear, concise audit control. The more all accounting activity can be automated, the greater the resulting cost efficiencies.

The need to ensure compliance with regulation

Regulatory requirements are constantly changing. One of a central treasurer's biggest challenges is ensuring compliance with the various regulations which apply. In the past, companies often concentrated their attention on the elements of the business that generated the largest income. This would generally include the home markets, as well as, in the case of international companies, the larger foreign markets. Operations in some countries with relatively low turnover were subject to less scrutiny. Two things have changed. First, it is increasingly possible to integrate the activities of even the smallest group entity into the group technology solution. Second, governments have imposed increasingly stringent regulation on corporations which requires them to be able to demonstrate financial control over all group entities, including the small foreign units. Treasurers will be required to ensure payments are not made in breach of applicable legislation and regulation, bearing in mind that these can differ significantly between countries. A technology solution that can record activity accurately and prepare reports where necessary can play an important role in simplifying the task of ensuring and demonstrating compliance.

Risk management

One of the treasurer's core responsibilities is the measurement and management of all forms of risk, particularly financial risk. Developments in technology have allowed treasurers to have a wider and current view of a group-wide position.

As with other areas, the main challenge is ensuring that the data that treasurers rely on to assess risk is accurate, complete and timely. This relies on getting data feeds from all business units. As with cash flow forecasting, the challenge for the central treasury is to set up a system that makes it as easy as possible for business units to provide the information required.

A second element, which has allowed treasurers to play a more active role in managing risk, is the development of functionality within treasury technology. As well as benefiting from improved data feeds, treasurers now have improved data analysis tools to support their measurement of risk management, which can also generate deals to hedge particular positions. The management of counterparty risk has demanded increased priority from treasurers since the recent financial instability and the technology suppliers have met the requirement with enhanced functionality.

As with any system, the treasurer needs to understand the underlying assumptions of the risk management element and be able to configure it to deliver a risk management solution appropriate to the company's appetite for risk.

CASE STUDY

Using Technology to Improve Process Quality

Although Capstone Infrastructure is not required to value a large volume of derivatives, the process of calculating fair values for reporting purposes used to take a number of days each quarter. According to Andrew Kennedy at Capstone (Vice-President, Finance), even the process of valuing simple instruments (foreign exchange forward contracts and interest rate swaps) was time-consuming. He realized that the status quo wasn't going to cut it any longer and that they needed to find a new way of calculating the fair values.

"Our original objectives were to reduce time, to bring an external process in-house to save costs and to improve the quality of the calculation. We wanted a routine predictable process for our level of activity: a mid-market solution able to manage a small number of one-off transactions," he explains. As existing users of a Bloomberg terminal, Kennedy approached them, along with other vendors, and selected Bloomberg's solution over outsourcing the calculation to a consultant or going with a competitor.

Capstone's solution is essentially in two parts: an automated calculation including a credit valuation adjustment (CVA) and a tool providing the ability to perform a change analysis. The first part is fully operational and has simplified the calculation process tremendously; instead of spending time cutting and pasting data between spreadsheets, the whole calculation takes about an hour. This frees time for other activities and also provides more confidence in the final results. The second part is currently still being done manually, at least in part because Kennedy wants to ensure the methodology is sufficiently robust before going fully live.

Implementation of the first part was relatively straightforward. Capstone was able to recalculate the fair values for previous periods and compare with the manual approach quickly to prove the consistency and quality of the tool.

CASE STUDY

Extending the project to value more exotic instruments is more complex, not least because there can be interpretive differences over the valuations. For instance, as an infrastructure provider, Capstone has used Bloomberg to value more complicated instruments such as an embedded derivative within an existing fuel supply contract: this is more difficult to value, because the methodology and underlying assumptions are subject to significant judgement and estimation.

"Our objectives now are to use the Bloomberg system's tools to further automate the step by step calculation process, to enhance the consistency of the calculation. This is an iterative process that takes time to work through," says Kennedy. "Whenever the opportunity arises, I challenge my team to improve the process. The process is constantly developing, such that we have made a number of incremental changes over the last year."

As they embark on the next stage of enhancements, the Capstone team are pleased with the results Bloomberg has provided so far. Kennedy's colleague, Ardem Tutunjian, explains, "While we no longer outsource the calculation, our advisors continue to assess and evaluate our methodology, in a much more cost-effective manner. We have saved days in these calculations and thousands on payments to external advisors. We have freed up internal staff time, especially at quarter end when that time is valuable, and we have improved the quality of our results with fewer inputs and outputs."

Non-core activities

Finally, there are a number of activities that can require specialist technology. Functionality to support compliance with new regulations, such as accounting standards, can take some time to be delivered by larger software providers. Niche suppliers can sometimes hold an advantage in delivery, for example in hedge accounting or specialist risk management. However, these systems are only successful if a way can be found to integrate information to and from the wider technology suite. A manual application would still work, although it would be less efficient.

Demand for this niche technology will vary significantly between companies. Larger, more complex organizations will have different requirements to smaller, straightforward entities. Notably, in more complex organizations, niche suppliers do work to support the centralization of activities and control by providing middleware which integrates data feeds generated in different or non-standard formats. However, treasury departments across all types of organization are looking to move away from spreadsheet-based data gathering and to adopt more robust alternative solutions.

Organization

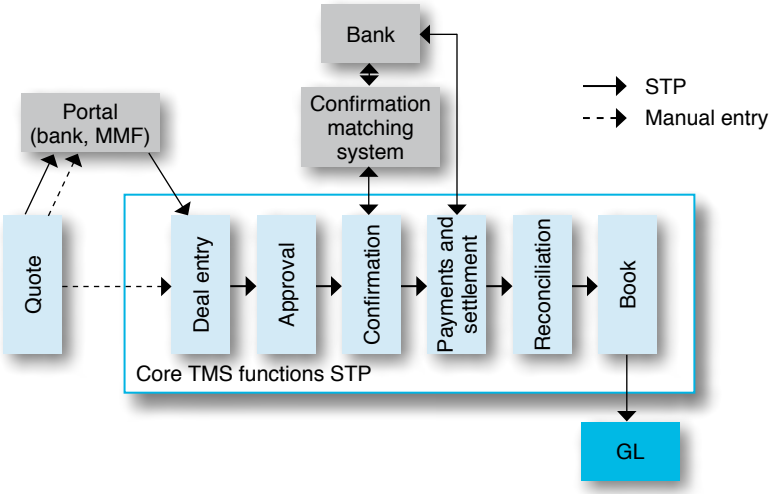
To be successful, a technology implementation must be based on a set of clear operating procedures. For some activities, such as the automated hedging of certain foreign exposures, technology can replace manual intervention for the whole procedure. For others, manual intervention may be necessary at one stage or more. This may be because the treasurer wants to exercise additional control, perhaps by requiring certain trades to be individually authorized, or

because local regulation requires a personal intervention, such as when opening a new bank account, or because sufficient technical functionality is not available.

Due to budgetary pressure or the lack of availability of sufficiently trained treasury practitioners, many treasury departments are forced to adopt suboptimal operating procedures to ensure a sufficient segregation of duties. Adopting a new technology solution can be a good opportunity to revisit all associated procedures to ensure they are as efficient as possible. Significant potential gains may not be realized if the treasury simply automates all existing procedures without review.

The typical transaction involves a number of stages. The challenge for the treasurer is to identify how technology can be used effectively within each process. Although the underlying processes are often very similar, the special requirements of each one can place different pressures on the department. Where there is a regulatory component, such as in some derivative transactions, this can also place additional requirements on the treasury department. Using a technology provider's specialist workflow in these situations should ensure compliance. Care should also be taken to ensure appropriate record-keeping, including, where necessary, the preparation of records for other internal systems such as the general ledger or the ERP system.

DIAGRAM 3.1 The key stages in a typical treasury transaction



Research

The first stage in any deal process is research. In the past, this required significant work by one or more members of the treasury team to identify the nature of any transaction to be performed. In reality, the lack of available analytical tools and personnel may have meant fewer positions were hedged or surplus balances invested.

Today, the presence of information analysis in treasury technology and other tools means it is easier to identify positions to be hedged and to spend time assessing the appropriate transaction to perform. Information can be

seamlessly integrated from the business units around the world allowing a more holistic view of exposures to be calculated.

- **Authorize**
  The next stage is to identify the appropriate transaction to perform and to arrange an outline transaction (this might be in the form of an agreement to hedge an exposure to EUR 300 million for three weeks). This will identify whether an individual is approved to arrange this transaction as each individual within the department will have his or her own personal limits. Individual limits can be incorporated into the various treasury technologies to ensure senior authorization is required once the individual's limits are breached. The company has responsibility for ensuring individual limits are not breached, rather than the counterparty which might have been the case in the past.

- **Quote**
  Once an outline transaction has been agreed, the team will need to collect the appropriate number of quotes for the particular transaction. This number should be set in the department's operating procedures and will depend on the nature of the transaction itself.

  - Standard transactions (such as USD/EUR trades) may be automated or performed in strict rotation with the company's cash management banks, with a quick verification against a market screen to check the quote.
  - More complex transactions may require competitive quotes from a number of banks.
  - The largest transactions (potentially market moving ones) may be arranged differently, perhaps through a specialist broker.

In the past all of these quotes will have been collected from phone calls to the different counterparty banks. This would have been time and resource consuming, with the additional risk of error. Today, many of these quotes can be collated from a single computer screen, especially where the use of portals (such as in foreign exchange and money market fund investment) is common. Although online quotes do improve workflow, some treasurers prefer to collect some quotes over the phone, as it provides them with the opportunity to discuss the trends in a particular market with one or more banks. This can be important when transacting exotic currencies, for example.

- **Agree transaction**
  Once the preferred quote has been identified, the company will agree the transaction. If telephone quotes were used, the deal will be entered into the treasury management system. Again, authorization limits will be used to approve the details of the transaction.

- **Confirm**
  The transaction will then be confirmed (if appropriate). There are a number of confirmation matching systems available, which are designed to be integrated with other treasury software, such that the details of any future transaction are matched with a confirmation issued (usually automatically)

by the counterparty. The technology employed needs to identify any non-matches quickly, especially for spot transactions. At some point, future transactions should also be entered into the company's cash flow forecast.

For automated processes, this is a vital stage. Any exceptions need to be identified and dealt with quickly, as they could be an indication of a wider error or a more deliberate fraud.

Effect payment and settlement

Depending on the nature of the transaction, the counterparty will either hold standard settlement instructions or specific settlement instructions should be sent directly to the counterparty institution. The technology should be able to initiate payment and manage settlement automatically, as long as the confirmations have been matched.

Reconcile

Once the transaction has been settled, the various transactions should be reconciled in the internal treasury management system. Again, this reconciliation process is an important protection against fraud. In today's environment, this activity can be performed via a web-based interface.

Book

Once the transaction has been recorded in the treasury's record-keeping system, it will also need to be booked in the company's general ledger. This should also be an automated process, but will depend on the set-up of the system.

Review

Finally, the transaction needs to be part of a regular review process. This should check that the appropriate procedures were followed and also assess the pricing of the transaction against market rates. It should also be subject to irregular spot checks, to ensure that any automated feeds have not been fraudulently or erroneously entered.

Each treasury should have a set of policies and operating procedures. Ideally, all treasury activities should be able to be processed "straight through" once a decision has been made. Where this is not possible, manual intervention, especially any need to re-key data, should be kept to a minimum. Treasurers need to be able to review each process from start to finish to ensure the appropriate procedures are followed, to identify how technology is used and where the pressure points are, before determining whether technology use needs to be reviewed and procedures updated.

Chapter Four

Treasury Technology Solutions.

SUMMARY

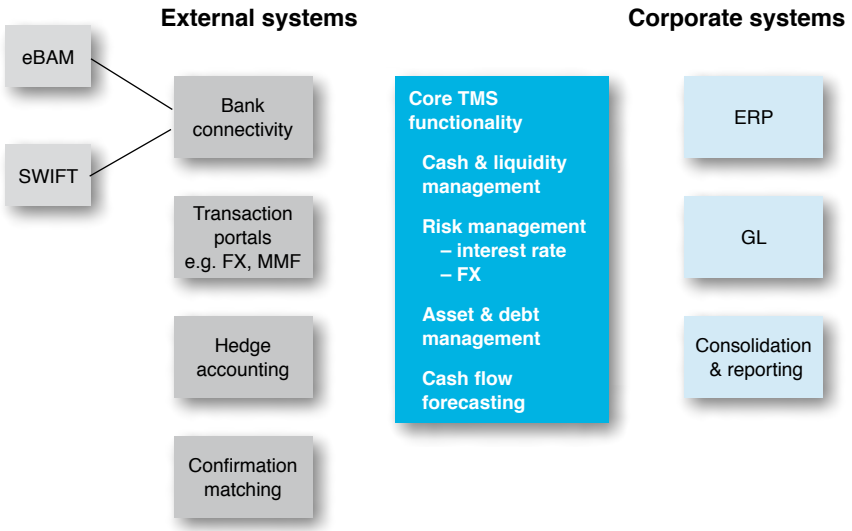
There is a wide range of technology solutions available to support treasurers. Treasury management systems are able to support the majority of the work of most treasury departments. However, it is also possible to develop a technology solution that supports treasury departments, including those with complex operations, without adopting a treasury management system. This can be achieved by developing in-house solutions or by using tools offered by banks and other vendors. This chapter identifies the range of potential solutions available to support treasurers.

Treasury workstation/management system

For many companies, the core treasury technology is a treasury management system or workstation. These have evolved over a number of years as the range of available functionality has grown, so that today most systems offer a similarly wide range of standard functionality. Just as important, these systems have evolved from being standalone machines in the corner of the treasury department to systems which can be accessed from remote locations via a web browser.

Diagram 4.1 indicates the depth of functionality in today's treasury management systems. All have core functionality covering cash and liquidity management, financial risk management tools, short-term and long-term asset and debt management and cash flow forecasting, as well as the ability to generate the necessary accounting entries. Many systems now include some of the functionality described below, including the facility to manage netting, in-house banking and payment factories. Some systems also include additional functionality such as more advanced risk management tools and a confirmation matching facility. This functionality is integrated, offering real straight through processing for users across a range of activities.

DIAGRAM 4.1 The functionality of a treasury management system



In many ways, the treasury management system used by the largest and most complex treasury organizations in the world will be the same as that used by a treasury department adopting its first treasury management system. The underlying functionality across systems is broadly the same, in the sense that cash can be managed, treasury transactions can be entered, monitored and reported, and financial risk exposures can be measured and managed.

However, there are significant differences in the way each treasury system operates and therefore its relative suitability for a particular organization. These differences arise in two main areas. First, systems vary in terms of their depth of functionality and the scope for customization and configuration. All systems can perform the core treasury functions, but some can cope with much more complexity than others. In addition, each system has its relative strengths in terms of functionality. Although most treasury departments will choose to take most of the core functionality when adopting a treasury management system, better resourced treasury departments do have more options. Generally, they can choose to adopt a single system, to take advantage of the fully integrated solution supporting all business processes, or to build a solution made up of a number of best-of-breed systems, offering improved functionality at the expense of a greater requirement for interfacing between these systems.

Second, systems can be installed locally or hosted by the vendor to be accessible remotely (hosted service and Software as a Service – SaaS). These differences also have significant implications for the price charged by vendors. Any treasurer considering the use of a treasury management system needs to form a view of the importance of customization and configuration and how the system itself should best be provided.

Both decisions will have a significant impact on the most appropriate type of system (or mix of systems) and they are a key part of any selection process.

Customization versus configuration

Customization is the changing of the core system by rewriting code to provide a unique solution for one or a small number of clients. Configuration is the tailoring of a system to the specific needs of each client without any rewriting of the underlying code. Customization is realistically only available to a very small number of the most complex treasury departments as it is an expensive and time-consuming activity.

Functionality

Broadly speaking, organizations purchasing new treasury management systems fall into one of three categories. The first type of new user wants a treasury management system to improve the management of existing, relatively standard processes. The organization is primarily looking to use the technology to improve operational efficiency within the treasury department. The system will allow activities to be automated, reducing the need for data to be re-entered, and information will be more readily accessible, leading to a more efficient use of cash. All activities will be recorded, allowing the treasurer to demonstrate better control. Most of the treasury's activities are relatively standard, so can be accommodated without the need for configuration. The treasury may also use other technology to support certain activities, for example a money market fund portal.

The second type of new user is one which wants the treasury management system to support a much wider treasury transformation project. Many of these users already use a standard treasury management system, but the treasurer may feel constrained by the system's inability to cope with increasingly complex requirements. This is an issue which has arisen as regulatory requirements have become more stringent and accounting rules have changed. This treasurer can often continue to manage core activities from their existing system and then, by "bolting on" additional functionality can support more complex activities via a combination of the use of specialist systems and tools developed in-house. Implementing a new treasury management system offers the opportunity to reduce the number of different add-ons employed by taking advantage of the greater functionality of a higher-end solution and therefore making the interfaces more efficient. More importantly, though, the treasurer can use the acquisition of a new system to significantly change or re-engineer the processes within the department. In a sense, this type of user views the technology as an important enabler of a wider objective for the department as a whole, which can include the adoption of more complex treasury transactions and activities. As a result, the treasurer will want to configure or even customize the system to meet those specific requirements. It is also likely that the department will use other technologies alongside a new treasury management system, so interfaces between them to achieve straight through processing will be vital.

The third type is a treasurer that adopted a treasury management system a few years ago. They want to review their existing solution against the solutions available in the marketplace today. This review process may be driven by

treasury policy (that it is appropriate to review technology provision on a regular basis), there may have been some corporate event which has changed treasury's requirements (such as an acquisition which requires management of additional currencies) or the treasurer may be attracted by the opportunity to alter the means of system delivery to improve efficiency and reduce annual costs (such as by replacing an installed or hosted solution with a SaaS solution).

Technology provision

The treasurer also needs to decide how the system should be provided. There are essentially three alternatives:

- **Local installation**

  This is the traditional method, where the system is installed on hardware at the company location. This is the most expensive method both in terms of installation and ongoing maintenance. It provides the greatest opportunity for customization and configuration.

  As a local installation, it also requires the greatest level of IT resources to support the implementation and any ongoing maintenance, including the management of upgrades. In particular, the company's IT team should be closely involved in the selection and implementation phases to understand how the system manages data.

- **Hosted installation**

  The system is installed at the vendor's location, with data held on a separate database and accessed via Citrix or a similar solution. It is still configurable, although the connection method means that it can be difficult to integrate data held within the company into the system because of the impact of company security. There are fewer installation or maintenance costs than for a local installation.

  As a hosted installation, the vendor will be responsible for maintenance and upgrades, placing less ongoing responsibility on the company's IT team. However, the IT team will need to manage the communications with the vendor's servers and is also likely to need to manage communications links with the company's banks and other external parties. The IT team will also need to ensure interfaces between this system and others used by the company (such as the general ledger or an ERP system) continue to work after any upgrades. Again, active involvement from the IT team in the selection process, and at times during implementation, is important to understand how the system manages data. Most importantly, and in contrast to a hosted installation, the IT team will usually be required to validate the security of any data held on the vendor's servers.

- **Software as a Service (SaaS)**

  In a SaaS solution, the company accesses the system via a web browser. Data is held by the vendor (usually on the same database as other clients, with controls restricting access). There is no installation at all. However, the system can be easily interfaced with other solutions and, because the system is accessed via a browser, any upgrades by the vendor should not affect those interfaces. Treasurers, as with other staff members, are able to perform

many more activities without the need for specialist support as technology providers make the interface, especially via the internet, much more user friendly. This is particularly the case among the vast majority of organizations for which a great deal of configuration is not necessary.

From an IT perspective, the main resource requirement for a SaaS solution will be at selection stage. The IT team will want to validate the integrity of the company's data and the robustness of any firewalls protecting its data and preventing access to other companies' data because vendors tend to accommodate more than one client on each server. It will also need to ensure interfaces between this system and others used by the company work efficiently. However, because the system is delivered through a web browser, any upgrades should not affect the data flow once the SaaS solution has been adopted. The IT team should only need to maintain internet access and, possibly, manage communications between the company and its banks and other providers after adoption.

As there is no installation cost, SaaS is more cost-effective than either of the installed options and can also be chosen and implemented much more quickly and easily than traditional installed solutions. However, there are greater potential risks in terms of data control and the treasury is more susceptible to access problems caused by reductions in bandwidth or a denial of service. A SaaS or ASP hosted solution is also subject to the risk that the vendor may either decide or be forced to end the service.

Enterprise resource planning systems

Enterprise resource planning (ERP) systems are used in a range of organizations as a tool to share information across different departments. The larger scale ERP solutions offer modules in the whole range of corporate activity, ranging from procurement and sales management to human resource management and accounting. All ERP solutions have financial management modules with some offering dedicated treasury management modules.

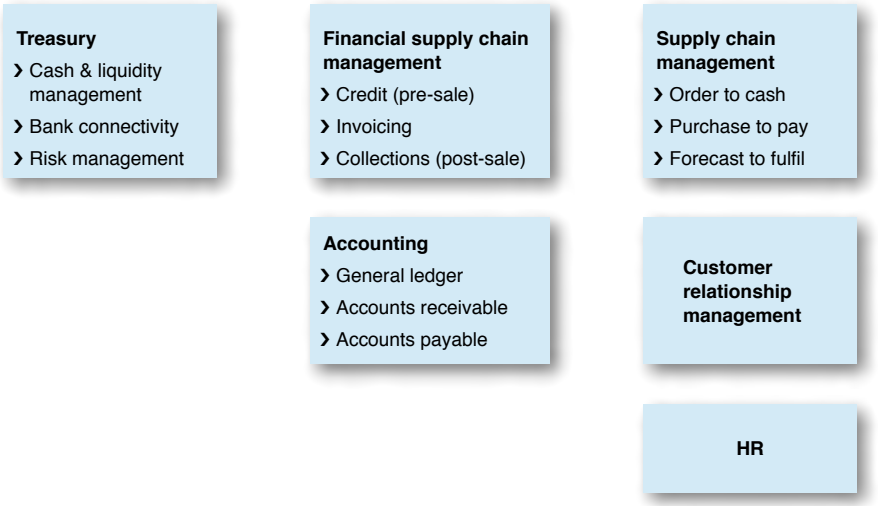
For treasurers in organizations with a corporate-wide ERP solution (or in one which is considering implementing such a solution), there is a real debate to be had over whether the ERP solution should simply be extended into the treasury department. To understand the issues, it is helpful to explore the functionality and scope of typical ERP solutions.

Most ERP solutions are modular in design, so organizations can choose to adopt only those modules for which they have a need. Although the precise delineation of the modules varies from provider to provider, most ERP solutions include modules covering the following areas:

- **Finance**

  The preparation of financial and management reports is central to all ERP solutions. This is an important tool as it allows finance directors to demonstrate control under the increasingly complex corporate governance requirements. Many finance modules also offer tools to companies trying to manage their financial supply chain and therefore to improve cash flow control.

DIAGRAM 4.2 An ERP modular system



Operations

Operations modules will support the management of the physical supply chain, from procurement through to production and distribution. The accounts payable and collection process are also included in these. These can incorporate a significant amount of automation, especially for the procurement process, and some will facilitate alterations to the production process if, for example, customer demand changes. In terms of efficiency, data from the operations modules will feed into the financial modules.

Sales support

Customer relationship management is another element of an ERP solution. This allows the sales and post-sales staff access to information about product availability and lead times, as well as to enter orders which will feed into the operations modules.

Administration

As well as core activities, ERP systems will also support most corporate administration tasks. These will include human resource management (covering both individual employment record-keeping and wider staff deployment), travel and entertainment, asset management (including real estate, fleet management and other machinery) and occupational safety and health support.

The key to the successful operation of an ERP system is the way data is stored, or "warehoused". To be effective, the same data is available across the company and can be accessed via different modules at the same time. For example, once some items have been procured, this data is automatically entered into the company's cash flow forecast and can trigger a payment initiation on due date, subject to authorization (as long as the functionality is configured appropriately). This improves operational efficiency as well as

the reliability of data as information is only entered at one point, making the consolidation of data across a group of entities much more straightforward. This data warehousing also offers organizations the opportunity to generate a wide range of reports, which can be used to review performance, manage financial risk and support future planning activity. These reports can be generated on both a group-wide and a business entity basis, or any other basis appropriate to the organization's requirements.

From a treasury perspective, there are significant benefits from the use of a common platform across the company. ERP platforms support accounts receivable and accounts payable activities, which can be supplemented by wider collections activities (such as electronic bill/invoice presentment and payment), credit control and dispute management tools. Configured appropriately, these should provide opportunities to streamline the use of cash and improve the control of cash flow.

Superficially, it seems attractive for a treasury to implement the ERP treasury management module, especially when the organization as a whole is adopting a new ERP system. The bigger question for treasury is to decide whether to manage the treasury department via the treasury management module of the ERP system. As with any decision, there are a number of factors to be considered.

Advantages of using ERP for treasury management

- **Data integration**
  As outlined above, ERP systems (as long as they are configured appropriately) do offer the opportunity to integrate data between functions in the business. They are particularly strong at integrating information from the accounts payable and receivable teams, which can have significant benefits for a treasury which is focused on managing high volumes of cash flows.

- **Use of data**
  Some of the more sophisticated ERP systems offer analytical tools which can support the treasurer and cash manager. For example, a system could analyze client payment behavior and translate that into predicted impacts on the cash flow forecast if that client is demonstrating a pattern of later payment. This not only helps the sales and post-sales teams manage counterparty risk, it also allows the treasurer to better anticipate future cash balances.

- **Reduced operational risk**
  Because the ERP system operates from one set of data, there are fewer concerns over the integrity of the underlying data. Data is not duplicated and there is a reduced risk of data translation error as it is only entered once.

- **Ability to integrate operations in different locations**
  One of the biggest potential advantages is that it does allow treasury operations across a disparate group of companies to be managed on the same platform. This clearly has potential benefits in terms of the aggregation of data and thus the visibility of cash. It also helps treasurers to

introduce standardized processes, even in more decentralized operations. Together, this enables the treasurer to demonstrate the important regulatory requirement of financial control.

Disadvantages of using ERP for treasury management

- **Lack of standardization**
  Despite the potential advantages, it is remarkably common for companies to be using a number of different ERP systems across the organization. There can be a number of reasons for this. It is common in groups of companies that have grown through merger and acquisition, as legacy systems form part of the transaction. It is also common where group entities are located in a number of geographies, where local subsidiaries may have selected a system based on different assessments of local vendor or language support. As a group treasury team starts to try to centralize visibility of cash, and perhaps control, it may be too large a project to do so if a new ERP system is required.

- **Unexpected integration problems**
  Even if a group of companies has deployed the same ERP system, it is often rolled out across geographies over a period of time. This can result in later participants installing later versions of the same vendor system which do not always interoperate seamlessly with the versions used elsewhere in the business. Again, the group treasury team may decide the process of installing the same version of the same ERP system may be too complex.

- **Weakness of treasury module functionality**
  Although ERP treasury management modules have developed over recent years, they do not offer the depth of functionality that dedicated treasury management systems do. Whether this precludes managing the treasury from the ERP module depends to a significant extent on the treasury activity in a particular organization. For entities with relatively straightforward treasury requirements, it may be possible to use an ERP system. However, once treasury activities start to involve a degree of complexity, perhaps in terms of currencies managed or jurisdictions covered, the treasurer may decide the functionality offered by an ERP system is not sufficient.

- **Weakness of external interfaces**
  Generally, ERP systems lack an external interface with functionality comparable with those offered by treasury management systems. This makes connectivity with external partners, such as banks, more difficult to achieve.

If the department does decide to implement the treasury module of an existing ERP system, this can give rise to particular problems. It can take time to implement these solutions, so treasury will need to ensure they employ strong project management leads from their side to deliver their requirements. As discussed, treasury will need to be satisfied that the version of the treasury module with the functionality they require is compatible with the base ERP system employed elsewhere. They will also need to conduct thorough scoping exercises in advance of any implementation to ensure the module can meet all of the treasury functionality and interface requirements.

There are additional concerns if the department is adopting the treasury module of a new ERP system about to be installed group wide. An ERP implementation is a major project and requires considerable resource and expert system knowledge. The treasury module relies on information from other areas of the wider system in order to function correctly. As a result, the implementation of the treasury module will usually be one of the last parts of the wider ERP installation. As the treasurer will want to control the timeframe covering the department's specific needs, there may be significant frustration as the wider project has significant potential to expand and, therefore, create delay for the treasury implementation.

It is certainly possible to manage a treasury department from an ERP treasury management module and there are significant potential advantages. Whether it is appropriate will depend on the nature of the treasury's activities, the treasurer's ability to integrate other specialist systems to provide additional functionality in particular areas (for example, dealing or risk management, see below) and the existing deployment of an ERP system within the organization.

Bank cash management systems and EFT systems

These systems are primarily focused on giving treasurers control and visibility over cash. The systems are offered both by banks and by specialty system providers. They range in complexity from a tool to manage cash positions with a particular bank to enterprise-wide systems which can manage cash across a number of banks in many different countries (multibank). Many bank-provided cash management systems are able to operate as a multibank platform, integrating data from a number of banks.

They allow treasurers and cash managers to assess cash positions at group and business unit level and on an individual currency or aggregated basis. This can be particularly important in centralized treasury organizations. They can help treasurers responsible for cash management where strict exchange controls apply to ensure that cash is not trapped unnecessarily in those locations.

Because the focus is on cash, these systems tend to have strong cash flow forecasting capabilities. It is important to remember the effectiveness of a cash flow forecasting system is only as good as the interface between the system, the participating group entities, including any treasury management system or ERP system used in the group, and the counterparty banks.

Some cash management systems provide additional modules which support the management of investments and debt positions. To be effective, these additional modules need to operate on a multibank (or multi-counterparty) platform so an organization's positions can be clearly and quickly understood. Where used, these additional modules will feed into the cash flow forecast, such that debt repayments, for example, are automatically included.

From the treasury perspective, it may be possible to use the cash management system as the core tool to manage the wider treasury flows. For this to be realistic, the cash flows themselves cannot be too complex, with

the overwhelming majority denominated in one currency and based in one jurisdiction. For example, it may be possible to manage a US-based corporate treasury on a cash management system, as long as the majority of cash flows are denominated in USD and are predominantly between counterparties located in the USA. In addition, the functionality of the cash management system would have to be sufficient to generate appropriate management and financial reports and its data could be exported to the group's general ledger for formal accounting purposes. Other activities, such as the hedging of risk or cash investment, would need to be managed from a spreadsheet or via an alternative solution.

If these conditions do not apply, a treasury department could still decide to use a standalone cash management system. In these circumstances, the efficient operation of the treasury department as a whole will depend on the interfaces with other technology employed within the department and the company as a whole to ensure straight through processing. In particular, unless the interface between the cash management system and the treasury management system (or other system used to manage the treasury) is effective, any gains from using a superior cash management system will be lost in data transfer.

Connecting to banks

Once a company uses more than one transaction bank, the treasurer will need to identify the most efficient way of connecting to these banks. It is important to make this decision in light of the treasurer's objectives. The various methods of connecting with banks should be evaluated against the following criteria:

- The extent to which payments processes can be standardized and, therefore, the cost of processing payments;
- The ability to obtain visibility of cash;
- The cost of maintaining secure connections to each bank; and
- The overall impact on group liquidity and risk management.

Broadly speaking, the treasurer will need to decide between managing the various connections to its banks itself and outsourcing this to a third-party provider, either in the form of a bank or a payments bureau.

Managing direct connections is easier today than ever before, largely due to the improved functionality of treasury management systems, the emerging standardization of payment messages (especially with respect to ISO 20022) and the opening of SWIFT to corporate users. There are a number of technology solutions available (either as part of a treasury management or ERP system or as a standalone solution) which can translate payment instructions into the various formats required by different banks.

For many companies, it may not be resource-effective to manage direct connections with each bank, if functionality is not available through a treasury management system (TMS) or via a middleware solution. For these organizations, there are different ways to achieve indirection connections.

- **Aggregator bank**
  The company can choose to outsource the responsibility to a core transaction bank: this bank will then aggregate data feeds from the company's remaining banks. This means the company only has to manage communications with one bank although it will give up some control over data feeds from the other banks.

- **Payments bureau**
  The payments bureau effectively acts as the conduit for communications between the company and its banks. Payments bureau have the ability to translate payment instructions received from companies into the formats required by the company's cash management banks. The contract with the payments bureau should guarantee a minimum service level.

When outsourcing in this way, treasurers should establish who is responsibe in the event of fraud and what commitments exist to meet cut-off times.

Middleware and niche service providers – what role do they play?

The increased use of SWIFT is an example of the significant scope for further standardization in message types and formats across the world. Although participation in SWIFT allows companies to standardize their processes to a greater extent than in the past, the fact that many banks do not use SWIFT means that this may only be part of the solution. Companies wanting to view all their accounts in one place have to find a way of integrating SWIFT and other message types into the same platform to view balances and transactions. This is the role of middleware.

Middleware has developed to meet the very real need to translate information provided in a range of different formats so that it can be viewed in one place by a corporate treasurer. Although some work can be done to standardize messages and formats between banks and corporations (including making this a criterion when selecting banks), the realities of the slow pace of standardization mean that many companies operating internationally or with a number of cash management banks will need some form of middleware if they want to manage cash from one location. (Note that even banks using the same payment message standard may have different rules about the use of non-standard fields in particular messages.) Middleware works by standardizing messages flowing from and to different banks to ensure data is complete and to make sure clear errors are repaired to prevent problems.

Usually, a middleware provider will store data on its own systems before preparing files in the format appropriate for the recipient (whether bank or corporate treasury). For cash management services, this applies to transaction and balance reports as well as any supplementary data carried in a message (e.g. invoice number). This allows the treasury department to generate payment instructions, for example, in one format, irrespective of the location and the preferred format in that location. This keeps processes in the treasury department standard and easy to control and audit. The middleware then

translates those messages into local formats, if necessary, to allow the company to reduce processing costs (because they can access cheaper local clearings for example). Data received in return can be similarly translated for acceptance into the treasury management or ERP system.

Most of the treasury management system and some ERP system vendors work with middleware providers to offer this service to their clients. Middleware tends to be a niche market because of the requirement to translate formats in two directions. Again, for the international treasury department, managing treasury technology without some form of middleware will make true straight through processing almost impossible to achieve.

Dealing systems

One of the core operational risk points within the treasury department is the deal process. For example, a miscalculation of a foreign exchange position has the potential to cause significant loss, as does an error over the identification of the most appropriate derivative instrument to hedge against a movement in interest rates.

A number of dealing systems have been developed, which allow treasurers to manage a transaction from initiation through to settlement on a straight through processing basis. These systems are integrated into market makers in the asset classes covered, giving the treasurer access to real-time pricing direct from the market maker. Most systems are configurable so that a corporate treasury dealer can only see market makers that are listed as approved counterparties.

Once an appropriate deal has been identified, the dealer is able to initiate the transaction. These transactions can be automatically confirmed in the dealing system's confirmation module, or via a link to another confirmation matching system (see below). Similarly, settlement can be effected via the system's own settlement module or via a link to another settlement method.

As part of their appeal to corporate treasurers, all the dealing systems have worked hard to accommodate the different messaging standards employed by market makers and corporate treasury departments around the world. This makes it possible for the dealing systems to be integrated into both corporate treasury management systems and the market makers' dealing platforms. Most corporate treasury management system vendors offer links to a number of different dealing platforms.

Dealing systems can reduce processing costs as price discovery is quicker than placing calls to a number of counterparties, and, once the deal has been agreed, the remaining tasks (confirmations, settlement and record-keeping) are all automated, reducing the risk of error and fraud. These systems also generate an audit trail, allowing transactions to be reviewed against policy and, if appropriate, market benchmarks. These systems can usually be configured in a variety of ways. For example, they may allow individual team members to participate from different locations or for standard hedge requests to be automatically generated.

The challenge for the corporate treasury department is to determine whether such functionality is appropriate. In broad terms, dealing platforms are appropriate when a treasury department has to initiate a number of different transactions on a daily basis.

Investment portals

Investment portals have evolved from platforms established to allow investors access to a number of different money market funds from one location. Money market fund portals were initially established in the USA as a means to improve efficiency for investors seeking to manage surplus cash, in particular overnight cash. As the use of money market fund portals has increased, both in terms of investors using them and funds being listed on them, investment portals have gradually developed in functionality and breadth of offering. Some portals now provide the opportunity to invest in a wide range of alternate money market instruments as well as foreign exchange. They also give access to real-time pricing and a range of research offered by the market makers listed on the portal. As with the other dealing platforms, these can be configured so that treasurers only have access to funds on which they have previously performed due diligence and with which they have agreed dealing mandates. The portal also allows treasurers to track the level of cash deposited across all funds.

The lesson is that although portals may improve efficiency of operation in terms of allowing quotes to be recorded, the full activity of the deal being tracked, recorded and documented and accounting entries generated, treasurers still have to be fully mindful of the appropriateness of the underlying transaction (in this case, the decision to invest with a particular money market fund). Where a portal is used for managing investment in more than just money market funds, these concerns are much greater.

If investing in instruments other than bank deposits and money market funds, treasurers will need some solution offering trust and custody reporting. Most investment portals include this functionality, which allows treasurers to track investments with investment managers as well as any investments the company trades on its own account. Such systems also usually include the analytical tools to perform FAS 115 reporting. Money market funds offer most of this functionality as part of their proposition to investors.

Market information systems

There are a number of market information systems available, most of which deliver similar levels of functionality for the corporate treasurer. Their main role is to give access to real-time market prices across a wide range of instruments. They are generally of most importance to treasury departments that have a high volume of foreign exchange and money market transactions in different locations. Some systems also offer data feeds into treasury management systems as well as spreadsheets as a tool to help evaluate exposure to interest rate, foreign exchange and commodity price risk. Data can also be used to measure treasury performance over a period of time. A direct live rates feed from a market information system into a treasury management system can

be expensive; however, few corporations need this service and a scheduled download via a spreadsheet at regular intervals (daily, hourly, etc.) is usually considered sufficient for translation exposure reporting.

They can also be valuable for treasury departments which perform their own credit risk management activity. The use of credit default swap data, for example, is an increasingly common additional credit risk check used by corporate treasurers who do not have the ability to perform detailed counterparty checks before investing in commercial paper and other money market instruments. It can also be important when sales teams and accounts receivable teams are seeking to evaluate counterparty credit risk before making a sale.

Risk management systems

Demand for risk management tools has increased over recent years as treasurers have become responsible for managing more complex cash flows and portfolios. As the demands on treasurers from regulators and accounting standards (for example, via FAS 133, IAS 39 and IFRS 9) have become more onerous over the same period, this demand for improved risk management tools has increased further.

Although most treasury management systems incorporate some degree of risk management capability, the rapidly changing regulatory environment has opened up the opportunity for specialty risk management systems to develop. These tools are required for treasurers who want to account for complex hedge transactions or have a broad investment portfolio (for example, if the treasury is responsible for managing a company pension fund). More recently, there has also been a growing demand for better tools to help manage counterparty risk.

As a result of this rapidly changing demand, a number of treasury management systems work with different risk management software providers (in the same neutral way that they work with dealing systems).

However, the use of a risk management system can add risk to a corporate treasury if it is deployed badly. One of the lessons of the recent turbulent credit markets is that over-reliance on a particular calculation of risk is dangerous. Instead of relying on a system to generate a value-at-risk (or similar) measure, it may be appropriate for the treasury to adopt a more simplistic view of risk by quantifying risks individually and understanding their interdependence to develop an overall view. Such a technique can be developed using fairly standard treasury management system modules. Moreover, because the technique is transparent, treasurers can respond to market events more quickly.

Where the structure of a company is too complex for this to be realistic, it may be appropriate to install a specialist risk management system or to outsource this activity to a specialist provider. However, the same proviso applies. Companies should understand how the system or provider operates before relying on its output.

Accounting systems

The accounting functionality of treasury management systems varies from the basic requirement of posting all trade related accounting entries into a third-party treasury ledger or directly into the company's general ledger, to the provision of full general ledger capability. Typically, organizations will follow one of three routes for treasury accounting, depending upon the systems they employ:

- Post entries from the treasury management system into an independent treasury ledger;
- Post entries directly from the treasury management system into the company's general ledger; or
- Use the general ledger module of the treasury management system for all treasury accounting.

One of the determining factors in multinational companies will be their need to prepare accounts to different accounting standards. For these companies, they will want a tool which allows them to create multiple entries without the need for manual intervention.

Compliance systems

As regulatory requirements evolve over time, technology providers are developing solutions which support treasurers who need to demonstrate compliance. Such systems include specialist hedge accounting solutions and regulatory reporting (to meet EMIR and Dodd-Frank requirements, for example).

Confirmation matching systems

The use of a standalone confirmation matching system is relatively common in larger corporate treasury departments. These systems match the details of the trade confirmation documents issued by both parties to a trade before settlement. This ensures that the details of the transaction are agreed by both parties. This is particularly important when a trade is agreed over the phone and a deal is entered manually into the different parties' deal management systems. A wide range of transactions, including foreign exchange, money market, derivative and some commodity trades, can be confirmed using these automated systems.

The providers of confirmation matching systems devote significant development time to ensuring that they can translate confirmation messages generated by both financial institutions and corporate treasuries. In addition, all the leading treasury technology interfaces work well with the main confirmation matching systems. Some treasury management systems also offer direct confirmation matching via the use of SWIFT 300 on key financial terms in real time.

To reduce operational risk, users are able to add settlement instructions to confirmation reports. In addition, the systems generate a record of all agreed transactions which works to reduce the risk of error and fraud. Some systems allow related documentation to be "pinned" to the confirmation. The use of a confirmation matching solution does allow the treasury to improve control and ensure appropriate payment release.

Trade finance systems

There are a variety of different trade finance systems available to support organizations. The systems primarily fall into one of two categories: document preparation and wider supply chain finance solutions.

Document preparation systems

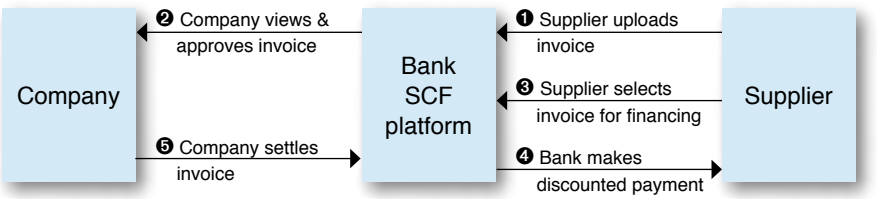
As payment in international trade is governed by the presentation of documents, it is vital that any documents prepared are accurate. Automating document preparation can reduce the costs associated with their presentation whilst also reducing the risk of error. Document preparation systems also ensure the documents are compliant with the rules of international trade. These systems can be configured to prepare documents across a number of group entities and also to integrate the data they generate into the group accounting systems. They will generate the appropriate SWIFT messages (if used) and also calculate charges, fees and foreign exchange equivalents on any transactions. These systems will also allow users to track progress of transactions and generate management reports.

Electronic invoicing and supply chain financing systems

Electronic invoicing presentment and payment (EIPP) platforms allow companies to issue electronic invoices to their customers. (EIPP platforms are generally business-to-business platforms. Business-to-consumer platforms are often called electronic bill presentment and payment (EBPP), although they essentially work in the same way.) These customers can view invoices and initiate payment in response. These provide savings to companies in two main ways. First, the paper trail is automated, reducing processing cost. (EIPP platforms allow the data associated with the underlying transaction to be captured with the invoice, requiring less reconciliation activity.) Second, EIPP reduces the time taken to resolve disputes because customers receive invoices earlier and are able to identify inconsistencies more easily (as data is submitted with the invoice).

This concept can then be widened to become supply chain financing systems which allow corporations to extend credit to their suppliers via a relationship with their bank.

DIAGRAM 4.3 A supply chain financing system



Typically, a supply chain financing solution works by automating the data flow between a company's ERP system (or other AP system) and a bank's trade finance platform. A company's suppliers will issue an invoice, often by uploading the invoice to the trade finance platform. The company's AP department will view the invoice and accept it, if appropriate. Once accepted, the invoice will be listed as such on the trade finance platform. The supplier will then have the opportunity to sell the invoice to the bank, effectively borrowing at the company's rate, rather than the higher rate available to the supplier. This has the advantage to all parties of reducing the cost of processing invoices and reducing operational risk. Data generated by the trade finance system can be viewed online by all participants. If an invoice has been disputed, this facility will usually lead to earlier resolution and payment. All parties benefit in the resultant reduction of counterparty/supplier risk. All parties also benefit from being able to access financing at the lowest potential rate along the supply chain, although all participants will need to think carefully about their overall funding strategies before entering into such a financing solution.

The treasury department is typically not involved in the selection or operation of document preparation systems, as this will be a specialist activity that is part of the sales process and accounts receivable teams. However, because of the impact on the company's borrowing capabilities, the treasury should be involved in a decision to implement a supply chain financing solution. To aid efficiency, the treasury should work to ensure that data on payment obligations to the bank are automatically entered into the group cash flow forecast and also any payment initiation instructions are automated.

Both types of trade finance system tend to be provided as standalone solutions. The supply chain financing solution is typically a platform provided by the bank through which the financing is being provided and is accessible via a web link.

Multilateral netting systems

A multilateral netting system aggregates intra-group payments between participating group entities before making net payments to group participants.

All eligible intra-group payments are submitted to the netting system. If both payables and receivables are entered, there may be a facility to match these entries and dispute invoices if necessary. On a pre-agreed settlement date (once a week, every other week, once a month), the netting system calculates the net positions for all participants. It may also generate a payment instruction for each participant or, if linked to an in-house bank structure, automatically settle the payments. At the conclusion of the process, the system will be able to generate a data file containing accounting entries.

It is possible to set up a multilateral netting system that allows group participants to invoice other group participants in their own operating currency, but for other group participants to pay in their own operating currency. A multiple currency multilateral netting system works in the same way as a single currency one, except that the system's calculations include the necessary

foreign exchange transactions. As part of the settlement process, the system will fix the rates for any transactions which require foreign exchange. This will be done at arm's length market rates. This has the effect of centralizing foreign exchange dealing, meaning that fewer foreign exchange transactions are required and the group as a whole should also benefit from better rates when the transactions are aggregated.

From a treasury perspective, the introduction of a multilateral netting system allows for group liquidity to be used much more efficiently. All group entities have fewer transactions, with the result that oversight of cash should be much easier for the treasurer. At a group level, this solution can be extended to a wider in-house bank solution, which would further leverage the use of cash within the group. Where the netting system includes a foreign exchange element, this reduces the cost to group entities of managing foreign currencies, both in terms of bank account management and foreign exchange risk management. Multilateral netting systems are typically available from treasury management system vendors as part of a solution or from specialist suppliers when the system may be integrated with existing technology.

Payment factory systems

A payment factory system is to some extent an extension of the multilateral netting concept. However, instead of limiting the netted payments to intra-group transactions, payment factories typically manage payments on behalf of group participants to external third parties. By netting vendor payments, the payment factory reduces the cost of transmitting those payments by both aggregating them to a single payment and routing them through the most efficient payment route, typically via access to a local clearing system.

The process is similar to the multilateral netting system, except that the group participants will need to provide standard settlement instructions for each vendor included in the program. If an ERP or similar system is used to manage procurement, it may be possible to upload this data automatically, depending on the nature of the interface. Once on the program, vendor invoices can be entered (potentially automatically via an electronic invoice presentment process) into the system. On or before the settlement date, the system will generate remittance advice for vendors listing all the payments that will be settled in that cycle (again a cycle may operate weekly, every other week or monthly, depending on payment volumes, industry practice and the ability of the payer to dictate payment terms). This advice may also include a data file containing accounting entries for booking. On the settlement date, the vendor will receive a single payment in settlement of all agreed invoices included in that settlement cycle. (This concept can be extended to vendor netting, where invoices between two parties can be offset by matching data in both the accounts payable and accounts receivable databases.)

The most successful payment factory modules are able to generate payments in multiple formats so they can be routed through the most efficient method. However, the processes within the payment factory are standardized to permit efficient workflow. This process allows central control over payment outflow (even if responsibility for raising invoices is very decentralized).

This concept can also be extended to collections management, whereby both payments and collections are managed via a payments and collections factory.

In-house banking systems

An in-house banking system is a further extension of both the multilateral netting and payment factory systems concepts. In-house banking is possible because group entities can now communicate efficiently with the group treasury (or shared service center) operating the in-house bank. Reduced exchange controls and similar regulations mean it is feasible to deliver such services on a cross-border basis (although residual controls means participation by entities based in certain countries is still difficult or impossible).

In terms of functionality, in-house banking software is closer to banking software than mainstream treasury management systems. As well as managing payments on behalf of group entities, with or without netting, in-house banks also need to maintain clear bank accounts on behalf of the participating entities, often on a multi-currency basis. The system needs to be capable of managing interest payments on any physical or notional cash pools operated at the in-house bank level. They may also administer intercompany loans on behalf of group entities and will need the capability to manage and document interest payments to comply with transfer pricing regulations. Where the in-house bank operates on a cross-border basis, it will also need the capability to manage internal and external foreign exchange transactions. It is common for group entities to maintain an in-house bank account in their operating currency only, and for the in-house bank to manage any foreign exchange transactions (both within the group and externally) on behalf of the participating group entities. This means the in-house banking software needs to be capable of capturing and allocating the appropriate market exchange rate across all participating accounts.

eBAM providers and capabilities

Electronic bank account management (eBAM) systems allow corporate treasury departments to manage bank accounts held by separate group entities from a single location. In particular, these systems allow corporate treasurers to open and close bank accounts electronically, subject to local regulation which may require a physical presence. They also allow corporate treasurers to update authorizations automatically, perhaps by a link to an HR module, and to manage the conditions of the bank account mandate.

From the treasurer's perspective, this development does provide significant benefits in terms of reducing operational risk. Ensuring bank mandates stay current has been a challenging task, especially as staff members change and their authority levels are amended. Reducing the time taken to manage this process and to ensure this is done effectively is a real bonus for corporate treasurers. More particularly, it is another tool which works to protect the corporation against the risk of fraud and error as they will recognize personal digital certificates. Because data is accessible online, it is easier for auditors to check that documentation held by the bank is current.

To be effective, the eBAM module needs to link to the treasury or cash management system in order to ensure any authority limits are applied consistently. Just as individuals have to be wary of internet banking fraud, so corporations have to be aware of the threat to the security of online bank accounts.

Bank fee software

Some corporate treasurers use bank fee software to manage the charges they pay to their banks. This software is capable of comparing fees charged by different banks, to predict future bank charges and to identify errors in any bank billing. This can be an effective tool for assessing the relative value from each bank in a multibank environment, prior to renegotiating fees with different banks. It can also act as a further check on the efficiency of bank account statements as it will cross-reference expected entries against the bank statement.

The availability of these tools varies. In the USA, software analyzes data submitted on the 822 account analysis statement – a document prepared by banks listing the services used and the fee charged – which allows treasurers to identify any differences between the fees agreed and those charged. In addition to listing the bank's unique code for each service, many banks will categorize services according to the Global Service Codes provided by the Association for Financial Professionals (AFP). This is a list of over 800 service billing codes that serve to provide a consistent standard across banks outside the USA. Together with the USA-based AFP Service Codes, there are over 2,800 codes that will enable clients to utilize bank fee analysis software better and to compare accurately services between banks through standardized codes.

Internationally, the TWIST BSB (bank services billing) standard offers the opportunity to compare bank fees. However, to date, there has been limited adoption by banks, partly because there has been a lack of demand from companies to offer this service on an international basis.

Although bank fee software will allow treasurers to check for errors and to predict future charges, a treasurer's ability to renegotiate fees with different banks will depend more on the wider bank relationship, in particular its value to the bank, than a set of comparative data on bank charges.

Spreadsheets – is there a role for them in today's treasury department?

Despite the development of all these different technology solutions to support treasury departments, many entities still use standard spreadsheets for at least a part of their operations. Spreadsheets are still commonly used by companies in their cash forecasting process and to perform other internal analysis. They continue to be used because they are easy to develop, use and amend and they are available as part of standard, inexpensive office programs.

They are often employed as report designing tools, particularly where the treasury management system does not have the necessary reporting flexibility or where report designing requires additional training or consultancy services.

Under these circumstances, the content of an existing report may be transferred into a spreadsheet for additional work.

In today's environment, though, which demands treasurers can demonstrate control over the company's finances, treasury by spreadsheet alone is not usually good enough. Due to the fact that spreadsheets can be changed easily, it is impossible to demonstrate that financial positions have been calculated using a clear, controlled and audited process. Moreover, because they rely on manual input of both the underlying formulas and the data, they are prone to error, which can have serious operational implications for a treasury and the wider company. The assumed cost of implementing more appropriate technology (or finding the time to do so) is typically the reason why companies which still manage their cash on spreadsheets continue to do so.

Despite the criticisms, spreadsheets remain a useful tool for a range of internal analysis, such as estimating the effects of particular market events while considering alternative approaches to risk management. However, they should not be seen as a long-term technology solution in any treasury department of any scale.

Bloomberg

Treasury Departments Can't Be Strategic When They're Stuck in Spreadsheets.

Cash management is at the heart of a corporate treasury department's core functions. If nothing else, treasury is expected to stay on top of the company's cash position, its prospective cash needs and its cash outlook.

Of course, there are other, more valuable, functions a treasury department can perform, such as managing foreign exchange exposures, optimizing cash and enabling capital allocation decisions. However, treasurers can't think about those until cash management is under control. And that remains a challenge.

The reason? Too many treasuries are still using inefficient, inaccurate manual processes for cash management.

The Problem with Manual Processes

Fifty-four percent of corporate treasuries have fewer than five full-time employees, according to the 2014 AFP Strategic Role of Treasury Survey. With so few people to do so much work, efficiency is essential. Yet findings from a Bloomberg case study showed that even a treasury with a fairly simple set of banking relationships can require a half-day of work for one employee to complete manually the operational processes required for cash visibility.

That's a half-day of work that doesn't add value to the company and is spent engaged in error-prone processes. Spreadsheets are only as good as the people who fill them in, and a 2013 Ventana Research survey of finance spreadsheet users found that half saw errors in spreadsheet data and a third saw errors in spreadsheet formulas.

Using spreadsheets also makes it harder to spot fraud. The Public Company Accounting Oversight Board said in October 2013 that auditors must improve audits of internal control over financial reporting and specifically mentioned spreadsheets as a concern.

Spreadsheets Stand in the Way of Strategy

Manual processes beget manual processes, which, in turn, beget reconciliations, and that's not what treasuries want to spend their time on. For example, most treasuries want to understand and reconcile their cash situation within a day, but tracking cash with spreadsheets and manual processes could take up to two days. In other words, treasurers wouldn't know where their cash was for two days.

The AFP survey found 84% of finance professionals say the treasury function is playing a more strategic role in companies today. Treasury teams want to move away from their traditionally operational role and into a more strategic role that really adds value to the organization. To move into a more strategic role, treasury departments need to move their processes out of spreadsheets and into a TMS that connects directly to banking partners and eliminate time-intensive manual entry processes and the error risk that accompanies them.

Cash Forecasting and Risk Management

When treasury teams use a TMS instead of focusing on updating and reconciling spreadsheets, they can move on to the valuable strategic functions of cash forecasting and risk management. Strong forecasting gives treasurers several advantages. These include the ability to:

- See shortfalls coming in advance, which can help teams avoid making rushed decisions;
- Mitigate risk from earnings volatility by making and executing hedging strategies;
- Optimize cash by taking steps such paying down debt to reduce borrowing costs or investing excess funds to increase return;
- Enable performance analytics, because accurate baseline forecasts allow treasurers to measure the effectiveness of business financial planning and model the impact of possible shocks; and
- Enhance the value of reports to internal and external stakeholders.

Financial risk management starts with managing error and fraud, but strategically should also include managing the company's credit, market exposure and liquidity. Accomplishing all this becomes possible when treasury teams have one integrated TMS helping manage these functions.

Evaluation.

SUMMARY

Any successful technology project needs to be based on a strong business case. This chapter explains how to build a business case and then how to develop a requirements definition. The requirements definition is a critical part of the process: it helps to set the scope for the project and is the core document in the selection process. The process of developing the requirements definition also helps to build support for, and awareness of, the project throughout the rest of the organization.

BUILDING A BUSINESS CASE

Building a business case is a critical process for any significant company project. At a minimum, any project lacking a robust business case will fail to attract the management support necessary for approval and implementation. Beyond that, the process of building a business case sets the scope for the project itself as it allows all participants to hone a series of abstract expectations and anticipated improvements into a clearly defined set of objectives and requirements. It will also, crucially, help the treasurer identify the level of resource required to implement the project.

From the perspective of a treasury technology project, the process of building a business case will help the treasurer determine whether the project will be a relatively straightforward automation of existing processes or be part of a much wider (and, therefore, more complex) treasury transformation project. (Note that for a transformative project, it may be necessary to structure the project into a series of phases. This could be as a result of resource constraints or as part of a need to keep disruption to day-to-day treasury activity to a minimum.)

In most cases, the treasurer will need to present the business case to the CFO and the board at some point. Depending on the scope of the project (and, therefore, its likely cost and implications across the group) and the size of the organization, the business case might be heard by the full board or by the treasury committee of the board. (Clearly, the level of board involvement will

vary according to the nature of, and the drivers for, the project. The dynamics will be different between a project in which treasury is seeking to automate current processes and one in which the use of new technology is part of a wider treasury centralization project, for example.)

Board level approval for a project, especially a transformative one, will help to give the treasurer support to overcome resistance within the group at key times. This can be important where the treasurer needs additional resource (especially additional personnel) during key stages of the project.

Although top-down management backing is important, it will not fully overcome resistance from business units who do not understand the objectives of the project or who have a vested interest in maintaining the status quo. It is just as important to obtain the support and agreement of other interested parties to the project at an early stage. Depending on its extent, making these teams aware of the project and the potential benefits to both themselves as well as the group, and crucially, involving them in scoping the project at an early stage can be a fundamental part of making the business case. The board will be interested in the implications of the project on group operations just as much as the potential benefits for treasury. Bear in mind, too, that involving other parties in this project may increase treasury's ability to engage them in other areas of activities and ensure their buy-in during potentially difficult periods of transition. For smaller projects such as bolt-on additions to existing solutions, a full consultation with other interested parties may not be necessary in terms of making the business case for change. However, discussing potential changes with other parties may identify ways in which they could benefit from the existing solution, even if the proposed change will not impact them.

Understand the process

In terms of presenting the business case to the board, the main objective is to identify how much better the company can run its cash, risk and other financial and treasury management activities. These benefits can then be used to justify the cost and investment in the project. From the treasurer's perspective, there are a number of factors which need to be understood before the business case is presented:

■ Understand who makes the decision

By understanding the decision-making process, the treasurer will be able to identify the key dates and meetings to target. It also makes sense for the treasurer to include significant decision-makers, such as the chief financial officer and members of the board's finance committee, in the design of the project. (This will depend to some extent on the scale of the project. The board will usually want to approve projects which require a substantial investment or which fundamentally change the relationship between the treasury department and other units within the organization. Small-scale projects or those already included in the treasury department's budget are less likely to require board level approval.)

Organizations vary in the way they make decisions. Some will want to approve an outline first (perhaps at board committee level), before making

a (full board) decision on the final project after the research has been completed. Others will only want to discuss such a project once, whether at board or board committee level.

- **Identify appetite for different levels of project**
  As part of this process, the treasurer also needs to understand the types of technology projects which are more likely to get the required approval.

- **Provide clear documentation**
  In advance of any meeting to obtain approval, the treasurer must draw up clear documentation highlighting the key elements of the proposals. This should be circulated before any meeting, along with an executive summary which highlights the key points. These should:

  - Explain key objectives and show how the project will help the treasury department (and the company as a whole) achieve them.

  - Demonstrate benefits for decision-makers.
    One way to achieve approval is to show clear benefits for the decision-makers, including the board (assuming they fully understand what the treasury department does and the value the department brings to the organization). Potential benefits will include the ability to gain greater visibility of cash (reducing the cost of borrowing and improving the use of working capital), a greater demonstration of financial control over the group (and thus compliance with regulatory requirements) and the ability to identify and manage potential operational risk that would impact the group. These benefits need to be tailored to the group's longer term objectives.

  - Be clear on cost.
    Finally, the business case must be clear on cost, both in terms of financial cost and resource including the cost of any temporary staff. At this point it will be useful to quantify the hard and soft costs as much as possible. The soft costs of process improvements, process redesign and resource redeployment (especially in terms of human capital) will become critical and should be set against the benefits outlined above.

- **Identify a second best scenario**
  Depending on the culture of the company, it may be appropriate to identify a second-best solution which will help the treasury team achieve most of its core objectives at a lower cost and with less operational interruption.

BUILDING A REQUIREMENTS DEFINITION

The next stage is to build a "requirements definition". This should be a clear statement of the organization's desired outcomes from the technology. It is critical that this is appropriate to the context of the project. The context should be defined by the timescale in which the implementation is expected to take place, the resources available and the budget. A treasury technology project may be an ideal time to step back and review the entire treasury operation and the processes employed. It is a mistake to attempt to install new technology into an inefficient organization if the technology itself is not going to resolve the

defined issues. Similarly, it is a mistake to attempt to change the structure of a treasury once the implementation is underway unless it has been pre-agreed and is part of the project plan.

It is critical that the process of developing the requirements definition is managed just as carefully as the selection and implementation stages, because it plays a key role in defining the scope of the project. With that in mind, the project manager, perhaps with some assistance, will need to manage the process of pulling the requirements definition together, to ensure nothing is omitted and that it captures all of the points developed in the business case. (Project management and associated issues are addressed in more detail in the next chapter.) The task clearly demands considerable time and analytical skill and so can present a major hurdle for the treasury department right at the beginning of the project, especially if sufficient resource is not readily available. At this point, the treasury may well seek outside help, either from elsewhere within the organization, if the skills are available, or from a specialist third-party consultant. The document should be built by someone who has a good general knowledge of treasury, who then either has or is able to acquire quickly knowledge about the company's specific treasury and has a reasonable knowledge of the range of technology available to meet the needs of the company. If an external consultant is used, there is a risk that the consultant may over-complicate any stage of the process to the extent that it does not benefit the company (only the consultant), so it is always advisable when appointing a consultant to consider recommendations and take up references.

The process of developing the definition must address the aspirations of all group participants, as this is a critical step in getting all parties to agree to the aims and direction of the project. For example, if the business units will be affected by the project, especially if they will be required to change processes as a result, they could be consulted during the development of the requirements definition. (See below, page 71, for a discussion on who should be involved in this process.) However, the final requirements definition should reflect a realistic project rather than a set of unrealizable aspirations. When developing the definition, it is important to discuss each participant's aspirations to ensure all points of view are considered. For those that are unrealizable at this point, it is important to demonstrate to participants why they are incompatible and to consider whether any elements of their request can be incorporated into the project. Understanding current aspiration is also an important part of identifying how the technology requirements might evolve over time. A phased approach to a project can help to manage any gap between need and aspiration and can also build in future requirements to the overall project.

The requirements definition should be related to treasury practices by understanding what treasury is supposed to be doing and is actually doing, as well as considering what it could be doing. Also consider the longer term aspirations of treasury and how group strategy may impact treasury. The key point is to remain flexible and open-minded when evaluating. Input from outside the treasury team may enable the project to incorporate additional activities and therefore generate greater efficiencies from the project.

On the other hand, though, there is a risk of "scope creep". As more is understood about the capabilities of different systems, there is a danger that more will be expected of the project. This can be positive, but should be very carefully managed to ensure expectations are not raised out of proportion either to the resources available or the chances of implementation. Scope creep is most likely to occur when people involve themselves in the project after the initial parameters of the project are designed or once a requirements definition has been developed. Anyone who will have sight of the finalized requirements definition should be included in the consultation and development process.

The key to avoiding scope creep is to ensure there are distinct stages in the process. Participants should be consulted on and then approve the parameters of the project first. Once these have been set, the participants should be asked to help develop the requirements definition before approval.

Scope creep is a particular risk for organizations whose aim is to achieve best practice through a review of processes during implementation. For these organizations, clear budget, time and resource constraints must be set when the initial parameters are set.

Why build a requirements definition?

Building a requirements definition is a critical moment in any technology project for a number of reasons.

- **Agreement from the project team**
  Unless all members of the project team, including the management, agree on the scope of the new technology project, it will be very difficult to identify an appropriate technology solution.

- **Ability to measure various solutions**
  A requirements definition is critical as a tool against which to measure vendor presentations and complete solutions. This is more important for more complex technology projects which require the integration of more than one system. In these circumstances, the selection process will not necessarily be a comparison of one system against others; instead it might be a comparison of one combination of systems against others.

- **Ease to manage selection project**
  Understanding the objectives of the selection project will help to maintain the focus during this process.

- **Avoids different opinions being developed**
  One of the risks of a selection process is that objectives change during the process. During the selection process, team members will be visited by a number of representatives of different vendors, whose role is to promote their product(s). In these circumstances, it can be easy for individual team members to develop their own agendas and ideas. If all team members have been part of the process of building the requirements definition, they will usually be more focused during the selection process.

- **Defining key decision criteria assists with making a vendor selection**
  Finally, the requirements definition needs to be characterized into key decision criteria with specific elements being prioritized to help rank solutions during the selection.

CASE STUDY

Planning Pays Dividends

One USA-based multinational embarked on a major technology project six years ago. Having managed treasury activity on a series of spreadsheets, a significant domestic acquisition exposed the company to a series of commodity risks. Already concerned over the need to achieve greater control over treasury processes, this additional exposure provided further justification for the adoption of a dedicated treasury management system.

Six years on, the treasury team considers the implementation to have been a tremendous financial success. The implementation of a specialist treasury management system has enabled the company to manage treasury activity much more effectively. It has allowed, for example, the company to centralize cash management to its headquarter location. Cash surpluses are now managed centrally by professional experts. This has resulted in tighter adherence to investment policy, improved counterparty risk management, the creation of a more diversified investment portfolio and the ability to invest further along the yield curve as group positions have been aggregated. Together, this is one example of how the TMS implementation has allowed the company to generate millions of dollars in efficiency gains each year.

Yet, despite these gains, the treasury team rues what might have been. With the benefit of hindsight, they consider they failed to spend sufficient time planning the project, such that some of the potential gains have not been realized.

"When you move from a situation where you have no technology solution to adopting one, you need to understand what you want and expect from the system. You need to spend time envisaging the future so you can understand what you are trying to build before you start. We didn't spend enough time discussing these issues", explains the company's director of treasury. "For example, it would have been useful to know our precise reporting needs and the data the team would need to extract. This would have helped the treasury when it came to designing the system: we needed to ensure that the necessary data was available for reporting, know how to set up static data and organize geographies, and build permissions within the system.

"You need to build the requisite time into the project plan to make that happen and the organization needs to respect the need to plan. This will be difficult. It is big commitment to have skilled individuals dedicated to the project: especially individuals who are both knowledgeable about treasury and also open-minded about changing processes to reflect where you want to go and include best practice. "

Because the company had not planned the key outcomes in sufficient detail, the vendor was asked to build a series of expensive workarounds to allow them to continue to use their existing processes. This process cost time: the project was implemented a year behind schedule. These workarounds continue to be pain point as they require additional internal support and business testing as software

CASE STUDY

upgrades are installed.

This lack of preparation has resulted in two primary and ongoing challenges. First, there is no effective straight through processing for accounting. Although accounting was part of the implementation process, the accounting team was not able to provide dedicated resources. Notably, there was no accounting presence at month, quarter or year end. As the team was trying to document and test various transactions, the accounting piece was often missing with no one to check it: then, when an accountant became available, the process was often found not to work. This has caused some duplication of work and created tension within the team. Having a dedicated accounting resource participate real time would have helped to minimize this inefficiency.

Second, the team had not fully considered how to continue to support the system, and end users, post-implementation. For example, it has taken several years for the company to develop a team of people internally who really understand how the system works. This makes implementing change more difficult. As an example, the company lacks sufficient internal knowledge of the system to add the use of exotic options. The choice then becomes spend money with the software vendor for professional services or execute those transactions outside the system.

Lessons have been learned. "My recommendation for anyone about to go through this is to make sure everyone affected by the new system is at the table, engaged in the process with appropriate experience and with the right mindset. The team must be comfortable challenging existing processes and moving to best practices, even if it means changing the status quo. Do not short-change the time and effort needed to plan for the implementation. The old quote of 'fail to plan, plan to fail' is certainly appropriate.

"Ultimately, if you invest the time before implementation in really understanding what you want and what you are working towards, this will help you design processes and reporting appropriately. It will also allow you to design a flexible system which will prove nimble in future. Flexibility is a call option: you don't have to use it but it is good that you can."

Despite these reservations, the implementation has been a financial success for the company. When the system went live, it worked: trades were entered, settlements created, money flowed. From the director of treasury's perspective, an investment in time planning the outcomes of the system before implementation would have resulted in even greater returns.

How to build a requirements definition

Building a requirements definition will determine the extent of the technology project and the impact it will have on the wider treasury department. In particular, it will determine whether the implementation of the technology will be an introduction of technology to improve the efficiency of existing processes or a component of a much larger transformation of treasury processes.

One of the critical elements of the project will be the successful vendor's ability to support the treasury's expansion from today's activities into those expected in the future. As a result, even if the team understands which course is going to be followed, it is still important to build the requirements definition and to go through each stage.

There are two stages to this process:

1. The first is to describe the treasury activity now.
   This will include areas where technology is currently used in treasury (as outlined above) and also other aspects of treasury activity which could be automated, maintaining the same processes. This should as far as possible include a diagram of existing activities, supported by a series of process maps identifying how technology is used.

DIAGRAM 5.1 A process map illustrating current foreign exchange process

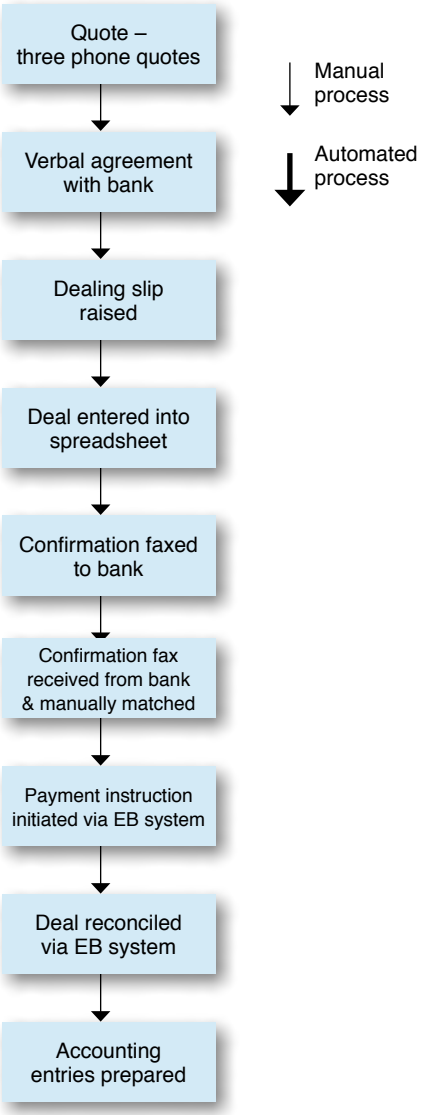
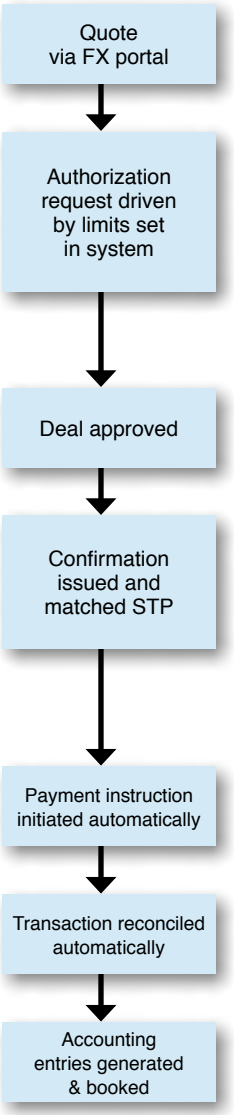


DIAGRAM 5.2 A process map illustrating future foreign exchange process



With that understanding, it is then possible to set some initial parameters for the project. Fundamentally, will the project seek to automate existing activity but maintain existing processes? Or will the project seek to restructure the treasury, with the result that some existing processes will be changed?

2. The second is to identify the treasurer's requirements and expectations from the technology in the future.

   This should be prepared for a series of points in the future:

   a. It should start with a statement of current activities which could be automated now;

   b. It should then look to a near point in the future, perhaps one to three years' time, depending on the company's wider plans; and

   c. If possible, the definition should anticipate developments beyond that second point.

      As with the current position, this should be supported by diagrams and process maps. These should indicate how the team expects the treasury (and other activities included in the project) to develop over time and the likely procedures which will be followed. It should also highlight any processes which could be changed.

The future-looking definition should be focused on the maximum degree of flexibility. as the company's activities and countries of operation may well change over time.

At both stages, the team should incorporate its knowledge of the functionality of existing and potential partner technology. As the team becomes more familiar with products, it is appropriate to change the requirements as a clearer understanding of both what is possible and what is likely to be possible is developed.

One of the key questions for the treasurer leading the project is to decide how early to define the detail of the project. One option for the treasurer is to decide best practice for the activities within the scope of the project and then to identify a technology solution which will support that. The alternative is to have a looser set of initial parameters and then review activities during selection.

Generally, the first option is appropriate for relatively standard implementations, such as the introduction of a treasury management system for the first time. In these circumstances, the primary gain will come from automating existing processes and reducing operational cost and risk, enabling the initial parameters to be relatively rigid.

Where the treasury team is aiming for a more transformative project, setting initial parameters too rigidly may mean that potentially effective solutions are dismissed too early. In these circumstances, the danger is that a lack of knowledge of the market will mean the final outcome is not as transformative as it might otherwise have been. In these circumstances, it may be worthwhile involving vendors and other potential partners a little earlier in the process to ensure such potential benefits are not missed. (We will examine the process of information exchange with vendors in the next chapter.)

What should a requirements definition include?

With an understanding of both the current and future use of technology, the team should start to develop the requirements definition itself. This needs to be done taking the following factors into consideration:

- The requirements of both treasury and other involved sections of the business (see below) should be listed;
- The definition should identify current requirements and also anticipate future developments (and therefore requirements);
- The requirements should be prioritized from essential to beneficial;
- The definition should be clearly drafted so it can be understood both by treasury team members and also other parts of the business, including management; and
- The requirements definition should be drafted in such a way that it can be used as the basis of the selection project.

Sample requirements definition

Status Key:

E Essential requirement. R Requirement. F Future requirement. PF Possible future requirement. NTH Nice to have.

Note: Certain requirements relate to additional functionality not currently available or to areas under consideration for implementation. These requirements are highlighted in italics in the table below.

Requirement	*Comment/Description*	*Status*	*No. of deals pa – approx.*
1. FOREIGN EXCHANGE			
1.1. Base currency – now/future	Group: USD. Other subsidiaries will have different base currencies based on the legal entity under which they operate.	E	
1.2. Currencies traded	EUR; AUD; CAD; DKK; GBP; JPY; SGD; SEK; PLN, CHF – and others	E	
1.3. Cross currencies – now/future	Multiple	E	
1.4. Spot	Extensively	E	
1.5. Forwards	Extensively – up to ten years forward.	E	
1.6. Forwards – time options	• Time options of one calendar month's duration are used for internal trades only. • During the reconciliation process, receipts of currency should be allocated using spot/time options. The transactions created would create entries across internal current accounts/external bank accounts as required. • See "Subsidiary Interface, Payments" below for more detail.	E	
1.7. Currency swaps	Yes	E	
1.8. Currency options	Not currently used but functionality required	R / F	
1.9. FX futures	Not currently used but functionality required	R / F	

Requirement	*Comment/Description*	*Status*	*No. of deals pa – approx.*
1.10. Intra-group FX structure	• All foreign exchange transactions from subsidiaries are routed through group treasury. • The subsidiaries are given the market price (i.e. no internal margin taken). • The transactions may be covered back-to-back with the market or aggregated in a group currency position. • The subsidiary breakdown of the aggregated currency position is required in order that the company can improve the efficiency of natural group FX hedging. • *There should be an automated batch closure of internal FX deals and creation of related settlement entries (internal current account or external payment depending on criteria for the specific entry).* • *Automated processing of receipts from imported bank file. The process would allow treasury users (or above) to view each receipt (if it is not already reconciled) and then allocate using spot/time options. The transactions created would create entries across internal accounts/external bank accounts as required.*	E	
2. INVESTMENTS			360 deposits
2.1. Overnight		E	
2.2. Fixed deposits		E	
2.3. Call accounts		E	
2.4. Commercial paper		R / F	
2.5. Eurobonds		R / F	
2.6. Certificates of deposit		R / F	
2.7. Money market funds		E	2 running
3. FUNDING			
3.1. Intra-group loans		E	360
3.2. External funding		E	480
3.3. Overdraft and short term facilities		E	
3.4. Loans			
Syndicated loans		E / F	
Fixed/floating		E / F	
Bullet, balloon, etc.		E / F	
3.5. Bi-lateral loan agreements		E	
3.6. Mortgages		R / PF	
3.7. Certificates of deposit issued		E / F	
3.8. Subordinated debt		E / F	
3.9. Eurobonds		E / F	
3.10. Other funding instruments		E / F	

Requirement	*Comment/Description*	*Status*	*No. of deals pa – approx.*
4. IR DERIVATIVES			
4.1. Interest rate options:		E / F	
Interest rate caps		E / F	
Interest rate floors		E / F	
Interest rate collars		E / F	
4.2. Interest rate swaps		E / F	
4.3. Amortizing swaps		R / PF	
4.4. Cross currency swaps		R / F	
4.5. Swaptions		E / F	
4.6. FRAs		E / F	
4.7. Futures		E / F	
5. COMMODITIES			
5.1. Commodities futures		E	

Requirement	*Comment / Description*	*Status*
6. GUARANTEES, FEES, ETC.		
6.1. Guarantees		E
6.2. Fees		E
7. CASH MANAGEMENT		
7.1. Banking structure		E
7.2. Cash pooling		E
7.3. Electronic bank balance reporting		E
7.4. Cash forecasting		E
7.5. Payments		E
7.6. Net settlements		E
7.7. Bank reconciliation		E
7.8. Multi-lateral netting		R
7.9. Net indebtedness		R
8. DECISION SUPPORT/RISK MANAGEMENT		
8.1. What-if		E
8.2. Strategic modeling		E
8.3. Sensitivity analysis		E
8.4. Stress testing		E
8.5. Mark to market		E
8.6. Money at risk (VaR)		R
8.7. Pricing capability		R
8.8. Yield curves		E
8.9. Other tools		E

Requirement	*Comment / Description*	*Status*
9. COUNTERPARTIES		
9.1. External counterparties		E
9.2. Internal counterparties		E
9.3. Facilities management		
Facilities available		E
Facility utilization		E
9.4.Credit risk		R
Credit ratings		R
Exposure to individual counterparties		E
Set limits		E
9.5. Comparative bank quote history		E
10. REPORTING		
10.1. Position reporting		E
10.2. Maturity schedules		E
10.3. Diary reports		E
10.4. Management reports – direct access		E
10.5. Drill down facility		E
10.6. Graphics		NTH
10.7. Other reports as defined		E
10.8. Report writer	User-friendly report writer not requiring specialist skills	E
10.9. Dashboard		NTH
10.10. Scheduler		E
11. SUBSIDIARY INTERFACE		E
11.1. General requirements		E
11.2. Payments/payment factory		E
11.3. Foreign exchange		E
11.4. Authorizations		E
11.5. Loans and guarantees		E
11.6. Internal accounts		E
11.7. Manuals		R
11.8. Other		R
12. ACCOUNTING AND OTHER BACK OFFICE		
12.1. Hedge accounting		E
12.2. General ledger / GL interface		E
12.3. Inter-company accounts		E
12.4. Subsidiary accounting		
12.5. Back-dating		E
12.6. Journal entries		E
12.7. Generated book exchange gains/losses, etc.		E

Requirement	*Comment / Description*	*Status*
12.8. Cash book reconciliations		E
12.9. Confirmations		E
12.10. Electronic confirmations		E
13. SECURITY AND AUDIT		
13.1. Dealer limits – by instrument type, etc.		E
13.2. Deal authorization levels		E
13.3. On-screen warning of limit breach		R
13.4. System administrator		E
13.5. System access		E
13.6. Password structure		E
13.7. Audit access and reports/ audit trail		E
13.8. Control reports		E
13.9. Storing and archiving data		R
14. TRANSACTION MANAGEMENT		E
14.1. Deal number format		E
14.2. Deal input screens		E
14.3. Portfolio structure		E
14.4. Deal linking		R
14.5. Intra-group deal margins		R / PF
14.6. Back dating restriction		E
15. SYSTEM INTERFACES		
15.1 ERP and financial consolidation systems		E
15.2. Market information systems		E
15.3. Import bank positions – EBR		E
15.4. Bank payment systems		E
15.5. Multi-lateral netting system		R
15.6. Accounting systems		E
15.7. Confirmation matching		E
15.8. Spreadsheets – MS, Lotus, etc.		E
15.9. Multi-bank on-line FX dealing		E
16. OPERATING AND GROUP BUSINESS ENVIRONMENT		
16.1. General IT environment		
16.2. Number of local terminals		
16.3. Group-wide system access		
16.4. Subsidiary interface		
16.5. System connection		
16.6. Technology provision – installed/hosted/SaaS		
16.7. Reliability		
16.8. Business continuity		

Who should be involved?

The exact list of participants in the process will depend on the nature of the company and the scale and scope of the project. Below is a list of the more usual participants:

Central treasury

Central treasury staff will be an important source of information when developing the requirements definition. Bear in mind, though, that some team members may view a new technology project as a threat to their positions (if one of the objectives is to streamline treasury operations it is an obvious conclusion), so their responses may be made in that light. On the other hand, a more transformative project may result in greater career opportunities for central treasury team members.

Regional / local treasury

The degree of centralization is an important factor in determining the importance of input from regional and local treasury team members. They will be more familiar with the inefficiencies at regional and local level, especially in a highly centralized structure. Participation of treasury team members away from the center is particularly important when considering the implementation of the project, especially the more transformative projects. These team members need to be managed carefully as their input will determine the success of the project and they will be key in driving forward the implementation. However, there is a very real threat to their own positions, whether as a full loss of employment or as a loss of autonomy as their decision-making power is reduced.

Other key business unit personnel

In many organizations, there will be personnel who perform treasury functions but are not formally part of the treasury team. This is most common in smaller companies which operate with a streamlined treasury organization. In larger companies, this is often the case in group subsidiaries where the business unit has not been included in a centralized structure or where local regulations in their country of operation make such participation difficult or impossible. Consultation is particularly important where these personnel are required (or will be required) to feed data into the central treasury, for example to develop the group cash flow forecast or as part of the wider treasury reporting activity. In larger organizations, the divisional or group entity chief financial officers (or similar) should be included.

Accounting and finance

Understanding the accounting requirements of and implications on any new technology project is an important element in its design. This question should be approached from two angles. First, the group will need to determine how best to generate treasury accounts. Second, all activity will need to feed into the group's general ledger. Where a group operates internationally, it is particularly important that any local rules are clearly understood before a structure is designed, to avoid any additional manual work in the future. Obtaining accounting support and engagement will require early planning

and communication: in lean organizations, accounting resource will be fully committed at month, quarter and especially year-end.

- **Internal audit and control and/or external auditors**
  Similarly, as one of the benefits of a redesigned treasury technology solution is likely to be the demonstration of improved awareness and control over all treasury activity, it is important that the system does actually deliver this. Specifically, the treasury department will need to work with internal audit to demonstrate how the system itself can be audited. First, the internal audit team must be able to understand and follow the processes that are automated in the system. Having a "black box" which takes data and generates a result is simply unacceptable either as an auditable process or for a treasurer seeking to demonstrate control. Second, the new solution will need to have appropriate security, both in terms of protection against external hacking and also as a means of ensuring only the staff members entitled to perform particular actions are able to do so. Finally, all parties need to understand how best to generate reports which will demonstrate these outcomes. Note that there is a risk that internal audit may not fully understand the full extent of the level of security and control required in today's treasury environment, especially where there is no formal treasury team or function. In these circumstances, external validation of the new structure may be necessary.

- **Information technology (IT)**
  The involvement of the IT department will depend on the extent to which IT participation is necessary in terms of developing, implementing and maintaining the treasury technology solution. In some larger organizations, the treasury department employs its own IT team, responsible for maintaining the systems and interfaces and for supporting team members who need to use and understand the system. Such organizations are few in number, given the resources available. Other organizations are moving towards an outsourced provision of service via SaaS type solutions, where the primary responsibility for system maintenance is the vendor's. However, there will be a point at which the treasury technology does need to interface with systems maintained by the IT department, so it is important that any new solution is compatible (although most can be made to be) and certainly any obvious potential problems are avoided. The IT department should be consulted as early as possible. This is especially important in organizations without large IT resources, as any IT commitment will need to be especially carefully managed.

- **Tax department**
  The tax implications of any transformative changes which result from the technology must be understood. Generally, the tax department should be consulted during the development of any such project, but it is particularly important if the project includes cross-border netting or pooling or the establishment of an in-house bank.

- **Other departments linked to treasury**
  Finally, it is critical to involve any other department which has some link with the treasury department. This list will vary from organization to organization, but will likely include the following:

- **Human resources**
  In some organizations, human resources will control the system which governs individuals' access to software functionality across the group. If the new technology is to include an element where individual authority limits are linked to the human resources program, this contact is critical.

- **Payroll**
  Even if the role of HR is not as central to treasury operations, the new technology will still need to be assessed from the perspective of payroll. In some cases, the new technology may introduce a requirement for new personnel with new skills. In others, the technology project may result in redundancies as some activities are automated or moved elsewhere. Physical data input from payroll into the new treasury system may also be required if treasury plans to use the new technology for group cash forecasting purposes.

- **Shared service centers**
  Where groups operate shared service centers, it is vital that their input forms part of the requirements definition. Any new technology project offers the opportunity to reassign tasks, so it may be possible for the shared services centers to perform more roles to generate more economies of scale. The technology project may also offer an opportunity to improve oversight and control of shared service centers from the central treasury. In the case of a shared service center with responsibility for accounts payable, this might take the form of giving treasury access to real-time payments data or an automated link to the group cash flow forecast. Finally, the technology project may also allow the shared service centers to take advantage of other opportunities such as the ability to route payments via a more cost-effective path.

- **Legal**
  The legal department should always be consulted on two main issues. First, there will be contractual arrangements surrounding the specific technology selection, implementation and support. Second, the legal department will also need to review any changes in responsibilities, especially where a centralized treasury assumes responsibility for making and collecting payments on behalf of group entities and requiring group entities to participate in an in-house bank.

- **Other**
  Finally, the treasurer will need to review the treasury department's activities to ensure all those who have, or could have, links with the department are consulted over the requirements for the technology.

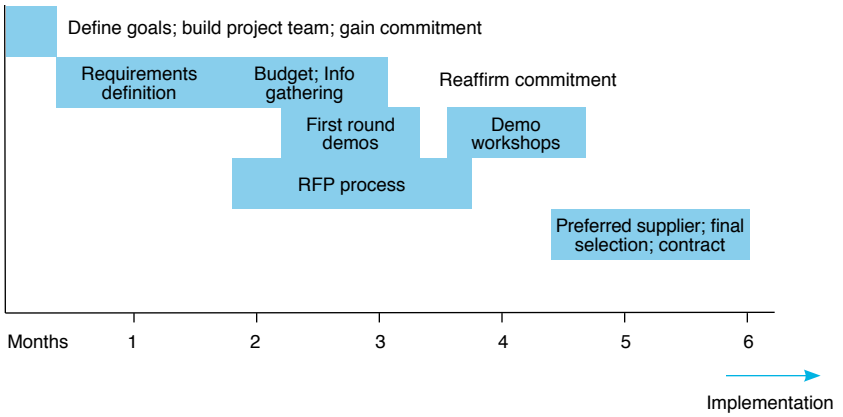
- **External providers**
  It may also be necessary to consult any existing or potential external providers which interface with treasury and supply or require data in a specific format. This might include, for example, credit card acquirers in the case of retail organizations.

Define success criteria

As part of the requirements definition, the team should establish a series of success criteria to help to structure the project, manage its progress and identify achievement.

A common way to do this is to establish a series of timetables for all the major elements of the project, including building the requirements definition, selection and implementation. The implementation project may be considered as a separate project from that of selection, with a project team of a different complexion and even potentially a different project manager.

DIAGRAM 5.3 Selection project timetable



Particularly for the implementation project, within each element, the project should be broken down into a series of sub-projects or phases. Each of these phases should be clearly defined, with a definition of completion and a statement of the required result. It is important to recognize that these phases may change as the project progresses. For example, success or failure at one stage may allow or require change in the project.

Success criteria

Success criteria for an implementation project could be:

- Project finished on time;
- Project finished within budget;
- Aims of the project definition met (Bear in mind, these might include objectives which might be difficult to measure, such as protection against fraud or retention of company competitiveness as a result of streamlined operations);
- Satisfied customers (business units, system users, etc.); and
- From a personal perspective, treasurer's reputation enhanced.

The requirements definition must always be matched against the available funding for the project. This should include:

- **Cost of software**
- **Cost of integrating different software packages**
- **Cost of special enhancements**
  Identify whether these will be produced by the vendor(s) or whether they will need to be developed in-house.
- **Cost of implementation**
  Depending on the project, some upfront costs may be required from the vendor. With the core treasury staff focused on the implementation, there may also be a need to hire temporary staff to maintain treasury operations during implementation.
- **Cost of hardware**
  The cost of any new hardware necessary should be factored into the budget. However, this is not always necessary, especially if a SaaS solution is adopted.
- **Third-party consultancy**
  Consultants specializing in treasury technology and/or project management may be used at some or in all stages of the technology project. The company may also consider employing different consultants at each stage to maintain control of the project should there be any fear of consultant bias. See below on how consultants can be used to draw up a shortlist, to run a selection process and to support implementation.
- **Ongoing maintenance and support**
  As well as the initial capital cost of the project, the treasurer must also consider the ongoing cost of maintenance and support for the solution. These figures should also form part of the business case for the project. The responsibility for maintenance and support will vary depending on the nature of the installation, with SaaS solutions being the cheapest, and local system installation the most expensive. Typically, the maintenance and support costs for a SaaS solution will be included in the regular rental payment, whereas for a full license implementation this cost will be calculated as a percentage of the license fee and charged separately on a regular basis. The treasurer should include any costs of maintaining interfaces between systems.

HOW DO YOU FIND THE MARKET?

One of the biggest problems is to ensure that all potential providers and systems are considered in the process of identifying the most suitable technology solution.

There are a variety of different sources of information, although all have potential disadvantages. These sources include:

- **Current system suppliers**
  The first source of advice should be existing system suppliers. This will

provide two critical pieces of information: whether the company can get the necessary increased functionality from the existing system and whether the company can get the necessary functionality from a different product offered by the same provider. We will examine these in turn.

- Improving use of current system

  As discussed, a treasury department's technology requirements will change over time. System vendors also tend to improve the functionality of their core products over time to maintain competitiveness and to solve some emerging needs. Treasurers may be able to derive greater utility from their existing solutions simply by discussing those requirements with their existing providers. It may be, for example, that the treasury has not been using a particular function because it was not seen as necessary or it was not available when a system was first installed. As long as the treasurer enjoys a good relationship with the existing supplier, achieving an improved technology solution by simply using current technology more effectively would usually be the best solution, at least in the short term. Even if this is not sufficient, it will allow the company to benefit from enhanced functionality while a search for alternative solution is found. To ensure an up-to-date knowledge of system enhancements and the modules available it is important, where the facilities are available, to take an active role in user groups and attend regular meetings and to subscribe to any news bulletins the supplier may provide. It may therefore be of value to carry out a review of the current implementation before entering the market for a replacement system.

- Installing a different product

  One reason many companies seek a new treasury solution is that they have simply outgrown the functionality of their current system. For example, the existing technology solution may allow some activities to be centralized perhaps by giving greater visibility of cash across a group of subsidiaries operating in different countries. The treasurer may want to expand the role of the central treasury, perhaps by introducing an in-house bank. This may be beyond the scope of the current treasury solution, although the company's current provider may well have a product which offers this enhanced functionality. Investigating other products from the same vendor should allow the treasurer to identify the differences in functionality between the products (as they will often have a similar feel to them based on a similar underlying structure, although this will not always be the case). It may be the case that rather than replace the existing system with another from the same supplier, they may have available a separate product that provides the required additional functionality as a bolt-on. Even if the treasurer decides not to install a different product from the same supplier, this process will give a benchmark against which to assess alternative solutions.

- **Other known system suppliers**

  The next stage is to approach other known system suppliers. These may include vendors who were approached during a different technology

procurement project, but whose proposition was not appropriate at that time or from projects carried out at a previous employer.

Recommendations

Recommendations from other professional colleagues (former colleagues, other delegates at professional development events) can be very helpful in identifying potential technology providers. If the opportunity arises, it can be useful to discuss a colleague's thought processes when considering a particular system or solution. The reasons why a treasurer decided not to adopt a particular solution are often very important. However, bear in mind that some of the reasons may no longer be valid (additional functionality may have been developed in the meantime) and that each organization does have different requirements.

Treasury conferences

Many technology providers attend treasury conferences, including the annual conferences and other events organized by the AFP and the ACT. Such events are a good opportunity for treasurers to identify potential suppliers and to see an initial demonstration of the vendors' product ranges. Most vendors will have a standard demonstration for such events, designed to give a general overview of their product's functionality, while some may offer longer and more detailed demonstrations. In general, demonstrations at a conference should be used to identify potential partners, rather than as a selection tool, as the demonstrators will be using data and structures which show the product in its best light.

To get the best from conference demonstrations, it is worth trying to book a demonstration time in advance of the conference, if possible. It is also important to work out in advance what information is required from vendors either individually or for comparative purposes.

Treasury publications

There are a number of publications targeted at treasury professionals, including the Treasurer published by the ACT and AFP Exchange magazine. Most contain regular features on treasury technology which can also be a useful source of advice for treasurers. Articles in some of these publications can vary significantly in terms of the level of advertorial content.

Specialist guide books

There are also a number of specialist guide books which cover the use of treasury technology. Some contain lists of treasury technology providers.

Internet

The internet is a useful tool in two regards. First, there are a number of resources which provide listings of, and articles by, treasury technology providers.

Second, a technology provider's website is a useful place to start your research. It will provide at least some information about the range of products a vendor offers, although vendors vary in terms of the depth of information they provide about technology solutions. Most vendors will also publish some information about the financial strength of their businesses and perhaps

a selection of clients. Especially when considering ASP hosted and SaaS delivered solutions, treasurers will be increasingly aware of the importance of building a relationship with a vendor committed to the market.

- **Use a consultant**
  It is also possible to contract a consultant to help to develop a shortlist. This has a number of advantages:

  - The consultant will have knowledge of the current market, so will be able to do much of the preliminary research. This frees up the treasurer's time for other activities in the process, including designing and implementing the technology solution;
  - The consultant will also understand how many of the vendors operate. In particular, the consultant will know which of a vendor's products will be most suitable for particular companies;
  - The consultant will be able to eliminate unsuitable providers and solutions before presenting a potential shortlist to the treasurer, thus ensuring any selection time is focused on realistic potential providers. This is particularly the case if the consultant has also worked on the requirements definition and thereby gained a thorough understanding of the client's needs; and
  - The consultant will ensure that the company has not missed an opportunity through failing to identify all of the available and appropriate systems.

Although an experienced specialist consultant will provide considerable benefit to the project, the company will need to consider the following before appointment (we will examine the role of consultants at other stages of the process in other chapters):

- The consultant should be independent of suppliers and should have no unwarranted bias towards or against particular suppliers, be it based on experience of past selection processes for other clients or as a result of a focus on a particular type of technology. The process of appointing a consultant should clarify any potential conflict issues. It is essential that references of past experience are taken. The consultant is being paid to provide their experience, so it is important to understand that experience;
- The consultant will need time to understand the company's technology requirements although this would have been acquired if the consultant has worked with the company in building its requirements definition. It will be impossible for the consultant to identify an appropriate shortlist unless the company has a clear view of its objectives. The consultant could also be used to help the company consider its objectives; and
- Beware an open-ended arrangement with a consultant. Consultancy arrangements work best when the consultant has a clear directive. In some circumstances it may be appropriate to use different consultants at different stages of a technology adoption project.

GENERATING A SHORTLIST

Once the evaluation process has been completed, the evaluation team should set a shortlist of potential suppliers. This process will be easier for straightforward treasury technology projects. However, for more transformative projects, the shortlist could include a variety of alternative technology methods designed to achieve the same objectives.

The next chapter examines the selection process in more detail.

Chapter Six

Selection.

SUMMARY

This chapter outlines the selection process step by step. It outlines the key personnel who should be involved and explains the key decisions that need to be made. It explains how the selection process can be iterative in nature, with the treasurer asking ever more detailed questions of fewer potential vendors as a decision is reached. The chapter explains the process for implementation of a large and more complex solution. A similar process will be followed for less complex solutions, albeit more quickly and, possibly, with some stages combined.

WORKING WITH THE REQUIREMENTS DEFINITION

The selection process will be driven by the requirements definition. As discussed in the previous chapter, there will be differing approaches to building the requirements definition. Some organizations will decide to finalize the requirements definition before moving on to the selection process. Others will start the process of building the requirements definition but will want a period of information exchange before finalizing the definition and moving to selection. The course taken by the organization will impact on the first part of the selection process.

The selection process will also be driven by the scale of the project. For example, the installation of a treasury-wide solution will generally affect more departments across the business than a bolt-on addition to a previous installation. Similarly, a treasury-wide solution will require a more detailed RFP and demonstration workshop than a bolt-on addition.

Getting commitment

As with the process of building the requirements definition, it is critical to get the same commitment from other key players within the organization. The process of building the requirements definition (regardless of whether or not it is complete at this stage) will have determined the parameters of the technology project and the departments likely to be affected by it.

As with the requirements definition, it is critical to maintain support across the organization during the selection process in a number of key areas.

Retaining management commitment

It is important to retain management commitment during the process of selection. This may become important if circumstances or requirements change during the selection process or if the requirements definition is amended as a result of the process of information exchange or during system demonstration.

Minimizing resistance to the project

Although the requirements definition will have been built with involvement from other departments in the organization, there may still be some resistance to the project. While this is a treasury technology project, it is still critical to involve other departments in the selection process where possible. There are three key points where this is most important:

- First, the other departments must have had the opportunity to feed into the development of the requirements definition and, if finalized, to approve the final document;
- Second, the other departments should be invited to view demonstrations where appropriate and to contribute to the process of information exchange (see below). This is especially important if the requirements definition has not been finalized prior to the commencement of the selection process; and
- Finally, other departments should have an opportunity to comment on the final selection prior to contracts being signed. Getting input at these crucial stages will help those departments to understand the scope of the project, ensure that their needs are addressed as much as possible and to start to prepare the ground for implementation.

Identifying the role of the IT department

Understanding the likely involvement of the IT department is critical to ensure first that key issues are resolved (ideally before a shortlist has been generated) and second so that resource can be used effectively during implementation. In some organizations, direct IT involvement in treasury technology may be limited to ensuring data feeds can be integrated into systems used in the wider organization (such as the ERP and accounting systems). In others, the IT department supports the implementation and operation of all technology, including dedicated treasury technology. In organizations where IT has a direct involvement in supporting treasury, it is vital that the IT department plays a central role in selecting the technology without impacting the defined treasury business requirements.

Where the IT department's role is less central, there will still need to be some IT input in the selection process (because of the need for interfaces between other centrally maintained systems). A problem may develop if the IT department does not or cannot support the new technology project. This may arise in a variety of forms, with a lack of cooperation over project planning the most likely. Leaner organizations may also find it difficult to devote dedicated

IT personnel to support the project. If experience suggests that the IT department is not likely to (or is unable to) support the project, the selection team will also need to work out strategies to overcome the problem. Their scope will depend on the resource available. One option will be to employ specialist consultants for the implementation period. Another option will be to select a solution where much of the support is managed by the vendor either through a hosted or a SaaS solution. Finally, depending on the scale of the project, the team can ask management to fund an in-treasury IT presence. Communicating the likely role of the IT department is also a key element in the selection process. All potential vendors will have experience of working with treasurers who enjoy different levels of support from their IT departments and all vendors will have strategies to overcome problems. Some of these strategies may add cost to the project.

For a smaller project, much will depend on whether its cost is already included in the treasury department's budget, as this will reduce the need to obtain management support. In most cases, a smaller project will have limited impact outside the treasury department. However, care should be taken to ensure other departments are consulted where necessary. Similarly, the level of IT support will need to be assessed at an early stage, too. For bolt-on solutions from an existing provider, integration should not be difficult. However, the IT team may need to be used to ensure the smooth transfer of data from the legacy systems.

BUILDING THE SELECTION TEAM

The selection process needs to be led by a project leader and a selection team. These can be (but need not be) the same people as for the evaluation and/or the implementation phases.

At this stage, it is usually appropriate to have a small core team driving the selection process itself, although the team will want to consult at various stages in the process. As long as the requirements definition is clear and agreed by the appropriate parties, there is no need to have a large selection team, as this will only complicate the process.

The precise make-up of the selection team will vary from organization to organization and according to the nature of the project. For example, the selection team for a straightforward entry-level treasury management system (or a smaller scale solution) may consist of three core treasury personnel. For a wider project, which might require interfaces to be built internally, it may be appropriate to include a member of the IT department (depending on which department manages treasury technology, subject to the IT department being able to dedicate someone to support the project) and a member of the accounting department (to ensure the selected solution can generate the necessary reports).

The selection team will need to have the skillset to be able to evaluate the potential alternative solutions against the requirements definition. The required skills will depend on the scope of the solution. Areas which may require specific

expertise to evaluate include any risk management functionality and the degree of additional IT support which might be required to build and maintain any interfaces with other installed technology. It is crucial that the personnel included in the team have a clear understanding of present and likely future activity, transactions and cash flows.

The selection team will be responsible for inviting input from other parties and for communicating progress with other parties. Careful thought needs to be given to this communication process as it can have an impact on the success of the implementation part of the project. Other parties may need to be invited to the workshop stage (see below) to ensure their input is considered sufficiently. Again, the key point is that the selection team has a full understanding of the treasury department's responsibilities and activities. Most importantly, each individual on the team must have spent some time discussing objectives and requirements with those parties for which they are responsible. The other parties must have confidence that their perspectives are being considered by the selection team.

KEY DECISIONS IN THE SELECTION PROCESS

As part of the selection process, there are a number of key decisions:

How should the project be planned?

Where the project requires the installation of a single system, the selection process will be relatively straightforward. However, if the project involves more than one small new installation, a decision needs to be taken as to the order of selection and implementation. For example, if a corporation is considering implementing a new ERP system, should treasury select its technology first (so the selected ERP system works with it) or should it wait until after the ERP system is selected (and include the ERP treasury workstation module as part of the selection project)?

If the treasury team knows that a single system will not be sufficient, should it identify the best solutions for specific activities (perhaps those where a spreadsheet is being used at the moment) and then work out how to connect them (although one should be particularly careful in following this route to ensure it does not result in a less than fully integrated solution), or should it identify a good core system and then work out how to provide solutions for activities which the core system does not cover?

What is the best way for the technology to be delivered?

As discussed in Chapter Four, there are three main ways in which the technology can be delivered – a local installation, a hosted service or via SaaS. As well as considering cost and efficiency, the treasury must also consider the current and likely future role of the vendor.

Each of the three delivery channels represents a different relationship between the vendor and the treasury.

- **Local installation**
  In the case of the local installation, the treasury is most immune from any change in direction from the vendor in the sense that the system will still operate if the vendor withdraws from the market. However, the treasury will typically have paid a significant installation charge and will still be reliant, to some extent, on the vendor for ongoing system support and particularly for further system enhancements and the development of new core functionality.

- **Hosted service**
  Again, the treasury may have paid an installation charge and will be reliant on the vendor for system support. However, because the system is hosted by the vendor, the treasury will be more directly affected if the vendor withdraws from the market. The client can opt to have the system hosted by an independent organization with an arm's-length agreement or the system supplier themselves may use the services of a specialist hosting supplier to provide the service as part of a complete service.

- **SaaS**
  The treasury will not have paid an installation charge, in most cases, although it will have had to spend some resource on integration when moving over to the new service. There would be some interruption to the treasury if the SaaS provider failed or otherwise withdrew from the market. However, in the case of a simple implementation and because the service would be relatively standardized, it would be relatively straightforward for the treasury to adopt a similar SaaS solution from another provider.

When considering the delivery channel, the selection team must evaluate the potential benefits and costs of each one. Most importantly, they should ensure that any data is backed up and stored in such a manner that it could be migrated to a new provider at any point in the future, if this became necessary.

CASE STUDY

Extending Treasury Functionality via SaaS

When Wolseley first implemented a treasury management system in 2006 to comply with IAS 39, their only realistic choice was to host it on their own servers. Ten years on, after a review of that installation, the Wolseley team decided to implement a cloud-based solution. The aim was to provide flexibility for the next eight to ten years, while avoiding the cost of maintaining a hosted solution. Although the project has been a success, moving from one technology solution to another can result in a number of implementation challenges.

The Wolseley team identified a clear set of objectives of the new technology. Since the adoption of the first system, the company had centralized significantly. They needed a solution which allowed some functionality to be rolled out to the rest of the group: primarily the ability for group entities to submit details on balances, forecasts and transactions

directly into the system, allowing central treasury access to more real-time information. A SaaS solution makes this process much easier.

To determine precise requirements, Wolseley followed a very simple process. "The treasury department put a series of data together about what we do and what we needed. We then consulted the business on what they would find useful from a new system via a simple, tick box questionnaire. We then issued a 120-page RFP to four shortlisted vendors (including the original provider). This included a lot of information about our current processes as we wanted all potential vendors to know exactly what we were expecting," explains Royston DaCosta, Group Assistant Treasurer, Wolseley Group. Although the team was keen to move to a SaaS solution, functionality remained a key driver. "Not only is it important that the new system can do things better than the current system, but it must also be able to do all the things you like about your current system," says DaCosta.

Considering their requirements to be not overly complex, they decided only to approach a small number of providers second time around. Given all these providers could support their needs, DaCosta focused on selecting a vendor to provide future-proofing. He was encouraged, for example, by their selected vendor's proactive responses on EMIR. He also welcomed the vendor's open pre-sales approach: the Wolseley team was invited to a user group conference before selection.

From an implementation perspective, the biggest challenge came from the new treasury solution being part of a much larger finance transformation project within Wolseley. This was focused on the upgrade of the existing ERP system and the Financial Consolidation Reporting system, which had two effects. First, senior management were engaged in the treasury technology project due to it being part of a wider Finance Transformation project. This means the due diligence hurdles were higher, especially with respect to SaaS, as it was new to the group. Second, it also complicated and delayed the implementation as the ERP system upgrade required a deal of configuration whereas the TMS was "plug and play".

There were unexpected issues, too. For example, DaCosta had expected the treasury system to be able generate the necessary accounting journal entries automatically. He explains, "We had to spend some time negotiating with our vendor to ensure the straight through processing we had before could be maintained, so the requirements of our colleagues in finance could be met. The result exceeded our expectations and more importantly that of our colleagues in Finance!"

Another challenge came from the need to transfer data from the original TMS to the new solution. When adopting a system for the first time, data is extracted from a series of spreadsheets. As Wolseley was extracting their data from an existing TMS, navigating this process was more effort than expected as the data needed to be converted into a format that ensured all the relevant data was captured in the new TMS.

DaCosta places great emphasis on good project management. "We had a steering committee, a treasury project board and a project manager all of whom reported on a weekly, monthly and ad hoc basis. Whoever you appoint as project manager must be experienced. If they are external, they should ideally work with an internally appointed project manager who will ensure that all relevant factors are considered."

DaCosta and his colleagues prepared 18 different types of documents to support the implementation process.

CASE STUDY

One, the project completion document, set out the team's objectives and timelines and recognized delivery on time and on budget as a major achievement. "We saw efficiencies from the new solution right away. We interfaced to at least seven different systems. In the past, these interfaces were managed internally and so we were reliant on internal IT. Now some are outsourced as a SaaS, however, the majority connect via SFTP (secure file transfer protocol), ensuring the high level of automation and control continues.

Can the activity be outsourced?

The final question to consider is whether some or all of the activity covered by the project can be outsourced. Broadly speaking there are three main areas where technology vendors can effectively supply an outsourced service:

- **SaaS**
  The growing use of SaaS solutions is an example of how technology vendors are effectively becoming outsource providers of their service. By allowing access to the system via a web browser, the vendor eliminates the need for the user to install the system at any level. The vendor assumes responsibility for maintaining the system and managing interfaces with other commonly used solutions. The end user will only experience change when the system's underlying functionality is upgraded.

- **Technology management**
  The use of hosted services provided by the vendor allows the treasury to enjoy an installed system, but with the system being hosted at the vendor's location. Under these circumstances, the treasury will access the system via a dedicated link, which will be the only element of the technology it will have to maintain. Because the system is hosted by the vendor, all responsibility for maintaining it and installing upgrades will remain with the vendor.

- **Integration management**
  One of the challenges in more complex technology solutions is to manage the flow of data between different software solutions. In the past, this would have been resolved by an in-house team developing an interface between systems (and redeveloping the interface as vendors upgraded these systems). Although this remains a solution to this problem, a range of "middleware" providers have emerged to provide interfaces between the most commonly available systems. The same solution to the same problem, for example translating payment files generated by treasury management systems into local formats for processing through payment systems, will work with almost all the available treasury management systems.

In addition, wider treasury activities can be outsourced to third-party providers. In these circumstances, the outsourcing provider will assume the responsibility for managing the whole process, including the technology. For example, if an organization uses money market funds as a location for its surplus cash, many of the technology issues, such as the initiation of transactions, settlement and

custody, are effectively outsourced to the money market fund provider. Other organizations may outsource accounts receivable activity by using a factoring company or accounts payable by establishing a supply chain finance structure via a procure-to-pay solution with a bank. The use of a wider outsourcing solution can be an effective way of reducing the treasury's reliance on complex technology, but this should never be the primary driver of such a decision.

Involve procurement

If the company has a separate procurement function then they should be consulted at an early stage to ensure all of their requirements and processes are met throughout the selection project. Some organizations require procurement to be involved in supplier meetings and throughout contract negotiation. Note that for many organizations the selection of new treasury technology will not have been made before. In these circumstances, procurement rules may not be sufficiently developed, so the treasurer will need to discuss procurement's approach at an early stage so that delays can be avoided later in the process.

First-round demonstrations

Once the team has identified a shortlist of potential suppliers, they then should arrange a round of system demonstrations (some team members are likely to have had a brief demonstration during the shortlisting process). These should take from a few hours up to a day each and should be given by each of the shortlisted suppliers. It is usually appropriate to invite between four and six vendors to demonstrate, although this will depend on the complexity of the project and its technology requirements, as well as the amount of time available to the project team. (For small-scale projects, only one demonstration stage may be necessary, especially if the preferred solution is a bolt-on to an existing system offered by the same vendor.)

For these demonstrations, the company should provide the suppliers with basic information on the company and its treasury set-up and the functionality required to ensure that the suppliers can give a meaningful presentation. This does not need to go into detail about numbers of bank accounts or provide deal data. Rather it must give each vendor a general picture of the treasury together with specific special requirements that might serve to eliminate non-suitable suppliers quickly.

The suppliers will be expected to give an overview presentation of their business, products, strategies, etc. at the demonstration stage; the workshop stage (see below) is the "sleeves rolled up" stage when pre-supplied data is run through their systems and worked upon in a detailed way. Specific company requirements and the application of the solution embracing workarounds and new required functionality would be covered at this time.

Some organizations prefer to issue a request for proposal (RFP) to all of the initial shortlisted suppliers. However, this adds considerable and unnecessary workload, particularly if the initial shortlisting and evaluation is carried out competently.

At this point, the final shortlist for potential vendors should be agreed. In most cases, the aim should be to develop a short list of two but no more than three suppliers. Keep in mind that it might well be appropriate to have a shortlist of one preferred supplier at this point.

Information exchange

The central stage of the process is the exchange of information between suppliers on the final shortlist and the organization. This stage should be divided into four key phases:

Provide key information to vendors

The first phase of this process is for the organization to provide key information to short-listed vendors. Companies may require disclosure agreements with the vendors as part of the process. The objective is to ensure the potential vendors have as much relevant information about the organization's treasury operations as possible. This should include the scope and core objectives of the technology project. This will allow the vendors promoting more than one potential product solution to determine which of their solutions would be best placed to meet the current objectives, whilst also being able to accommodate future expansion plans. Some vendors may decide at this stage that the scope of the project is either not sufficient to justify their time or that their solutions may not be sufficient on their own to meet the project's objectives. In the case of the former, this will help the team to focus the shortlist (and thus selection time) on more appropriate potential solutions. The latter will give the potential vendors the opportunity to indicate where shortfalls might be in their solutions and to suggest potential partners to fill those gaps.

The bottom line is that the more detailed the information provided at this stage, the more focused the response from the potential vendors should be. (Bear in mind that, for smaller scale projects, the level of information required on both sides will be less.) Any potential vendor which fails to provide a detailed response will have indicated by default that they believe the scope of the project is not sufficient to justify their time. This is an important factor. After all, if the potential vendor is not prepared to respond to initial questions at selection time, it is likely that their response at implementation (or post-sales) will be similarly underwhelming, resulting in operational implications for the organization.

List of information to be provided to vendors

At this stage, the following information should be provided to potential vendors:

- An overview of the company;
- An overview of the treasury department, including staff numbers, areas of responsibility and transactions volumes. It should also include details of any in-house bank, shared service centers and other relevant structures in use and also planned to be used after completion of the project;
- A list of countries and currencies operated in (including those for planned expansion);

- The number of legal entities broken down by country and group division; and
- Bank accounts held by bank, broken down by country and group division, including details of any liquidity management structure.

The last two points above will only need to be provided at a high level for the first round demos (unless the company is doing something unique) so that the vendor can understand the overall structure.

At the workshop stage the vendor should be provided with more detail. The company will also provide the vendor before the workshop (in good time) a portfolio of data to be run through the system for testing, together with a business structure to be used by the vendor as the basis of the workshop.

Also, an agenda should be prepared for any initial meeting. This agenda should include details of any specific elements which the treasurer wants discussed at this meeting. This can be clarified by telephone call.

At the same time, it is important to ask the potential suppliers about their business and the way they work. Although some clients may be able to get suppliers to operate in a different way than usual, vendors will usually work best in the environment they are used to.

Information to be sought from vendors

The organization should ask for the following information from potential suppliers:

- **An overview of the company**
  The supplier should be asked to outline its corporate structure, office locations and details of its support staff. This information should show the potential client how committed the supplier is to the business and to the particular geographical market. This information should also indicate whether local or online support is available post-sales. It is also important to get an understanding of the supplier's client list. Are there companies with similar complexities on that list? The company should also perform proper due diligence on each potential supplier. This should seek to analyze the long-term viability of the vendor by assessing issues including the company's financial health, its management structure, its current projects and any protections covering change of control.

- **An overview of the company's products**
  This should show whether the company is committed to supporting treasury. Treasury needs vary from relatively straightforward for the organization operating in one country and one main currency to highly complex for those organizations with global operations in multiple currencies. Getting information about whether the supplier distinguishes between alternative types of client will help to decide whether the supplier will be able to support the organization through different stages of development. It is also worth trying to identify how suppliers coped with recent regulatory changes. For example, did they try to develop their own hedge accounting functionality or do they have partnerships with specialist providers?

- **Understand the next steps in the process**
  All vendors operate slightly differently. Just as a potential client will want to be comfortable with a vendor, so that vendor will want to be comfortable with the client. Vendors will go through their own internal processes to assess the viability of a potential client, to understand the client's needs and to try to work out the best way of providing a solution to their objectives. This will also give the client a clear idea of timescales when developing potential implementation plans.

Set out a request for proposal

Once the final shortlist has been agreed, it is appropriate to send out an RFP to each shortlisted vendor. This applies even if there is a single name on the shortlist. The RFP will act to validate the selection of the single shortlisted vendor. As such, the RFP response will be an important document in the event that the implementation fails to deliver a specific requirement. An RFP document should also be sent out for a smaller, bolt-on solution for the same reason, even if it is sent to an existing supplier for an additional module.

More usually, the treasury is likely to send out a small number of RFPs. The ideal number will vary between projects. However, it is important to send RFPs only to real contenders for the business. If drafted correctly, there will be a significant amount of work to complete the RFP on the vendor side, which may require some treasury time to provide them with information with which to complete it. Similarly, once the completed RFPs have been received, the selection team will have significant work to assess the responses. In this context, it is not normally appropriate to send RFPs to more than three potential vendors. In most cases, it will be sufficient to reduce the list to two.

Some organizations may have internal procurement regulations requiring that more than one potential vendor must be approached. In these circumstances (and if the company has a preferred vendor), identify whether this regulation applies to technology projects (or projects over a specified value), but consider that company culture may protect the treasurer in the event that something goes wrong with the installation if two vendors are asked to respond to an RFP.

The RFP document itself should be carefully drawn up. There is a sample document in the appendix to provide an illustration of an RFP which could be used to acquire a new treasury management system.

When drafting the RFP, the following points are important:

- **Work out what information you want**
  Unless the treasury team understands the purpose of the project, it will be impossible for the vendor to meet the objectives. The core objectives of the project should be submitted along with the RFP to help the vendors understand the project.

- **Ask questions which support that requirement for information**
  The team should already have details of the vendor and have seen an overview demonstration of their product(s). The purpose of the RFP is to ask specific questions which require specific answers. This could, for example,

include details of specific payment message types which are supported in each of the locations listed or a list of specific reports which the treasury department will want to generate.

- **Ask questions in a coherent way**
  Demonstrate to the vendors that the information is necessary by structuring the RFP in such a way that they can see that the team has clearly thought through the project and how it will affect treasury.
- **Ask questions in a way that demand a full explanation from the vendor where this is appropriate to ensure all-embracing "yes" responses are not proffered**
- **Make sure to include sample terms and conditions of contracts so that the team can negotiate these upfront with more negotiation leverage**

Evaluating responses to RFP document

Once the responses are received, there are two broad ways to evaluate them:

- **Ensure minimum level of functionality**
  The first option is to ensure any products which are to go to the next stage have a minimum level of functionality. In this case, the core functions need to be identified beforehand and the RFP used to remove any unsuitable products from the list. If this is the objective, the RFP needs to be designed to ensure the full level of detail is provided by vendors by asking appropriate questions. This is most appropriate when the treasury has a shortlist of one and it wants to ensure the preferred vendor can deliver the core functionality. It can also be used to ensure that required elements (over the "nice to have" elements) can be delivered in other projects.
- **Rank vendor responses according to a matrix**
  The main alternative is to use the responses to rank shortlisted products in order of preference. Again, it is important that the RFP is designed in such a way that the appropriate information is provided. This is most appropriate when comparing very similar products for relatively straightforward technology projects. The danger with this approach is that it might reward a product with excellent functionality in a small number of areas, but which is poor in one, over another which has a wider range of good functionality. The matrix should therefore include a weighted scoring mechanism placing greater emphasis on the most important functionality and issues. The matrix should also incorporate additional and important issues that may have been generated at the workshop stage, for example a comparison of the approaches the supplier would take to the project and the client/supplier relationship.

The best approach is to ensure a minimum level of functionality (as above) and then rank qualifying products according to the matrix. The approach for a smaller solution should be the same, albeit less detailed.

When reviewing the responses, there will be some key factors to consider:

- **Be wary of the responses provided**
  All vendors receive a large number of RFP documents and there is a clear

temptation to "cut and paste" responses. Vendors may also exaggerate the functionality of their products, especially at the RFP stage. For example, if some functionality is being developed, the respondent may consider the product to provide it. If a check list is provided, the vendor will typically check "yes" if some element of the functionality is available.

- **Use the responses to test the vendor**
  Just because the responses may not be 100% reliable, this does not mean that the responses are worthless. The team should use them with reference clients and in workshops with the vendor to check the accuracy of the response.

- **Decide how much to rely on RFP responses before moving to the next stage**
  At this stage, it may be appropriate to narrow down the shortlist. This will depend on the number of RFPs issued. For example, if the team already had a preferred supplier and a second "reference" RFP was also issued, the RFP document may be sufficient (depending on the responses) to determine it appropriate to work with the preferred supplier.

  If one vendor's responses were formulaic, this may indicate a lack of appetite for the business. Again, it is likely to be appropriate to remove that vendor from the shortlist.

The key is to decide how many potential vendors to take to the next stage. As the process develops, it requires more time to evaluate each potential vendor as the required responses get more detailed. If the team decides to try to identify a preferred supplier at this stage, it is important to evaluate the RFP responses fully.

Use reference clients

Either at the same time as issuing the RFP or after the responses have been evaluated, the treasurer should seek the names of reference clients from each vendor remaining on the shortlist.

Although reference clients will be those who are pleased with the service from the vendor, they still represent the most useful source of information about a particular product. Almost all reference clients will be prepared to divulge details of things which failed in the implementation process or where a product's functionality falls short of the expected or promised level of delivery. Reference clients will probably have gone through the process a short time ago and can offer insight into other vendors' solutions or what their key decision criteria were, as well.

Depending on relative location, the team (or at least a member of the team) should visit a small number of organizations where a product has been implemented. Ideally, these organizations should have similar transaction flows and responsibilities (both in terms of activities and geographic responsibility). At these visits, the team should see the product in action and, if possible, a demonstration of other activities. The team should ask the reference client about the implementation process including the identification and resolution of issues that arose during implementation, functionality across the product

(including the nature of any upgrade process) and the level and method of support from the vendor. It will be useful to reference the RFP response to that from the reference client.

Where necessary, also arrange to discuss the same issues over the telephone with other reference clients. This may be particularly important for non-standard technology projects where a physical visit to the reference client is difficult to arrange.

It should also be possible to speak to other users of the same product who are not reference clients. However, when discussing these issues with non-reference clients, remember that some problems may not be the (sole) fault of the vendor. In particular, be cautious of users who demonstrate unreasonable results from a particular product. Consultants, if used, will also be a useful source of information with respect to comparing RFP responses to practical responses.

Discussions with reference clients should highlight three key issues:

- First, it should indicate any significant discrepancy between an RFP response and reference users' experiences of the product. This may signal that the product should be removed from the shortlist. Alternatively, it may suggest that the team should re-evaluate whether particular functionality is possible within the set budget.
- Second, it should highlight areas to pursue with the vendor at the next stage of the process, the demonstration workshops.
- Third, and most importantly, it should allow the team to identify its preferred product or solution.

Hold demonstration workshops

The next stage is to hold demonstration workshops to compare the two or three vendors remaining on the shortlist. In many cases, especially in organizations with smaller treasury departments, the company will have identified a preferred provider. In these circumstances, it will usually be appropriate to invite the preferred vendor to this demonstration stage and to only invite other vendors to participate if the preferred vendor falls short. The scale of this stage will depend on the size and scope of the project with shorter workshops necessary for bolt-on solutions than full scale implementations.

The purpose of these workshops is to get proper, hands-on experience of using the product. At this point, it is appropriate to use data prepared by the treasury team (rather than demonstration data used by the vendor, which will have been tested to work). This will show the team how the product handles data and manages information.

The number of workshops planned will depend on the nature of the project (relatively straightforward projects may only need two – a substantial initial workshop and then a follow-up workshop to address any particular issues which emerge). However the workshops are structured, the team should meet all the key personnel from each vendor at some point, including the prospective

account manager, their project manager and most importantly the key members of the implementation team.

In advance of each session, the team should prepare the agenda for that workshop. This should include the following items:

- Data should be submitted to the vendor to be pre-loaded into the product well in advance of the workshop.
- Additional data should be prepared for entry during the project. Both sets of data should reflect actual and likely future transaction patterns.
- Before the workshop, the team should meet to discuss the objective of each workshop. In complex projects, it may well be appropriate to break the workshops into a series of sessions to address different functionality. Other parties from within the organizations should be invited to attend workshops addressing their particular requirements.
- Having decided these objectives, this should be communicated as early as possible to the vendor team. This will allow them to include product specialists, if necessary, in the appropriate workshop. Tell the vendor what the team wants to see during the workshop and how the prepared data should be used. Bear in mind that it is unreasonable at this stage to expect the vendor to write specific code to address interface or other issues which arise during the workshop (although it is important that these issues are recognized during the process).

The workshop process will be very time-consuming and potentially confusing, so it is vital that the team has an appropriate way of recording product performance. This should be related to the workshop objectives with each function having a minimum required standard and then additional scores for functionality.

Finally, make sure the key questions are prepared in advance of each workshop and schedule a final workshop to address all final questions that emerge during the process or the review. This stage will be very important if only one vendor participated in the workshop stage.

Identify how the solution will be implemented

Although the workshop process will focus on functionality, determining the most appropriate means for the solution's implementation is a key decision. In general terms, the more standard the product, the wider the range of implementation options the treasury department will have.

The workshop stage should give the supplier the opportunity to explain the implementation process they follow for each of their product offering types and the company can quiz them on the relationship they would expect during the project.

Some vendors allow potential clients effectively to trial a system or solution before buying it. This is possible because the solution itself is not locally installed and is accessed via a web browser. This is only appropriate for relatively

straightforward activities, because there will be no option to customize the technology before use and will generally be taken by treasury departments using such a solution for the first time. From an operational perspective, this process represents a reduction in operational risk at the purchasing point as the treasury department will have a clear understanding of the solution and how it uses information from the trial period. There are some operational costs because the treasury department should trial the product alongside its existing procedures. This trial period will also give the treasury department the opportunity to review any processes before moving actual processing over to the new system.

As discussed in previous chapters, the core decision is whether to install the solution locally or whether to use a hosted or SaaS service. (For a full discussion of the different implementation options, see page 84.) Each treasury department will have different views on the operational benefits and costs from each type of implementation. Some companies may reject hosted services because of concerns over data protection.

However, for most departments with relatively standard requirements, all three implementation options may be appropriate. In these circumstances, there may still be internal interfaces (such as with the accounting package) to manage, which would apply in all circumstances. From an operational risk perspective, the treasury will need to balance supplier risk (if the solution is hosted elsewhere) with internal IT risk if the system is installed locally. In general terms, the easier a hosted solution is to implement, the lower the supplier risk (as the treasury will be able to migrate to a new system relatively easily in the event that a supplier fails or decides to withdraw from a market). While the local installation offers a degree of protection against supplier risk, there will be a point at which the supplier will cease to support a particular product. In addition, upgrades to products will have to be installed locally and they may have an impact on any locally developed interfaces.

MAKING THE DECISION

Finally, the decision (or a series of decisions) must be made. In most cases, the team will have identified a preferred provider and will have used the reference visits and workshops to identify solutions to any particular problems.

It may be appropriate to reapply the scoring matrix used to compare the RFP responses with suitable adjustments and then aggregate the two sets of results. Alternatively, the company may elect to employ a simple scoring system of fewer than a dozen important headline issues, including, for example, cash management, risk, hedge accounting, implementation and cost.

In some cases, a previously identified preferred supplier may be found not to be appropriate and the workshop process might need to be repeated with another vendor. If this is not successful, it may be necessary to revisit the requirements definition, as this may mean the desired solution is simply not available within resource constraints.

In a number of projects, most likely the more standardized products, there may still be a choice to be made between alternative products.

Whether the decision is between alternative providers or simply to confirm a preferred vendor as the appropriate solution, making this decision is still a critical point in the project. Even if the outcome is clear to the treasury team, this decision will need to be sold to the senior management (to guarantee budget) and to the relevant partners within the organization (to try to ensure as smooth an implementation as possible). To achieve this, the decision needs to be carefully documented, as it will form both part of the presentation to management and as an introduction to implementation throughout the interested parties in the business. (For smaller scale projects, it may not be necessary to obtain formal management support (if the department already holds the budget) or to sell the decision to other parts of the business. However, the decision should still be documented, not least as a tool against which to evaluate the solution's effectiveness in the future.)

In almost every circumstance, there will have to be some form of compromise between desired functionality and cost (whether time or resource). This is most likely to apply in the following areas:

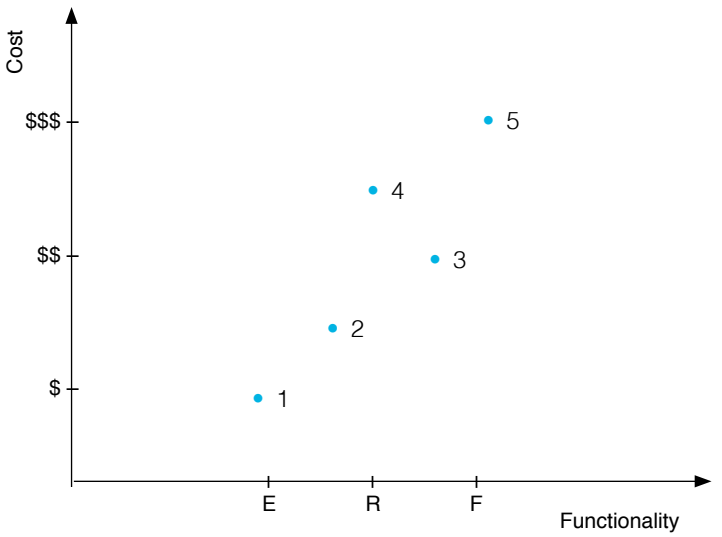
- **Custom-made and/or spreadsheet applications may be needed for one or more activities**
  Although the intention may have been to try to identify a fully provided solution, this may be out of budget or, in some cases, not available. The decision will need to indicate where in-house development is necessary and how it meets the needs of the project.

- **The risk of failure may be too high in some areas**
  If the perfect solution is not available, it may theoretically be possible to develop (either in-house or via the vendor) a solution. However, any new product will carry additional risk. It may be more appropriate to use standardized functionality to provide most of the requirements of the project, rather than risk failure for some marginal additional functionality. Part of the decision-making process is to assess the future functionality against current functionality as well as the requirements definition. Even if a standardized process does not meet all the requirements, if it provides a better outcome than an existing process it may suffice.

- **Installation time**
  Any bespoke project will take time to deliver over and above any necessary installation time. Again, there is a potential compromise here. If the bespoke element has the potential to delay the implementation, it may be more appropriate to install a standard product or module to maintain momentum in the implementation. Additional functionality may then be worth developing at some point in the future. The more core the underlying functionality is to the project, the more important it is to maintain momentum in the project over achieving all desired elements of functionality. The team's objective should be to see broad goals achieved as quickly as possible. This will maintain momentum, especially in wide-ranging projects, which will help to sell the projects across the organization.

Using a product decision matrix and plotting cost of installation and operation against functionality can be a useful way of differentiating between different levels of functionality and as a tool to help decide the complexity of the required solution. The matrix should include functionality and system capability and technology together with "soft" issues such as implementation and ongoing support, working partnership potential and locality of support. The matrix can be scored at a highly detailed level or the scores set simply against the basis of less than a dozen headline issues. As already described, the most important aspects will be weighted to ensure they attract the correct degree of importance. The structure and weighting of the matrix needs to be discussed and agreed by the team in advance.

DIAGRAM 6.1 A product decision matrix with five shortlisted systems plotted



E – Essential requirement

R – Requirement

F – Future requirement

(From requirements definition.)

Weight requirements according to importance.

PRESENTING THE BUSINESS CASE

Whether and how the final decision needs to be approved by the board or finance committee will depend on the nature and scale of the project and also the culture of decision-making in the company. (This process is discussed in more detail in Chapter Five.) For smaller scale projects, the treasurer may already have authorization and budget to be able to move to implementation. For larger scale projects, the final decision may need to be presented for approval from the board or finance committee, in which case the business case will need to be presented again.

When it comes to presenting the final decision in the business case, the core objectives and requirements definition should be restated. The business case should demonstrate how the prospective solution will help the organization achieve these objectives, as well as any additional benefits. As before, any absolute requirement should be indicated in one way, with additional functionality assessed via a weighted scale. It may also be appropriate to indicate where compromise is necessary for cost or complexity reasons.

It will also be necessary to demonstrate a clear costing for the project and to outline a preliminary implementation plan as part of the presentation of the business case to ensure management buy-in. Management buy-in to the project will be critical in the next implementation phase of the project.

The next chapter examines the implementation process.

Implementation.

SUMMARY

This chapter guides the reader through an implementation process. It starts with the process of agreeing a contract with the selected vendor. It explains how to build a project team and then how to develop a detailed project plan. It discusses how to resource an implementation, recognizing that the daily business of treasury must continue during the project, and also how to maintain the commitment of all the key partners to the project, both internal and external. It also identifies that the original plan may need revising as the project develops and provides a framework for implementation.

AGREE THE CONTRACT WITH THE VENDOR

The company will need to agree an implementation and operational contract with the vendor of every system it deploys. This can be one of the most time-consuming parts of the whole agreement process. However, contract agreement is critical to the success of the project as it will be this, rather than any verbal agreements during demonstrations, which will form the basis of any redress in the event that something does not perform as expected.

As with many elements of the technology project, the contract negotiation is likely to be an iterative process and the time that it takes to negotiate the contract can be underestimated. The vendor will often put considerable pressure on the treasury team to agree a standard contract, incorporating standard terms and conditions. Treasurers should view these standard vendor documents as the starting point for iterative discussions. Ideally, the treasury team should ask for sample terms and conditions of contracts as part of the RFP process: a vendor may be more like to provide a copy of their standard agreement in advance if they are in consideration for appointment as preferred supplier. (Some companies require non-disclosure with vendors as part of the RFP process to get access to the vendor's standard terms and conditions.) This will allow the company to negotiate these during selection, when they have maximum leverage. Whether or not the treasurer is able to negotiate terms and conditions prior to selection, the earlier the process starts, the better.

In the case of any SaaS style implementation, it is likely that most terms and conditions will have to be accepted as they are the basis for the vendor's proposition. However, care should be taken to ensure any special considerations or deliverables agreed in the demonstration and selection phases are incorporated into the contract.

For more customizable projects, especially where the vendor requires an upfront payment, the contract itself must be much more open for negotiation. On one level, the relationship with the vendor will not work if both parties resort to debating the terms and conditions of the contract in the implementation or post-sales phases. However, on another level, the vendor will be under less pressure to deliver the agreed level of service if the contract does not reflect that agreement.

There are two stages to most contract negotiations. First is the process of agreeing the schedule of works with the vendor. During this process, the treasurer and the project team will work with the vendor to formalize the terms and conditions discussed and agreed in the selection process into a clear schedule of works and project plan. (There is more detail on the development of the project plan below.) These documents will form the basis of the ongoing relationship with the vendor, so it is important they reflect the verbal commitments made during the selection process. During these negotiations, the treasurer should refer to two key sets of documentation:

- **The RFP and the vendor's response**
  The team's requirements will be set out in the RFP. More importantly, the vendor's response will indicate whether it commits to providing certain functionality. These two documents should be used to ensure all the key points are included in the schedule of works.

- **Notes and presentations from demonstrations**
  Where further detail was agreed in the demonstration process, it is important this is clearly recorded by the treasury team. Ideally, minutes of each meeting with the vendor during the selection process should be prepared, discussed and agreed at subsequent meetings. These records will then form a formal record of the agreements reached in the selection process. Even if not formally agreed during the demonstration process (it may not be practical if the demonstration process is short), these notes should be used during the negotiation process as a reminder of what was agreed.

Once the schedule of works and project plan have been agreed, the second stage is to ensure these documents are fully reflected in the legal contract and any service level agreement (SLA). At this point, the treasurer will have to rely on counsel (whether in-house or not) advice when wording the contract. The attorneys' role is to work with the vendor to produce a contract document that is representative of what was presented, what will be delivered and the agreed length of contract.

As discussed, this process can take a considerable amount of time. It is important that the team maintains its commitment to get the agreed functionality listed in the contract. (Details may not be listed in the contract document but in a side letter whose existence must be recognized in the contract.) However, the

contract negotiations should not be seen as an opportunity to try to change the price or functionality agreed during the selection process. The key relationships are those with the vendor's implementation and post-sales teams, not between the two parties' legal representatives. The contract should reflect the agreement reached during selection, not try to replace it. It may be worth negotiating an SLA or operating agreement to provide protection in the event that the relationship between the company and the vendor breaks down post sale. Again, this should be based on the agreement reached during selection.

BUILD THE PROJECT TEAM

The choice of project manager is central to a successful implementation. The project manager need not have been involved in the earlier stages of the process, although continuity has some clear advantages. If the project manager was not part of the formal selection team, it would be useful for the project manager to be selected in time to be able to attend some of the demonstration meetings. This will help the project manager to get a clear view of how the technology works.

Irrespective of the point at which the project manager joined the project, the key point is for the project manager (and the wider project team) to develop a good working relationship with the vendor and the vendor's implementation team. Three points are critical:

- **Ensuring control**
  In a successful implementation, the project team will ensure an appropriate balance between the client's control of the project and the vendor's ability to use its expertise to implement the solution.

- **Enabling decisions to be made**
  In an ideal world, most of the key decisions will have been made during the selection process. However, due to circumstances, there will always be some decisions which need to be made during implementation. The project manager should enable the appropriate individual or team to be consulted to ensure the best decision is made. This means the project manager must have a good overview of the project and its objectives and a clear understanding of how the technology will impact both treasury and the wider business. It does not, though, require the project manager to have detailed day–to-day knowledge of the project as long as good communications lines are in place. Any decision made to change or add to the original specification will need to be authorized by the project manager (additional authorization may also be required, depending on the terms of the agreed project governance).

- **Maintaining the support of senior management**
  The project manager will usually be the main point of contact with the organization's senior management. This is important for two main reasons. First, if there are any significant changes to the project during implementation, it may be necessary to obtain additional senior management approval. This will be easier if the senior management believe the project itself is being

managed appropriately. Second, if senior management support is needed to overcome some internal problems during implementation (perhaps resistance from a business unit), they will need to understand the nature of the project and be able to step in at the appropriate moment. (It may be appropriate for someone else to manage communications with senior management. For example, the treasurer may be the appropriate communications link with senior management if someone else is acting as project manager.)

In addition to the project manager, other members of the team will also need to be selected. In large treasury departments, this should include representatives of all sections within the department. For all projects, representatives of departments outside the treasury participating in the project should also be included in the project team. One member of the team will also need to be responsible for overseeing the contractual elements of the project (see above) although this may be a function of an internal procurement department.

IT is a very large component and should be included in the team. The precise involvement of IT will depend on the nature of the project. At the minimum, perhaps for bolt-on additions to existing solutions, this may simply be verification that the additional module will not adversely impact integration with other systems, such as accounting or the general ledger. In the case of a SaaS solution, the IT team will want to ensure data can be appropriately imported into, and exported from, the solution into these other systems. For larger scale projects, IT membership of the project team will be more important. Large treasury organizations often have dedicated in-department IT support (or members of the IT team who work within treasury), who should be represented on the project team. The biggest difficulties arise where organizations without dedicated IT support staff are engaged in a large scale project. In these circumstances, the project's success will depend on being able to get internal IT support at the appropriate times in the project to ensure it maintains momentum, so IT involvement in the project team is vital. Moreover, the IT representative should be able to know when IT resources can be committed to the treasury project to support the planning process.

Other team members may be necessary on either a full-time or part-time basis. Depending on the project plan (see below), people may be appointed to oversee particular tasks so they would participate at the appropriate time. Generally, it is better to have a small core team with overall responsibility for managing the project, which can call on additional expertise as and when necessary.

The size of the team will depend upon the amount of resource available and smaller staffed treasuries may find it difficult to provide the full resource discussed. In these circumstances, time has to be managed even more carefully and it can be appropriate to bring in outside help to support the team. Project managers with good treasury knowledge and experience of systems implementation can add considerable value (as discussed below).

DEFINE THE PROJECT

Once the project team has been formed, it should work to specify the nature of the project itself.

Project definition

This should start by quantifying the scope of the project through the development of a project definition. This should be a high level document setting out the clear objectives of the project in as concise a way as possible. It should not go into detail on either how the project will be implemented or who will be responsible for, or participate in, the delivery of any element. This document should be shared with all elements within the organization which are expected to be affected by the project. If drafted correctly, it should help the treasurer explain how the project will affect the various business areas. As such, this is a first key stage in getting the necessary support from these business areas in the implementation process.

Sample Project Definition

To select and implement an integrated treasury management system that will meet the defined needs of company X treasury in (named) centers/ regions with sufficient flexibility to meet perceived future requirements.

DETAILED PROJECT PLAN

The next stage is to develop the detailed project plan. This needs to be finalized before the implementation process starts. As many departments lack the resources or expertise to draft a plan, a proposed plan submitted by the vendor as part of the RFP process could serve as the starting point for a discussion. However the plan is developed, it should be a collaborative effort between the parties.

Although there may well be changes to the project plan once the project starts, it is important that the team view the finalized plan to ensure elements are sequenced in the right order. Once the project is under way, it may be too late to change the project so it can result in delays to implementation.

The detailed project plan should itemize the precise work to be done at each point, identify who will do it and sometimes break down the cost of that element. In the case of larger projects covering a wide range of treasury activities, this might include breaking the project itself into a number of sub-projects, each addressing a particular issue. For example, in the case of a transformative project, the sub-projects might include payments processing, risk management and accounting. For organizations with an international focus, the sub-projects might be organized country by country or activity by activity. However the treasurer decides to implement the project, the sub-projects need to be clearly identifiable elements with a definable required outcome.

Each sub-project element should be divided into a series of phases. These will be the building blocks on which the sub-project is built, so each phase will

also need to have a definable required outcome. Dividing the project in this way helps the team understand the required implementation sequence.

Within each phase, there will be a series of individual tasks that contribute to its success. Again, these need to be included in the plan, with any necessary sequence identified. Each activity must be assigned to an individual in the project team to oversee and, ideally, to those individuals from the wider organization who will need to participate at that point.

Once the structure of the implementation has been developed, the project team needs to evaluate it to ensure it will maintain momentum (as long as there are no significant unforeseen circumstances). The team will want to make sure the key building blocks are in place early so that the project delivers a rapid return on investment. This should include ensuring funding for the project is in place and that management is aware of this timing.

In more complex organizations, project teams often have a choice between a big bang approach where all business units are part of the transition at the same time and a more staged roll out on a unit by unit basis. (In international organizations, this might be a distinction between implementation at once and roll out by country.)

A big bang approach should result in a shorter timescale from start to finish, although it will require much more careful planning. Moreover, there is potential for significant disruption as it will require additional resource during implementation.

A carefully managed staged approach can allow a project to run alongside other projects or to blend in with known events that will be likely to pull resource away from the technology project. It also allows lessons to be learned so the last elements to be included should be able to be implemented more quickly. There is a risk, though, that such an approach can result in a loss of momentum. More dangerously, it can sometimes result in different versions of the same system being implemented in the same project. This can arise if the system being implemented is upgraded during the project.

Most importantly, however the team plans the project, it must be ready to review and revise the plan during the implementation. Things always go wrong. The challenge for the project team is to make sure these problems do not harm the implementation.

RESOURCE THE PROJECT

The treasury team will need to continue to operate during the implementation process and regular tasks will still need to be performed. Depending on the resources available, it may be possible for some activities to be performed by additional personnel, freeing up permanent staff to work on the implementation project. At the planning stage, the team will need to identify whether or not it needs the support of additional personnel. This will depend on the scale of the project and the level of funding available to the team for implementation.

It is imperative that the treasury project lead is available for the term of the project to ensure timely decisions can be made and supported. This will ensure that the project delivery does not slip.

Whether the team is able to use additional personnel will have an impact on the time taken to implement the project. In effect, the project team needs to evaluate the relative benefit of achieving a quick implementation against the additional cost.

The nature of the project is also important. In some projects, it may be possible to achieve a relatively quick implementation without the need for additional staff. This will apply for some small projects that require no significant change in processes. It may also apply where there is no local installation of technology, as in a SaaS solution.

However, in larger projects and especially those with a local installation, obtaining additional personnel to assist during implementation may prove to be the better solution. Given the cost of the technology implementation, it is important to maintain momentum during the project which can be put in jeopardy if project team members are called away. Also, in the context of the cost of the implementation and its potential benefits, employing additional personnel in the short term to achieve a quicker implementation may often be cost-effective. (The cost savings achieved by allowing the solution to come online three months earlier may pay for much or all of the additional personnel.)

Assuming additional personnel are required, the team will need to consider where they will come from and how they should be best used. There are four main sources of additional personnel:

- **Temporary reassignment from elsewhere in the business**
  Staff from other financial departments or business units may be able to perform some of the day to day treasury activities during the implementation. This is most likely if there are individuals who are already trained to provide support in the event of absence through vacation or illness. Members of the IT department may also be available to support the implementation from a non-business standpoint.

- **Temporary staff**
  It is usually possible to appoint temporary staff to provide support for the day–to-day treasury activity. For long projects, this could include appointing interim treasury managers to cover the more senior members of the treasury team.

- **Supplier's implementation team**
  The supplier's implementation team will be available to support the implementation project at various levels. This will include times when a detailed product and technical knowledge is required during implementation (a key evaluation metric during the RFP process), the supplier and the provision of the initial system training. The supplier's consultants may also be available for other work to assist the company. However, the supplier's team is a relatively expensive resource, so they should only be used carefully and after full consideration of the alternative sources of support. (Suppliers should always provide an estimate of their consulting time required to

implement the system on the client site. This estimate of time should then be carefully monitored and managed by the customer and will be included within the project plan. Any required system development work will be priced separately. A supplier typically will not include the cost of implementation work which is more easily done by the customer, such as loading static data or historical transaction data. They will do it if asked but will charge their normal consulting rate, even though the task would be relatively basic.)

- **Third-party consultants**
  Finally, third-party consultants can be used in a variety of ways, primarily as project managers but also to make many of the project decisions (and to advise the treasury leadership on the critical ones), to provide personnel for much of the implementation or to provide day to day cover for the treasury team. Third-party consultants should be able to assist with developing project and implementation plans.

For the project team, the pressure points will be during both implementation and in the final stage of parallel running (when old and new systems are being used). Due to the different skill sets required, it may be appropriate to use different additional personnel at different stages. Where temporary staff are used to manage day-to-day activities, they can be used during both stages with the permanent team taking control of the new system during parallel running. As a general point, any work interfacing directly with the new system should be taken on by the permanent treasury team as that will form part of the training process and they will ultimately retain the new system knowledge.

Although the project team will do its best to identify pressure points during the implementation, the reality is that all such projects will require additional work and effort from the permanent team members, however the additional resource is deployed.

IDENTIFY THE WIDER IMPACT OF THE PROJECT

At the same time as trying to identify the best way to resource the project, the project team must also try to understand the impact of the project on the treasury department and other parts of the business. Although most of the disruption in both implementation and parallel running will impact on treasury, other business units will be affected, especially if the project has a wide scope. These business units will need to be prepared for potential disruption (especially if they are to be asked to second people to support the project) and advised of the introduction of any new procedures. Meetings with the business units should be arranged at appropriate stages to explain the project and to effect any required training. Being able to demonstrate the likely gains for the business units will be an important part of the internal sales process. The accounting department may have a significant role to play, especially during the general ledger mapping process and particularly if the organization decides to apply the general ledger capability of the new system to the business as a whole. In such circumstances, the accounting personnel will need to be involved in meetings and in the implementation and testing process.

The treasury team will also need to consider how best to use the organization's IT department. In most implementations which include a local installation, there will be some technical input from the IT department, especially if they are supplying some of the project team. The treasury team will also want to consider how it plans to support upgrades and to resolve problems as they occur. Some treasury departments employ their own IT specialist or have a dedicated person within the company's IT team (although this is only a realistic solution in the largest treasury departments), others rely on the vendor's post-sales team (although this depends on the vendor remaining committed to the market and the product) and others involve their own IT departments in ongoing maintenance. If the in-house IT department is expected to play a significant role in post-implementation, it is important that not only do they have a say in the design and selection of the project but they have a big input into the wider implementation. This will help the IT department to understand the new solution and how it uses data and, therefore, how its interfaces work. This is particularly the case when amendments to code and other solutions are adopted to meet organization-specific problems which arise during implementation.

In theory, there should not be a need for IT support if a SaaS solution is adopted. However, in practice although the SaaS solution may require little implementation, there is still likely to be an interface requirement between the treasury solution and other systems used in the organization, such as an ERP system or the accounting system and its delivery across the organization.

Bloomberg

Winning Support for New Technology.

Angelo Marrocco is the group treasurer at the privately owned Italian menswear company Canali. Marrocco draws on 14 years of experience working in treasury to explain how best to implement new technology solutions. In his role at Canali, he set up the company's treasury team in Dublin and installed a fully integrated treasury management system. This commentary appeared first in Bloomberg Brief | Corporate Treasury.

You have finally obtained the go-ahead for implementing new technology that will take your treasury department to a new level. All the hard work is about to pay off. But this is not time to celebrate, at least not yet. Now the project must be successfully implemented.

Treasury plays a pivotal role in the organization, so treasurers say, but the department cannot function alone. Your project, to be a success, must get buy-in from non-treasury stakeholders. How you try to achieve this is highly dependent on your definition of success.

If your goal is to complete the project on time and within budget, than you can aggressively demand you get the required support outside treasury. But if your ambition is to implement a project that will bring value to the business, then you must work with the entire organization.

I have accumulated a fair amount of experience implementing treasury systems during my career working in the corporate treasuries of small, medium and large multinational companies.

For this reason I would like to share a few insights. Given that every treasury department and every organization carries their own peculiarities, during the first phases of a treasury implementation project you must ask yourself the following questions.

What will the project impact be on technologies outside treasury?

How will the daily routine of non-treasury staff be affected?

Are you considering the non-treasury requirement of your treasury implementation?

Answering these questions is the most effective way to obtain the necessary support for your project from non-treasury stakeholders.

The impact on technologies outside treasury is key. You may already have a project drafted and the treasury department is ready to commence, but if you have not shared at least the basic technological requirements with your IT department, then you are in trouble.

In one of my latest projects I was setting up the infrastructure for the implementation of SWIFT technology. My initial understanding was that the impact on IT was not particularly demanding. There was only the requirement for a dedicated server for running SWIFT services, which I did not think would be a problem.

It was by pure chance that I mentioned the SWIFT project while talking with the group chief information officer. We quickly realized that we had not sufficiently considered the impact of the project on the security of the existing infrastructure.

The key to achieving a full collaboration with those affected by the new processes is to listen. It is by listening to them that you can understand their needs. If possible, you must go above and beyond the simple treasury requirements to facilitate their processes.

In implementing a new treasury management system, I came across the cash flows generated by the credit card collections within a worldwide retail operation. There are several aspects of these cash flows that need to be treated carefully. The transactions are small in value, but large in quantity. In several countries, the information in the bank statements do not provide a great level of details. It would benefit your accounting department if transactions were posted by credit card type with related charges and relevant cost codes.

Even if the treasury department did not strictly require the level of details listed above, we implemented an efficient process to deliver the transactions enriched with extra data, pulling the information from sources outside treasury.

Answering the final question regarding the non-treasury requirement of your treasury implementation is a tricky one. This is because you are very unlikely to encounter the problem during the study or the implementation phase.

But sooner or later, you will have to answer questions that seem far removed from the role of the treasury. If you have invested in strengthening the relationship between the treasury and the other company functions, such questions will be easier to answer.

To summarize, expertise and the technical knowledge are not enough to complete a successful project. In order to really obtain the collaboration from non-treasury stakeholders you must build a solid relationship inside and outside the organization.

The project team will also need to think through the impact of the project on other parties outside treasury and IT. These may be both internal and external parties. The following list is not exhaustive but indicates the types of considerations which need to be made:

- **Company management**
  Senior management must be kept informed about the progress of the project as part of the treasury's strategy to maintain momentum. In wider ranging projects, the senior management will also need to have a full understanding of the impact of the project on all business units. The longer the treasury project takes, the more likely that another business unit will have a critical project that may have to compete for scarce internal resource. In these circumstances, senior management may want to oversee negotiations about timings and make decisions if an agreement cannot be reached. Regular reporting to and/or meetings with senior management will serve to ensure progress and problems are reported at the required frequency and level of detail.

- **Other financial units within the organization**
  Many treasury technology projects have a wider reach than the central treasury function. Where the project will allow or require other financial units to participate, it is evident that team members in these units need to understand how the project will affect them both during implementation and afterwards. This may include a provision for training within the project plan. Any changes to the general ledger mapping may well impact the accounting department, so it should be consulted about the way data will flow from the new technology into the general ledger. Accounting (or the responsible department) should also be consulted for corporate governance compliance.

- **Business units**
  Where the technology project simply automates internal treasury processes, there may be no requirement to involve business units in the project plan other than where system training is required. However, where business units are required to change processes (the project may change bank account structures or reporting structures), they will need to be involved in the project plan. Business units may also take the opportunity to leverage additional benefits from the treasury technology project. For example, it may give the business units the opportunity to eliminate the need to manage bank accounts locally (although this may be a new group policy which embraces a review and consolidation of all group banking relationships, centralizing their management). Where business units do have the opportunity to make decisions, it is crucial to involve them early in the project planning process.

The new system may also provide business decision making tools that would be of value to the business units. These can include analytic functionality that can be run against cash flow forecasting.

Internal audit

All changes in processes should be discussed and cleared with internal audit before implementation. The internal audit team will also want to examine the transition period to ensure reporting systems will be appropriate, especially if there is a lengthy transition.

External audit

It will usually be beneficial to discuss the project plan with external audit teams, too. They will want to understand any specific new procedures, especially hedge accounting and security and control elements. They will also want to review procedures for the transition. Involving them early in the process will ensure problems are resolved before implementation.

Tax and legal teams

There is an overriding theme for treasurers to work continually with their tax and legal departments as treasury migrates or modifies its operations or processes.

Banks

It is critical that the treasury can continue to operate on a day-to-day basis through implementation, parallel running and into final completion. Some projects may require significant changes to bank relationships, especially if they involve reducing the number of bank accounts, changing a liquidity management structure, the adoption of an eBAM module or the application of dealing portals. If the project involved an RFP for ongoing liquidity management (or other) business, the successful banks will be involved to some degree in project planning anyway. However, it is just as important to involve any current bank which will not be a core bank after the implementation to ensure as smooth a transition as possible. As part of maintaining good bank relationships, all banks should be given regular feedback on the progress of the project.

Other treasury technology providers

Where the treasury uses other providers and will continue to do so after implementation, it is critical that these providers provide input to the project plan for their specific activity to ensure their solution will interface with the new installation as planned. This is also important if related technology from another supplier (e.g. confirmation matching or a multi-bank dealing portal) is being installed and integrated as part of the main project.

Suppliers

Some treasury technology projects, most obviously supply chain finance projects, can have an impact on the customers' suppliers. If necessary, the affected suppliers should be advised of any changes in advance and have any options to participate explained.

Customers

Ideally, any such treasury project will have no direct impact on the organization's customers. However, in a wide-ranging project that incorporates a transformative element, such as the introduction of an in-house bank or a shared service center, it is possible that this might be accompanied by a rationalization of bank accounts held by the group. Treasury needs to consider the impact of any changes on the customer base carefully before adopting any procedures which might give the impression of a change in the relationship between the company and its customer base.

MANAGE THE ONGOING IMPLEMENTATION

The implementation process is the most labor-intensive part of the project. The key to success is having a detailed project plan overseen by an effective project manager and project management team. Success will be defined by a clear final outcome which meets project objectives while ensuring the treasury department continues to operate throughout. The project plan will help to anticipate particular pressure points in the project so plans can be put in place to support treasury when necessary.

CASE STUDY

Set Aside Enough Time to Prepare the System

Many factors can provide the catalyst for a change in treasury technology, but in this example the trigger was a major banking project to move the company to a new global bank. The banking project required a significant amount of work, not least the opening of 90 new bank accounts. To achieve maximum efficiency gains from the banking project, the treasurer wanted to achieve greater visibility and control over the company's positions across the almost 50 countries in which it operates. To do so, the treasurer realized the company needed a new treasury management system. Although the company had an existing, server-based, workstation, they lacked the in-house knowledge to update it to be able achieve those objectives. The problem was that the CFO could not provide any funds to implement a new system.

The treasury team assessed a number of different solutions over a period of about a year and a half. The Bloomberg TRM solution was attractive because it offered the functionality the team required, as well as the opportunity to use a new Bloomberg terminal across the organization. The cost structure worked, too. Bloomberg's annual fee was similar to the annual maintenance charge applied by the previous vendor. Critically, given the budget constraint, Bloomberg did not charge an implementation fee.

Bloomberg provided a structured work plan to help the treasury team prepare the system for testing. The tasks included ensuring connectivity was in place, that data was validated and that the necessary changes had been made to the system. Getting reporting in place took about three months: the company needed to be able to capture balances and get different reporting by entity and

CASE STUDY

currency. Getting agreements signed with the vendor was straightforward. Other things, like reaching out to banks to get them to use new SWIFT codes, took much longer than the treasury team expected. The team also found it was not possible to extract data from the old workstation to populate the Bloomberg one, adding further unanticipated time to the process.

Once they were confident everything was prepared, the company started daily testing. They used data generated by the existing workstation to evaluate the quality of the data and reports produced by the new Bloomberg system, creating confidence in the accuracy of the new solution.

Progress so far has been good. Because of the age of the previous system, existing processes were extremely manual. With the new solution, approximately 85% of activity has already been automated, proving major efficiency gains. As examples, instead of taking three hours, the team now spends about an hour calculating the daily cash position and using the system to calculate foreign exchange hedge effectiveness is both more time-efficient and more accurate.

The company is not yet using the new Bloomberg system to full capacity. The treasury team is now working to automate the final 15% of activity. There are also some things they have yet to test, such as the FBAR functionality. Nevertheless, the project is already a success, giving the team greater visibility and control over cash. The CFO is happy, too: the project was implemented without any new budget.

However, there will be problems with the project plan for all sorts of reasons. The key is to avoid the most common barriers to success and to put in place a range of strategies to ensure implementation goes as well as possible. These include:

- **Ongoing reviews of the project plan**
  The initial project plan must be viewed as a working document. It needs to be regularly reviewed by the team and updated to reflect actual progress. As in the initial plan, every revised element should list the individual responsible for delivering each element. Moreover, that individual must have the power to meet that responsibility. This review process is particularly important on longer projects to ensure a continued momentum is maintained. The plan should also be reviewed at the end of every stage to try to understand the effect of any changes which were made during that stage on the rest of the project. Any changes to the project plan must be carefully managed and communicated to all involved parties, with significant changes also communicated to senior management. This process is the key to avoiding unrealistic expectations and thus overruns and disillusionment with project. Significant changes should be managed through a change control process. All changes should be routed through and managed by the project manager, who should have sole authority to change the physical project plan.

- **Managing the relationship with the supplier**
  One of the most important elements of implementation is to maintain the relationship with the supplier's implementation manager and team. They should have significant experience of managing such projects with other clients which should be tapped. However, it is also vital that the supplier

is not able to dictate the final level of functionality where alternatives are available. It is important that the two parties agree a process for addressing problems and escalation procedures before the implementation begins. Some organizations may have a team member with both the treasury knowledge and the project management skills to maintain an effective relationship with the supplier. Where this is not possible (often because such a person will have many demands on their time), the appointment of a consultant project manager taking overall responsibility ensures both project teams work effectively together and can resolve issues involving potential clashes of interest.

Use of an effective steering committee

One way to manage this core relationship is via an effective steering committee. Ideally, this would meet physically, but time and geography may require conference call meetings. These meetings should be held on a regular basis and should include a number of standard agenda items, such as a review of progress so far, specific activity since the last meeting, expected activity before the next meeting and a point for discussion of any emerging problems and expected future decisions. Each member of the steering committee should have a clear set of responsibilities within the project. It may be appropriate for the membership of the steering committee to change as the project moves through the phases. For example, the cash manager might be replaced by the financial controller as different modules of the solution are implemented.

Managing relationships with other parties

As outlined above, a technology project can affect plenty of relationships with other parties, which will also need to be managed through the implementation. One of the roles of the project team is to communicate when these parties might expect to be affected and to forewarn them of any changes. For example, if any interfaces with other systems, whether provided by banks or other software suppliers, will need to be changed or built. Group business units may be asked to provide information to treasury in a different way.

Finishing off

The final stage of the implementation is the transition from the old to the new system. This will usually involve a period of parallel running, usually over two and maybe three month ends, to identify problems and to ensure the required reports and other information are being generated.

There will also need to be a period of training across the group. The training period can put significant pressure on internal treasury resources, so identifying suitable people attending for particular training sessions is important. It may be necessary to run each session more than once to allow day-to-day treasury activity to continue without too much disruption.

Before accepting the handover of the project from the vendor, the treasury should apply a process of “user acceptance testing” to test thoroughly the installation to check that all of the agreed functionality is in place and that it works and that any agreed systems interfaces are in place and working. Each treasury process should be run on the new system and the result compared

against the same process run on the old system (where applicable). If there are any errors these should be resolved before the implementation team is stood down from the project, otherwise the post-sales team may view the resolution as a demand for additional functionality.

- **Monitoring cost**
  Throughout the project, the project team must continue to monitor the costs of the project. There will be problems during the project, some of which may only be able to be resolved by an additional spend. If this happens, the project team must have secured additional funding beforehand. Otherwise there is a risk of the project being ended incomplete once finance has been exhausted.

COMPLETED PROJECT

In an ideal world, the project will finish on time and on budget and with all the original objectives met.

In the next chapter, we consider how to ensure that the new technology is used as effectively as possible over time.

Chapter Eight

Maintaining the Solution over Time.

SUMMARY

A fully implemented solution is not the end of the process. The treasurer will want to ensure that their selected solution remains appropriate and able to support the company in its objectives over the coming years. Having a strategy in place to review existing technology and make amendments where necessary is a critical part of ensuring the technology continues to add the maximum value to the treasury department. This chapter provides guidance on how to maintain efficiency as requirements change.

USING TECHNOLOGY EFFECTIVELY

Once the selected technology has been successfully implemented, the treasury department must use it as effectively as possible, both initially and over the next few years. Where the chosen technology is installed locally or hosted, managing upgrades is a key part of this process. It is usually appropriate to take upgrades and adopt major software releases to ensure the technology remains as current as possible, although there may be a case for phasing in a major software upgrade. In the case of SaaS solutions, managing upgrades is the responsibility of the vendor.

The challenge is to maintain effective use as the demands on technology reflect changes in circumstances, whether internally or externally driven. In many cases, the underlying use of technology may not need amendment to cope with such changes. However, in other cases, the treasury may identify a need for additional technology functionality either in the form of new modules of the existing system or new additional or replacement systems. There are plenty of examples of treasury departments that decide to implement a new solution to achieve greater functionality without realizing that their current installation can adequately provide this.

For many treasurers it would have been possible when drafting the requirements definition to predict likely future technology requirements. Future areas of corporate expansion may well be known, especially within a three-to-

five-year timescale, as long as the expected means of expansion remained organic. Again, some treasury technology developments might also have been predicted, especially if the technology project was seen as one step in a wider treasury transformation project. For instance, the installation of new technology might have been viewed as a facilitator towards wider changes with the introduction of an in-house bank as a further step in the wider project. Alternatively, the technology project might be seen as a way to automate core processes, freeing treasury time to become more involved in other areas of the organization's business, such as the management of the wider supply chain. In these senses, treasury technology could be seen as a tool for the proactive treasurer, seeking to anticipate change.

On the other hand, treasurers always have to be able to react to change, whether forced on the organization by regulation, a changing business environment or as a result of changing managerial decisions. Organizations may enter into mergers or make acquisitions in response to opportunities which cannot be predicted. Market conditions can change for a whole host of reasons. Governments and other regulators can change regulations, which can either prevent activities continuing, forcing change, or open up the opportunity for treasurers to seek greater operational efficiency, perhaps by reducing exchange controls.

There are a number of different drivers that will result in treasurers demanding more functionality from their technology. Unless the organization chose a solution that approached the top end of the available functionality, the solution should be able to cope with most organic changes in functionality requirements. The main exceptions come from changes in requirements that could not have easily been anticipated during the previous selection process. (In some cases, an organization might have anticipated a "game-changing" development, but decided to implement a solution with lower level functionality until that event took place, on the basis that it was not necessary to pay for unneeded functionality.)

In terms of changes that might result in additional functionality, the following are the most likely:

- **Domestic organization operates in more than one currency**
  In terms of treasury activity, once a company decides to maintain bank accounts in more than one currency, transactional, reporting and risk management functionality becomes much more complicated.

- **Regional organization expands globally**
  Moving into a new continent often poses an additional challenge for any treasury. Not only will the organization have to cope with additional currencies, it will also have to understand the implications of the many different banking and other standards across the world. While banking standards have evolved to make straight through processing possible, there is still a requirement for middleware to cope with the different banking and messaging standards across the world. This is particularly true in locations where SWIFT type messaging is not commonly used. There will also be an

impact in association with cash positioning and cash forecasting where data is brought into the center from global business units for consolidation.

- **Major acquisition**
  A major acquisition or merger may also have a significant impact on treasury operations, especially if it involves a move into new territories or it results in significant differences in risk exposures. The main challenge from an acquisition is for the new treasury team to integrate processes and data from the two organizations, including the use of technology. The treasurer of the enlarged organization will need to decide whether to continue to use technology used by one or other of the previous companies or whether to deploy a different solution.

- **Change in treasury responsibilities**
  Any significant change in treasury responsibilities can require increased technology functionality. Such changes can include the assumption of responsibility for managing a company pension fund or the increased involvement in treasury in managing the financial supply chain.

- **Accounting or regulatory changes**
  Perhaps the most difficult changes to manage are those imposed from outside, such as changes to accounting or regulatory regimes. Where these are changes that affect large numbers of companies, treasury technology vendors will usually develop their own solutions (perhaps as an additional module) or create interfaces to specialist providers (as has happened with hedge accounting, for example). In these circumstances, the functionality is usually improved as part of an ongoing system upgrade cycle.

  Difficulties arise for organizations that have developed their own solutions in-house or whose system providers no longer offer upgrades to the software they use (or for regulatory requirements which only affect a small number of organizations). Depending on the nature of the regulatory requirement, it may be possible to develop a further tool to address it or to implement a standalone solution. On the other hand, if addressing the new regulations might prove to be too difficult, the treasurer may view such an event as the catalyst to implement a new treasury-wide solution.

HOW TO MAINTAIN EFFICIENCY OVER TIME

It is clear that a treasurer needs to evaluate the technology functionality when any event, such as those listed above, occurs. It is much harder for a treasurer to evaluate whether technology is still being used as efficiently as possible if no such event occurs to trigger a wholesale review. As a result, it is important that the treasury team takes action to review the use of technology on a regular basis. This will help them avoid the scenario of thinking they need additional functionality which is already available. As a first step, it is common for treasurers to meet with their current technology vendor occasionally to understand the marketplace better, changing technologies and assess if there is a gap that might be filled.

Regular review of processes

All treasury departments should review their internal operating procedures and processes on a regular basis. Auditors will assess whether these processes are being followed both as part of annual reviews and also in spot checks for compliance with key regulations. The treasurer should also review the set-up of any technology at least once a year, for example to establish whether the authorized parties are correct and the deal and authority limits appropriately reflect team members' skill sets.

The treasurer should also establish a less frequent (perhaps every three years) review of the processes themselves. For example, this should take into account the effect of any changes to banking standards which might allow for a more streamlined processing of payment transactions or the effect of a change in exchange controls which might permit a wider use of cross-border liquidity management structures.

Having reviewed these processes, the treasurer must evaluate whether any internal processes need to be changed and whether the current technology can be used to facilitate that.

Regular review of the market

Even when the treasurer is not considering changing technology, it is worthwhile to keep abreast of any significant changes in the market, such as the development of new solutions to cope with particular regulatory issues, and to be aware of any trends.

In addition, the treasurer should undertake a wider review of the market on a regular basis (perhaps every five years) to understand how propositions have changed since the adoption of the current system. This will help to evaluate the latest functionality that is available and to give the treasurer a sense of where the current technology solution may need to be improved.

Maintain relationship with suppliers

Most importantly, the treasurer must maintain a good working relationship with the company's suppliers. Suppliers should ideally contact all of their clients on a regular basis as part of professional customer care. This does not always happen, so the treasurer may need to be proactive to maintain the relationship. If the solution relies on internal IT department as well, any meetings with suppliers should also have representation from the IT department.

Most suppliers run regular workshops and host user-group meetings for their existing clients to discuss how their technology is being used, hear any grievances and to explain any upgrades or new developments. (Some software solutions have user groups that meet on an ad hoc basis for peer-to-peer end user sharing and development, with the results often shared with the software provider.) Attending these workshops gives the treasurer the opportunity to share experiences with other users, especially with respect to common problems. They also give users the opportunity to press the supplier to develop solutions or upgrades to provide particular functionality. Finally, they can also

indicate a supplier's approach to particular markets. For example, a supplier may offer workshops less frequently if it is preparing to downgrade the level of support it plans to give to a particular product.

If the team is having problems with a particular element of the technology, it should always contact the supplier. Unless the supplier is aware of a problem, it can do nothing to address it.

It is also worth considering whether it is appropriate to act as a reference client or participate in a pilot scheme. Organizations vary in their approach to both issues as they can both be time and resource consuming. Acting as a reference client should ensure good quality service from the supplier and participating in a pilot scheme may help the treasurer to persuade the supplier to develop specific functionality.

Review use of systems and technology

Every year the treasurer should also review the existing systems and technology to evaluate whether the functionality is being used appropriately. This should include an assessment of the modules (or sub-modules) which are available but that the team does not currently use.

It can be worthwhile arranging a site visit from either a representative of the vendor or a third-party consultant to get a better understanding of the underutilized parts of the technology, and whether using these elements would provide benefits.

CASE STUDY

Maintaining Efficiency in an Implemented System

It is often the case that the use of a treasury technology solution is deemed a success on the strength of the initial implementation process. Yet, in reality, this assessment should be determined over a period of years, as the treasury department continues to use the solution to support its activities. This example of one US subsidiary of a global multinational highlights the level of time, resource and organization needed to maintain the effectiveness of their treasury management system over time.

One of the strengths of the company's approach comes from its structure. The company has its North American treasury center located in the USA: its core processes align very much with the company's other treasury centers. Each treasury center is organized in similar ways with teams responsible for operations, risk management and markets/funding. "The aim is that if someone moved from one Treasury Center to another, they would be able to perform in a similar way the core processes." Standards have been agreed upon and they support the ease of IT implementation and processes.

If issues do arise with the treasury management system, the treasury team can raise them with the IT department based at the company's European headquarters. Initially, treasury will

CASE STUDY

contact a member of the IT team who will triage the problem. If necessary, an issue will then be escalated to a subject specialist.

The company has been using a global installation of the same treasury management platform for a number of years. Over this period the treasury department continues to expand the scope of its operations to cover additional activities. As an example, the company has recently incorporated a bond module into its treasury management system to help the team track bonds, execute payments, generate postings, and calculate fair market values. In order to meet customer requirements, the team worked with the vendor to develop solutions. This involved a lot of iterative work. A further round of development was needed as the business end users started to test the module. As well as ensuring the new module worked effectively, all the processes had to be approved by the company's external auditors and then documented for future reference.

The treasury team continues to look to extend the scope of the treasury management system to drive efficiency and enhance control. The company has dedicated IT resources; however, it still has to prioritize these resources when implementing new solutions. In addition, the company must ensure the treasury system supports all daily activities/issues and any new regulatory requirements. Ultimately the treasury group must make choices between the "must haves" and the "nice to haves".

At the same time, the treasury team has to ensure the system remains updated to be able to continue to function efficiently. The system vendor produces packages of enhancements on a regular cycle. Before adopting any updates, the company performs its own internal tests to ensure full functionality remains available. Tests are run both by the IT department and by functional group users across the group. When a major enhancement to the system is planned, the US team will sometimes send people to Europe to work alongside the group IT specialists. This allows the system to be functionally tested without any added complications caused by time zone delays. Any updates are then installed on the system at a preset time, chosen to minimize user downtime. Although fully tested, an IT team will be on standby during implementation to address any unforeseen problems.

When both extending the scope of the treasury management system and installing necessary updates, the company's organization supports the process. Having clear lines of responsibility in both treasury and IT helps to ensure clear communication, both about forthcoming updates and about extending the scope of the system. Ensuring these developments run smoothly helps treasury ensure the system continues to provide the required efficiency after a number of years.

Set a plan to review technology and assess if needs have changed

The timescales outlined above will differ significantly between organizations. The key point for the treasurer is to establish a program to review the use of current technology and to evaluate market developments.

Many treasurers perform many of these functions at, or just before, a contract renewal. This may be appropriate for most circumstances, but any underperformance of the technology against expectations should be raised as soon as possible.

Technology use should always be reviewed as part of, or after, any departmental event, such as an acquisition or divestment.

However the treasurer decides to structure the review plan, it is vital that this review is performed in the context of treasury need. It may be appropriate to develop a requirements definition (as explained earlier) every three to five years and then to evaluate the current technology against that new document. To streamline this process, it may be possible to ask interested parties whether the requirements definition used for the latest installation is still relevant. If not, the technology needs will have changed, so the team can evaluate how best to meet these changing needs. In order to make sure any resulting projects are included in the capital planning process, the treasurer should also discuss technology issues at regular meetings of the organization's finance committee.

If over a period of time the usage of the system has changed to the extent that the original financial terms appear to be inappropriate, especially if functionality originally acquired is no longer used, it may be worth discussing with the supplier a revision of any regular SaaS fee or ongoing support and maintenance payment.

In summary, it is vitally important that treasury teams recognize that, once installed, a system can, and arguably should, still be changed to reflect changing circumstances. A regular, planned and documented review is a key part of this process.

Looking to the Future

SUMMARY

This final chapter identifies some of the current trends in treasury technology and assesses how they might impact treasurers over the coming years. It outlines some of the key areas of development in technology and also some of the market changes which might require a technological response. Whether reviewing an existing solution or adopting a new one, understanding potential vendors' approaches to these issues can help treasurers to determine how proactive vendors are future proofing their solutions.

COPING WITH FUTURE DEVELOPMENTS

Most of the text in this book places the onus to identify requirements (and then to select and implement a solution that will deliver those requirements) on the treasurer and the treasury team. Ideally, the selected solution will remain effective for a period into the future allowing the company to benefit from the selected solution over this time. Ensuring sufficient longevity for a solution is more important with installed solutions, as SaaS solutions require less upfront investment (both in terms of finance and resource). To do so effectively, treasurers need to anticipate a certain amount of change through the use of business forecasts available to them, and making an assessment, where necessary, of potential vendors' abilities to continue to develop and service their products.

However, there are a number of areas where future market developments may have a significant impact on how companies use technology and treasury technology in particular. Due to the nature of technological development, it is not always possible to forecast future changes and, especially, how those changes will affect corporate treasury departments. It is, though, possible to anticipate where changes may come, as these will reflect areas where technology companies are currently investing their research and development budgets. This chapter outlines some of the most likely developments over the coming years and identifies ways in which treasurers can evaluate their future suitability.

Mobile technologies in treasury

One of the more exciting developments from a technology standpoint is the emergence of more mobile forms of technology. Every year more powerful handheld processers are available, making it ever easier for treasurers to keep their office with them wherever they happen to be. This provides many different opportunities for treasurers to refine processes as actions can be authorized and reviewed via a range of devices.

As new mobile functionality continues to develop, treasurers will need to prioritize two elements when evaluating its suitability for their operations. First, any adopted mobile technology must be sufficiently secure for the purpose for which it is to be used. So, for example, technology which facilitates a decision to initiate payments requires a greater level of security than that which permits a transfer of information. Second, any mobile technology must provide sufficient access to data to allow the user to make an informed decision and then for any decision to be appropriately recorded.

ISO 20022 and payment standards

Over recent years, there has been some success in achieving payment message standardization. In theory, the adoption of XML messaging standards (such as ISO 20022) should help treasurers achieve the straight through processing of payment messages. It should also result in a reduced requirement for companies to adopt middleware or payments bureaus to translate messages into formats required by different banks (and other counterparties).

In practical terms, although the move towards standardization is welcome, treasurers, especially those operating with more than one bank and/or in more than one country, will still need some assistance to minimize manual intervention in the processing of payment instructions. There are a number of reasons for this. First, despite the pressure for standardization, achieving compliance with new standards is something of a moving target. The ISO 20022 project, for example, continues to develop new messaging standards.

Second, there is no international body with the power to require adoption of any payment standards. In the case of ISO 20022, this means that the standards have not been adopted everywhere and, also, that different countries impose different requirements at a local level. From a corporate treasury perspective, it also means that banks can apply different additional requirements when processing messages. This has already been seen in the SEPA where additional fields are used in SEPA payment instruments.

There is no prospect of an ideal standardized solution (where there are no freeform fields in payment messages and no ability to alter the format) being adopted across every country around the world for the foreseeable future. Together, these mean that treasurers will continue to need a solution to ensure payments can be processed with the minimal level of manual intervention both internally and at their banks.

The impact of FinTech and the disintermediation of banks

There is an ongoing debate over the emergence of financial technology (FinTech) companies and their potential to disintermediate banks. This is most apparent in the payments space, where the traditional models of correspondent banking and the use of trade finance instruments have played a central role, especially in cross-border trade. One area of interest is the development of blockchain (or distributed database) technology, which is being reviewed for use by discreet groups of related parties. Its apparently robust validation process could be used to allow all participants in a transaction to view the progress of a financial transaction. This would reduce, or completely eliminate, the role of banks as the trusted partners of commercial trading companies.

In practical terms, it is highly unlikely that banks will be completely disintermediated from payments any time soon. Companies will continue to need to maintain bank accounts; it will take some time for alternative methods for transferring funds to be accepted. There also remains a lack of regulatory oversight.

However, from a technology standpoint, there are some factors that will become of more interest and relevance to treasurers over coming years. First, the development of blockchain technology does have major implications. Banks are already working on how to incorporate this technology into their own propositions: for example, some banks are already developing blockchain technology to use in interbank settlements. It may provide benefits in a number of areas, for example, allowing improvements to data management across multinational organizations so that all participating entities in a cash forecasting system have access to data, providing for more accurate and timely forecasts to be developed. In addition, it may be possible to utilize blockchain technology in cash pooling structures, although there are many technical and legal hurdles to overcome.

The emergence of cryptocurrencies

A further step in this journey may result in the growing use of cryptocurrencies using blockchain technology. Cryptocurrencies are digital currencies that are created via encryption techniques, which prevent the oversupply of the currency. Blockchain technology can be used to facilitate the secure transfer of funds from one user to another. There are a number of cryptocurrencies, with Bitcoin the first and most well-known.

Although these currencies are used by some companies as payment, significant obstacles remain before they can achieve widespread acceptance. Chief of these is the lack of regulation of these currencies combined with the highly publicized failure of some (such as Mt Gox) and the rapid decline in value of Bitcoin in early 2016 when a developer judged it a failure. To be more widely accepted, the process of creating them and the valuation process both need to be more widely understood. In addition, there are a number of practical issues surrounding their greater use. For example, cryptocurrency is not stored in traditional bank accounts.

Although blockchain is the most widely discussed FinTech development, other FinTech propositions are already having profound impacts on the way corporate treasurers manage their operations. The successful solutions include those that allow corporate treasurers to simplify their department's processes. This might be because the solution provides greater visibility of cash (through the integration of data streams from different banks to show a consolidated position), or because it streamlines a transaction process via a solution which automates the workflow.

Coping with regulatory change

Regulatory change has the potential to have a significant impact on corporate treasurers. Much of the most recent activity by regulators has been focused on trying to prevent another liquidity crisis in the banking industry. To that extent, regulators have concentrated their attention on two elements – trying to use regulation to build stronger banks and introducing additional regulation to start to control the "shadow banking market", primarily money market funds and the use of derivatives. In addition, regulators and legislators around the world continue to introduce measures designed to combat money laundering. Given this focus, corporate treasury practitioners have been indirectly affected by most of this activity, as their partner banks respond to the changes in liquidity and capital ratios demanded by Basel III.

Yet there are a number of key regulatory changes which represent major challenges for corporate treasurers and where technology can play a role in achieving a solution. These include:

Prevention of money laundering

In the past, companies could rely on their banks to provide any reassurance over the identity of their international customers and suppliers. Increasingly, there is an expectation on companies that they will do full due diligence on their customers and suppliers so that they can demonstrate that they know their customer. As treasurers assume more responsibility over the financial supply chain, this is increasingly becoming an area of direct responsibility. Once banks become disintermediated from an increasing range of transactions (either through the use of non-bank providers or the adoption of blockchain technology), this responsibility will grow again.

From a technology standpoint, therefore, having access to solutions which can help to verify identities of counterparties (and, in due course, how they use any funds or goods acquired as a result of transactions), especially in foreign countries, and then record this data, will become an important tool in the battle against money laundering. Treasurers will also need to ensure all solutions they employ are auditable with a clear record of actions.

Banks also impose greater requirements on their customers when managing bank accounts (especially opening bank accounts). The use of technology to manage signatories on these accounts is available and can also be used to manage FBAR (Report of Foreign Bank and Financial Accounts) requirements and similar requirements imposed by national regulators.

Derivatives reporting

The USA and EU have both introduced regulations (Dodd–Frank and EMIR, respectively) designed to improve regulatory oversight of the global derivatives markets. These impose additional reporting requirements on corporate treasurers using derivatives. There are a number of solutions available to treasurers to facilitate reporting.

Impact of Basel III for cash forecasting and management

Corporate treasurers have felt the impact of Basel III in a number of ways: placing cash deposits with banks is more difficult (capital adequacy regulations can require banks to hold collateral against repayment, which limits the value of these deposit to a bank's lending activities). As the elements of Basel III become more fully implemented, banks may start to charge explicitly for services. One example is the potential charge for the provision of intra-day liquidity. This can apply when companies make a series of disbursements in the morning and then collect payments during the course of the day, even if an account has a credit balance at the end of the day. Banks will be required to hold cash against any intra-day credit that they offer their clients, and some will want to pass this cost onto those clients which use it. To avoid unnecessary charges, treasurers may need to plan their disbursements more carefully. This may require investing in more sophisticated forecasting solutions to allow treasurers not only to predict end of day balances but also to predict and manipulate intra-day cash positions, too. Alternatively, companies may need to fund their bank accounts to cover these intra-day outflows.

Changes to payment systems including faster payment regimes

There are still significant differences in the types of payment instruments used in different countries. This is driven by the functionality of interbank payment systems, by local business practices (which may promote some instruments or effectively prevent the use of others), and by local culture (especially in terms of the volume of checks used). Payment system operators continue to develop their systems to try to gain or retain competitive advantage. Regulators also wants systems to offer faster settlement (to reduce systemic risk) and improved security (to reduce fraud).

Today, the focus is very much on reducing settlement times for retail payment systems towards an environment in which non-urgent payments can be settled in near real time. This change has the potential to alter the dynamics of cash management for companies and place greater pressure on technology. When selecting technology to support payments activity, treasurers should focus on two elements. First, the acceleration of settlement cycles means the ability to forecast will become ever more important. Second, controls around payment initiations and settlement instructions will need to be as robust as for high-value payments – with near real-time settlement it will become harder to recall and amend payment instructions, especially with respect to cross-border payments.

Conclusion

This is not an exhaustive list of changes to affect corporate treasurers over the coming years and it is not designed to be. Instead, it is possible to identify some trends that have already emerged and which should help to inform treasurers when selecting their preferred treasury solution and assessing future innovations. These can be distilled into three key areas in which treasurers will need technology to simplify an ever more complex task. First, by collating data from partners, both internal and external, technology should help treasurers obtain visibility over cash and identify exposures to risk. Second, by controlling access to that data, technology should help treasurers exercise greater control over all treasury activity. Third, by providing a tool to manipulate that data, technology should help treasurers prepare all the various reports they are required to file: accounting entries, management reports and regulatory reports.

Developing a Request for Proposal.

Developing an appropriate request for proposal (RFP) document is a key point in the selection process for two important reasons. First, it is a tool to evaluate potential vendors and their solutions as the treasurer seeks to identify the most appropriate system or solution. Responses from potential vendors will indicate whether they can provide the required level of functionality. Moreover, a basic response (or even a non-response) may indicate that a potential vendor is not interested (or capable) of winning the business.

Second, and just as important, the process of developing the RFP itself helps the treasury team (and other participants within the organization) to understand their core requirements of the system or solution. To complete the document in a structured manner and with the appropriate level of detail, the team must first draw up a thoroughly researched requirements definition document. This will be used to produce the RFP. In a sense the development of the RFP is just as much a tool to support the identification of the requirements definition as it is about evaluating potential vendors.

Put simply, the more that the RFP reflects the organization's requirements in the information it seeks and the questions it asks of potential vendors, the more likely the responses will help the organization to identify the vendors it wants to shortlist. By asking focused questions, the RFP will engage interested vendors as it will be clear to them that significant thought has been put into the purpose of the project.

At the same time, the more information a treasurer can give to potential vendors to help them understand existing flows and processes, the better they will be able to respond and answer the questions posed in the RFP document. This should include descriptions and diagrams of existing processes, volumes of transactions and other flows and expected future flows. It is also helpful to provide details of any processes which do not work well or which are identified as potential risk factors requiring greater control.

CHECKLIST FOR INCLUSION IN AN RFP

This is a list of areas which could be covered in the RFP document. Wherever possible, questions should be framed to require a full answer, using terms such as explain, describe.

Where detailed information is required about a specific function, avoid asking questions which provoke only a yes/no answer. There are two ways of doing this:

- Ask a closed question and then a second follow-up question asking for a description of the process. For example, "Can subsidiaries access bank account information in real time? Describe how they can do so."
- Alternatively, ask for specific details. For example, "What methods are available for subsidiaries to access real-time bank account information?"

The following areas could be covered in an RFP, although the detail will vary depending on the project:

Information to be provided with RFP

- A brief overview of the company and the structure of the treasury organization;
- The objectives of the project and, therefore, the reasons for the issue of the RFP;
- The scope of the project, including details of any other related project (for example, is this project part of a wider technology project? Will the organization consider solutions which meet only some of the objectives? Is this part of a wider treasury reorganization?);
- Relevant data, including diagrams, about existing processes and flows as indicated above;
- Any expected process and procedure changes;
- The expected decision-making process, including a timetable for the response and review of RFPs, up to a preferred implementation date;
- Contact details for more information and clarification and also for the receipt of responses.

The RFP should also be issued after product demonstrations or, preferably, after a more detailed workshop. These would help the vendor acquire more knowledge of the organization's structure and needs. At the same time, this process would give the treasury team a greater understanding of the technology available and the opportunities it offers. By issuing the RFP at this stage, the document will be richer with more detailed and focused questions.

Areas to be covered in the RFP

These will naturally vary from project to project. This is designed only as a checklist of areas to consider.

The following areas could be covered, depending on requirements:

- The vendor company's financial strength and business development, experience, personnel, international presence (if appropriate). Details of reference clients.
- Functionality. For each of the following areas which are appropriate to the project, ask detailed questions about required functionality, including whether the vendor works with other vendors:
  - Bank polling
  - Cash flow forecasting
  - Cash positioning
  - Short and long-term investments and debt management
  - Cash pooling
  - Netting
  - Payment and collection factory
  - In-house banking
  - Intercompany loans
  - Risk management (FX, interest rate, commodities, other)
  - Confirmation matching
  - Accounting and reconciliation
  - Links to other corporate systems, including general ledger, ERP system
  - Hedge accounting
  - Use of portals (e.g. for foreign exchange or money market funds)
  - Bank account management
  - Bank connectivity
- Access to system. How do subsidiaries and other business units access the system?
- Data presentation. How can information be viewed by treasury team members? How can information be prepared and presented for formal and informal reporting purposes (senior management, audit, regulatory compliance)?
- System delivery (How can the system be delivered – local installation, hosted installation, SaaS?)

- Security and controls. This should cover control of data held on vendor's systems, access to the system and its data, and the maintenance of appropriate authorities and limits.
- Implementation (how would the vendor expect to implement the solution?)
- Post-implementation relationships (regular meetings, user groups, etc.)
- Regular on-going support and maintenance; should be formalized within a service level agreement.

Country Reports.

Argentina

Currency: Argentine peso (ARS)

Electronic payment systems

	MEP	Interbanking
Payments processed	High-value financial and commercial electronic transfers.	High-value interbank and commercial electronic credit transfers.
Value threshold	None.	None.
Settlement type	RTGS	Net settlement.
Settlement cycle	Settlement on a same-day basis.	Settlement on a same-day basis.
Access to system	Via the internet (extranet), through applications provided by the Banco Central de la República Argentina (BCRA).	Via accounts at member banks.
Links to other systems	All other domestic payment systems for final settlement.	MEP

Other payment clearing systems

There COELSA (Compensadora Electrónica) payment system in Argentina processes checks, credit transfers, direct debits, postal payment orders, letters of credit, bills of exchange, fixed-term certificates of deposit and ATM transactions for the Banelco and Red Link networks.

Banking standards

There is no bank-independent electronic banking standard. However, the standard functionality for wholesale customers in Argentina includes domestic and cross-border payment initiation, balance and transaction reporting, collections/remittance data and zero-balance accounts.

The BCRA and the electronic clearing houses have adopted a standardized code (CBU — Clave Bancaria Uniforme) for all interbank electronic funds transfers.

Bank account structure

Argentinean bank accounts can be identified by the use of:

- a two numeric digit account type number; or
- an 11 numeric digit account number.

The BCRA and the electronic clearing houses have adopted a 22 digit standardized code (CBU — Clave Bancaria Uniforme) for all interbank electronic funds transfers.

The CBU consists of two blocks:

First block consists of three elements:

- a three numeric digit code identifying the bank;
- a four numeric digit branch code; and
- a numeric check digit for block 1.

Second block consists of three elements:

- a two numeric digit account type number;
- an 11 numeric digit account number; and
- a final numeric check digit for block 2.

e.g. an Argentinean CBU number could be:
0140125655654185476543

International Bank Account Number (IBAN)

Argentina has not adopted IBAN.

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Use of payment and collection instruments

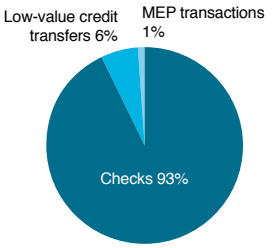
	Transactions (million)			% change	Traffic (value) ARS billion			% change
	2010	2014	2015	2015/2014	2010	2014	2015	2015/2014
Checks	93.5	91.4	89.1	– 2.5	828.9	1,931.5	2,355.9	22.0
MEP transfers	1.4	1.7	1.8	5.9	4,550.0	13,782.5	18,581.6	34.8
Low-value credit transfers	14.7	122.9	142.5	16.0	109.4	7,763.1	10,545.6	35.8
COELSA	11.6	122.9	142.5	16.0	85.5	7,763.1	10,545.6	35.8
ACH	3.1	-	-	-	23.9	-	-	-
Total	**109.6**	**216.0**	**233.4**	**8.1**	**5,488.3**	**23,477.1**	**31,483.1**	**34.1**

Source: Banco Central de la República Argentina, March 2016.

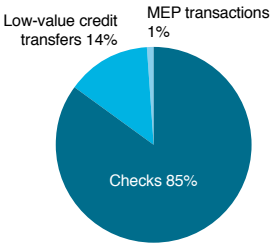
Payment statistics

Number of transactions

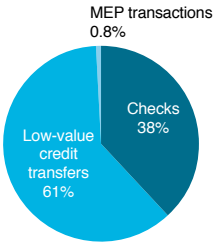
2004



2010

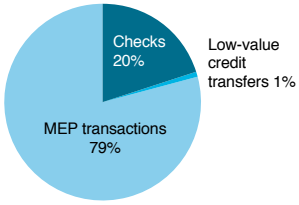


2015



Transaction values

2004



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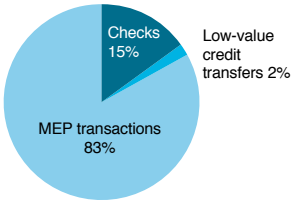
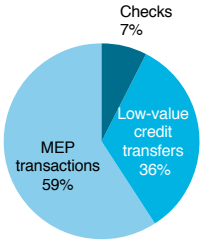


2015



Source: Banco Central de la República Argentina.

Australia

Currency: Australian dollar (AUD)

Electronic payment systems

	RITS	HVCS
Payments processed	Interbank obligations from participant banks' transactions made via the country's other clearing and securities settlement systems.	High-value and urgent electronic payments.
Value threshold	None.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Settlement in real time and with immediate finality.	Settlement in real time.
Access to system	Obligations from HVCS are in SWIFT format.	Via SWIFT FinCopy.
Links to other systems	None.	RITS

Other payment clearing systems

The Bulk Electronic Clearing System (BECS) clears low-value credit transfers and direct debits; the Consumer Electronic Clearing System (CECS) clears proprietary debit card payments; and the Australian Paper Clearing System (APCS) clears check payments and other MICR-encoded paper-based payments.

Banking standards

The Australian Bankers' Association has developed bank-independent electronic banking standards for ATMs, EFTPOS terminals, telephone banking and internet banking.

Bank account structure

Australia has not adopted IBAN.

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Use of payment and collection instruments

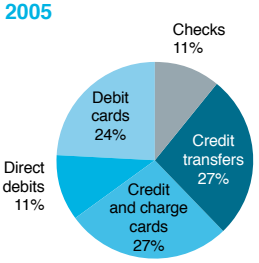
	Transactions (million)			% change	Traffic (value) AUD billion			% change
	2010	2014	2015	2015/2014	2010	2014	2015	2015/2014
Checks	301	167	140	-16.3	1,453	1,229	1,228	-0.02
Credit transfers*	1,781	2,204	2,245	1.9	6,319	8,467	8,542	0.9
Direct debits	681	915	977	6.7	5,024	6,129	5,793	-5.5
Debit cards †	2,056	3,791	4,302	13.5	128	208	245	18.3
Credit and charge cards	1,601	2,072	2,287	10.4	240	278	303	9.0
Total	**6,420**	**9,148**	**9,950**	**8.8**	**13,164**	**16,310**	**16,111**	**-1.2**

* Not including transfers cleared via HVCS. † Not including ATM cash withdrawals. Source: Reserve Bank of Australia.

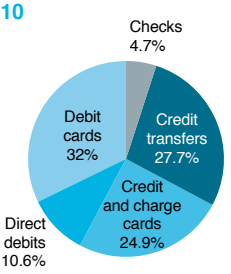
Payment statistics

Number of transactions

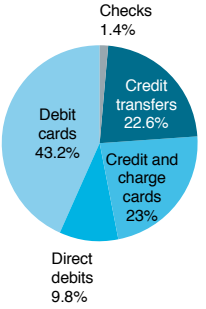
2005



2010

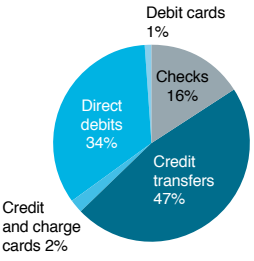


2015

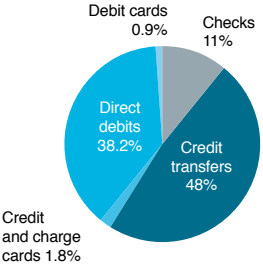


Transaction values

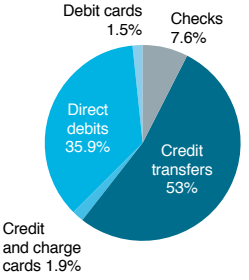
2005



2010



2015



Source: Reserve Bank of Australia

Belgium

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BE	CEC CSM
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	Low-value and non-urgent electronic and paper-based payments. Paper-based payments (primarily checks) must be truncated into electronic items before processing. SEPA payments.
Value threshold	None.	Maximum EUR 500,000 for domestic legacy credit transfers and direct debits. Maximum EUR 25 million for checks. SEPA payments have no maximum value limit.
Settlement type	RTGS	Multilateral deferred net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement on a same-day or next-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Using the telecommunications network. Participants can view progress through WIROW FIN'Markets, accessible either directly on the internet or via the NBB/BNB's extranet.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2-BE

Other payment clearing systems

STET intends to launch a new CSM for the Single Euro Payment Area, entitled SEPA.EU, in November 2016. SEPA.EU will be accessible via SWIFTNet. There will be multiple intraday clearing cycles, while settlement will take place via TARGET2.

Banking standards

The Interbank Standards Association Belgium (ISABEL) is a national bank-neutral electronic banking system that was developed in Belgium. A full range of electronic banking services is available through the ISABEL6 web solution, from daily transaction and balance reporting, to domestic and international payment initiation. SWIFT for Corporates is also available to large multinational companies.

Bank account structure

All Belgian bank accounts are represented by a 16 digit alpha-numeric code:

BE-dd-bbb-aaaaaaa-cc

Where:

- BE is the two digit ISO Country Code for Belgium;
- dd are two IBAN check digits; and
- the remaining digits are the national bank account number.

e.g. the IBAN for the above number could be:

BE-13-352-0089643-95

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Use of payment and collection instruments

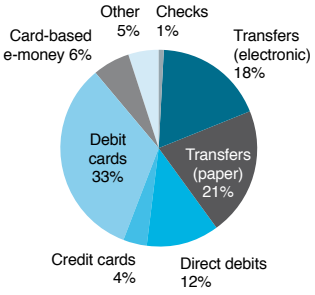
	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	8	4	3	- 33.4	43	34	24	- 29.4
Electronic credit transfers	864	990	1,337	35.0	3,946	3,514	6,395	82.0
Paper-based credit transfers	90	32	29	- 10.5	574	462	284	- 38.5
Direct debits	260	313	529	69.1	63	78	120	53.4
Debit cards	885	1,169	1,350	15.5	44	57	60	5.1
Credit cards	112	164	153	- 6.7	11	15	13	- 9.2
Card-based e-money	71	29.4	28.5	- 2.8	0.31	0.14	0.36	157.1
Total	**2,289**	**2,702**	**3,437**	**27.2**	**4,682**	**4,159**	**6,899**	**65.7**

Source: ECB Payment Statistics, October 2015.

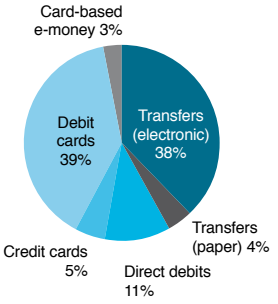
Payment statistics

Number of transactions

2004

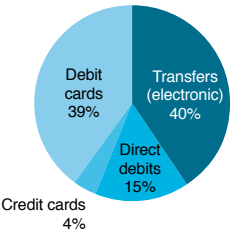


2009



Checks <1%
Other <1%

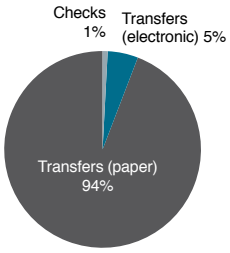
2014



Checks <1%
Transfers - paper-based <1%
Card-based e-money <1%
Other <1%

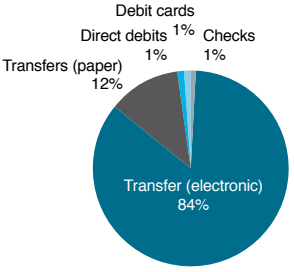
Transaction values

2004



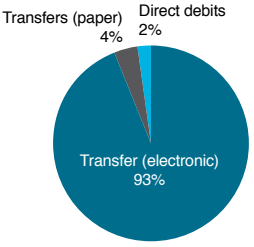
Direct debits <1%
Credit cards <1%
Debit cards <1%
Card-based e-money <1%
Other <1%

2009



Credit cards <1%
Card-based e-money <1%
Other <1%

2014



Checks <1%
Credit cards <1%
Debit cards <1%
Card-based e-money <1%
Other <1%

Sources: ECB Payment Statistics and Blue Book.

Brazil

Currency: Brazilian real (BRL)

Electronic payment systems

	STR	CIP-SITRAF
Payments processed	High-value financial and commercial electronic transfers (*transferências eletrônica disponível* – TEDs).	High-value electronic transfers (*transferências eletrônica disponível* – TEDs).
Value threshold	None.	There is a BRL 1 million value limit in CIP-SITRAF. All credit transfers equal to or greater than BRL 5,000 are made as TEDs.
Settlement type	RTGS	Net settlement.
Settlement cycle	Settlement on a same-day basis.	Settlement on a same-day basis.
Access to system	Access to the system can be made via the National System Network (RSFN) using a proprietary XML-based messaging protocol. The system can also be accessed through the internet using the STR-Web application.	Electronic file transfer. Access to the system is be made via the National System Network (RSFN).
Links to other systems	CIP and COMPE for final settlement.	STR

Other payment clearing systems

Brazil also operates CIP-SILOC (Sistema de Liquidação Diferida das Transferências Interbancárias de Ordens de Crédito), which processes low-value credit transfers (*documentos de crédito* – DOCs and transferências especiais de crédito –TECs). collection orders (*boletos de pagamento*) and POS and ATM interbank transactions (TecBan). There is also COMPE (Centralizadora da Compensação de Cheques e Outros Papéis), which handles truncated checks.

Banking standards

Many companies operating in Brazil exchange data electronically with banking and commercial counterparties via VANs (value-added networks) and EDI protocols. Most banks in Brazil are connected to one or more VANs.

Bank account structure

When making an interbank credit transfer (TED) in Brazil, banks can be identified by the use of an eight digit number known as ISBP (Identificador do Sistema de Pagamentos Brasileiro). Each bank account held at the bank will be identified by an account number, whose structure will be determined by the bank.

International Bank Account Number (IBAN)

Brazil has adopted IBAN for international fund transfers to bank accounts in Brazil. Bank accounts are represented by a 29 digit alpha-numeric code (IBAN):

BR-dd-bbbbbbbb-aaaaaaaaaa-P-1

Where:

- BR is the two digit ISO Country Code for Brazil;
- dd are two IBAN check digits;

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- bbbbbbbb represents the bank identifier code;
- ccccc represents the branch identifier code;
- aaaaaaaaaa is the 10 digit account number;
- P represents the account type; and
- 1 is the character for account holder position.

e.g. the IBAN for the above number could be:

BR97 0140 0305 0000 1000 0020 921P 1

Use of payment and collection instruments

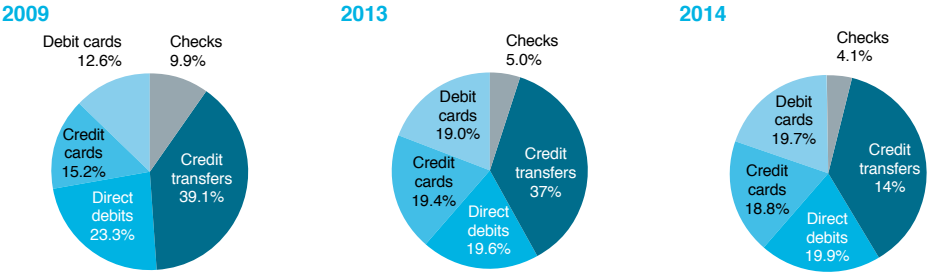
	Transactions (million)			% change	Traffic (value) BRL billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks *	1,803	1,304	1,171	– 10.2	2,502	2,926	2,826	– 3.4
Credit transfers †	7,158	9,588	10,749	12.1	18,559	32,988	35,119	6.5
Direct debits ‡	4,265	5,083	5,686	11.9	5,082	9,401	8,866	10.0
Debit cards	2,309	4,908	5,627	14.7	122	293	348	18.8
Credit cards	2,777	5,020	5,367	6.9	254	534	594	11.2
Total	**18,312**	**25,903**	**28,600**	**10.4**	**26,519**	**46,142**	**47,753**	**3.5**

* Includes inter- and intra-bank transactions. † Includes inter- and intra-bank TEDs, DOCs and bloquetos. ‡ Includes inter- and intrabank transactions.

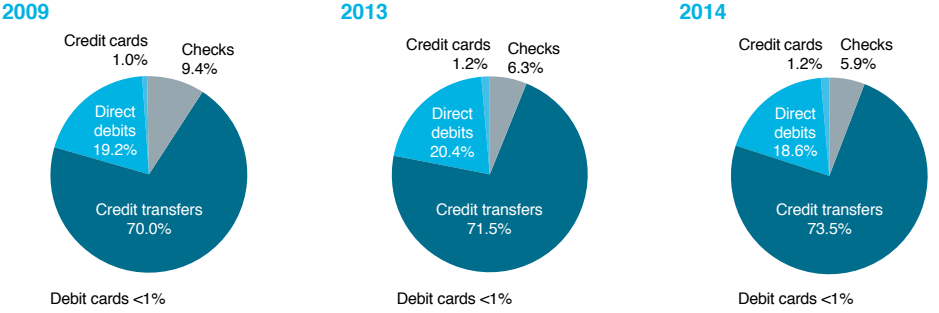
Source: Banco Central do Brasil, July 2015.

Payment statistics

Number of transactions



Transaction values



Source: Banco Central do Brasil.

Canada

Currency: Canadian dollar (CAD)

Electronic payment systems

	LVTS	ACSS
Payments processed	High-value and urgent electronic payments.	Low-value and non-urgent electronic credit transfers (Automated Funds Transfers - AFT) credits and AFT debits. EDI, POS and automated banking machine transactions.
Value threshold	None.	Maximum CAD 25 million for checks, bank drafts and other paper items.
Settlement type	RTGS	Deferred net settlement.
Settlement cycle	Payments are settled on a same-day basis and with immediate finality	Payments are settled on a next-day basis.
Access to system	Using SWIFT FIN Y-Copy service (SWIFT standard message types (MT 103 or MT 205). A private Direct Network can be used for non-payment messaging and for payments (equivalent in purpose to the MT 205) in contingency situations.	NA
Links to other systems	NA	NA

Other payment clearing systems

As well as the two main systems, there is the US Dollar Bulk Exchange system (USBE), used for the clearing of USD-denominated checks.

Banking standards

Although there is no bank-neutral electronic banking system, all the major Canadian and international banks provide their own proprietary electronic banking platforms, most of which facilitate multibanking through the use of common standards.

The Canadian Payments Association (CPA) is coordinating the adoption of the international payment messaging standard ISO 20022 as part of a strategy to modernise Canada's payment system.

Bank account structure

Canadian direct payment routing numbers and transit numbers are regulated by the Canadian Payments Association (CPA).

When making electronic fund transfers to a Canadian bank account, banks can be identified by the use of a nine digit direct payment routing number.

The direct payment routing number consists of three elements:

- a leading 0 (zero);
- a three digit code identifying the bank; and
- a five digit code identifying the branch.

A Canadian direct payment routing number has the following structure: 0YYYXXXXX

The structure of transit numbers for checks differs from the structure of direct payment routing numbers.

- A check transit number consists of two elements:
- a five digit code identifying the branch; and
- a three digit code identifying the bank.

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A Canadian check transit number has the following structure:

XXXXX-YYY

The dash between the branch number (XXXXX) and the bank number (YYY) is an integral part of the transit number.

Each bank account held at the bank will be identified by an account number, whose structure will be determined by the bank.

International Bank Account Number (IBAN)

Canada has not adopted IBAN.

Use of payment and collection instruments

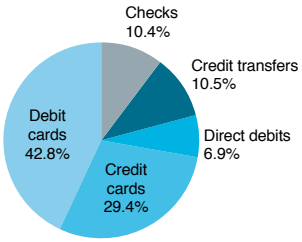
	Transactions (million)			% change	Traffic (value) CAD billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	943.7	761.1	708.9	– 6.7	2,811.7	2,935.2	2,977.5	1.4
Credit transfers	949.7	1,233.0	1,270.3	3.0	40,127.7	39,851.3	41,073.5	3.1
- High-value credit transfers	5.6	7.6	7.9	4.0	38,696.3	37,609.4	38,652.8	2.8
- Low-value credit transfers	944.1	1,225.4	1,262.4	3.0	1,431.4	2,241.9	2,420.7	8.0
Direct debits	630.8	728.4	762.3	4.7	503.4	611.3	642.5	5.1
Debit cards	3,881.0	4,518.9	4,899.0	8.4	171.4	196.1	211.0	7.6
Credit cards	2,671.4	3,580.3	3,897.8	8.9	288.8	374.8	403.7	7.7
Total	**9,076.6**	**10,821.7**	**11,538.3**	**6.6**	**43,903.0**	**43,968.7**	**45,308.2**	**3.1**

Source: BIS – CPMI – Red Book statistical update, December 2015.

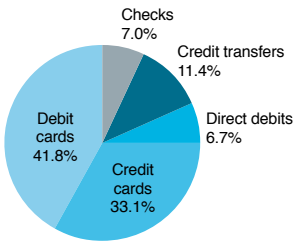
Payment statistics

Number of transactions

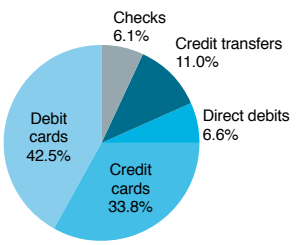
2009



2013

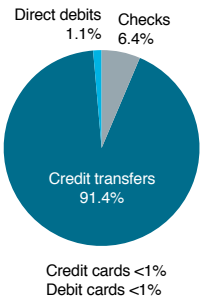


201



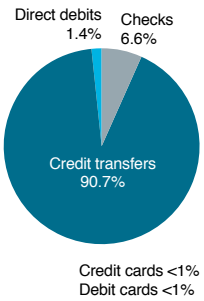
Transaction values

2009



2013

2014



Source: BIS – CPMI – Red Book statistical update.

Chile

Currency: Chilean peso (CLP)

Electronic payment systems

	LBTR (Sistema de Liquidación Bruta en Tiempo Real)	CCAV – Combanc (Sociedad Operadora de la Cámara de Compensación de Pagos de Alto Valor)
Payments processed	Urgent, high-value, electronic credit transfers.	Urgent, high-value, electronic credit transfers.
Value threshold	None.	None.
Settlement type	RTGS	Net settlement.
Settlement cycle	Same-day value with immediate finality.	Settlement on a same-day basis.
Access to system	NA	NA
Links to other systems	CCAV, CCA and the National Clearing House for Checks and other Documents in Local Currency for final settlement.	LBTR

Other payment clearing systems

There COELSA (Compensadora Electrónica) payment system in Argentina processes checks, credit transfers, direct debits, postal payment orders, letters of credit, bills of exchange, fixed-term certificates of deposit and ATM transactions for the Banelco and Red Link networks.

Other payment clearing systems

Chile also operates the Centro de Compensación Automatizado (CCA), which processes low-value electronic credit transfers and direct debits; and the Cámara de Compensación de Cheques y Otros Documentos en Moneda Nacional (National Clearing House for Checks and other Documents in Local Currency), which processes checks and other paper-based instruments.

Banking standards

There is no bank-independent electronic banking standard in Chile.

Bank account structure

Bank numbers, account numbers and corresponding check digits do not follow a standard pattern in Chile.

International Bank Account Number (IBAN)

Chile has not adopted IBAN.

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Use of payment and collection instruments

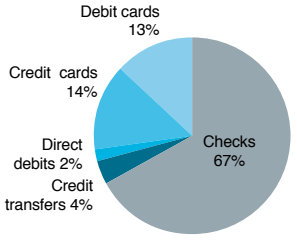
	Transactions (million)			% change	Traffic (value) CLP billion			% change
	2010	2014	2015	2015/2014	2010	2014	2015	2015/2014
Checks	208	180	154	– 14.4	320,174	291,322	282,981	– 2.9
LBTR transfers	0.26	0.38	0.38	0.0	1,639,598	3,025,778	3,123,549	13.2
COMBANC transfers	1.3	1.4	1.5	7.1	739,372	1,121,773	1,185,552	– 4.7
CCA Credit transfers	73	198	242	22.2	63,943	155,363	186,323	19.9
CCA Direct debits	23	37	40	8.1	1,154	2,251	2,368	5.2
Debit cards	184	474	577	21.7	3,460	9,131	10,911	19.5
Credit cards	92	171	216	26.3	4,598	9,027	11,298	25.2
Total	**582**	**1,062**	**1,231**	**15.9**	**2,772,299**	**4,614,645**	**4,802,982**	**4.1**

Sources: CCA, COMBANC and Chile Superintendency of Banks and Financial Institutions, 2016.

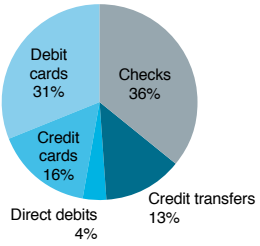
Payment statistics

Number of transactions

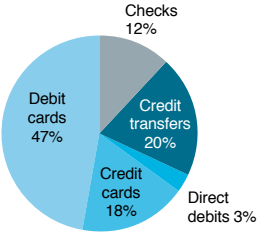
2005



2010

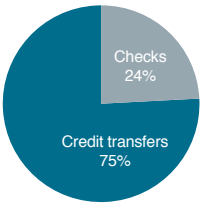


2015



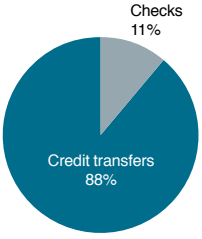
Transaction values

2005



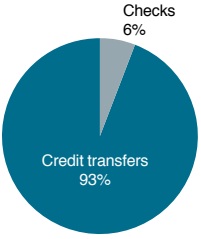
Direct debits <1%
Credit cards <1%
Debit cards <1%

2010



Direct debits <1%
Credit cards <1%
Debit cards <1%

2015



Direct debits <1%
Credit cardss <1%
Debit cards <1%

Sources: CCA, COMBANC and Chile Superintendency of Banks and Financial Institutions.

China

Currency: Renminbi (RMB), also called Yuan (CNY)

Electronic payment systems

	CNAPS-LVPS	CNAPS-BEPS
Payments processed	High-value and urgent low-value electronic payments, and third-party transactions.	Low-value and non-urgent electronic payments in the form of credit, preauthorized collections and dated debits.
Value threshold	Minimum value RMB 50,000. All payments over RMB 1 million must be processed through CNAPS-LVPS.	Net values processed must be less than RMB 50,000.
Settlement type	RTGS	RTGS
Settlement cycle	Payments are settled on a 24-hour basis. Can take up to 48 hours for intercity payments. If the sending and recipient banks are direct clearing members of CNAPS and have a direct link to CNAPS, then real-time settlement is possible.	Settlement is on a same-day or next-day basis: T+1 for credits/debits of receiving bank, T+2 for dated debits.
Access to system	Using SWIFT format.	NA
Links to other systems	NA	NA

Other payment clearing systems

The Local Clearing House system, which processes all paper-based credits and debits; and the China Domestic Foreign Currency Payment System, which handles foreign currency electronic funds transfers in eight currencies (AUD, CAD, CHF, EUR, GBP, HKD, JPY and USD).

The Online Payment Interbank Clearing System or "Super-e-banking" clears internet-initiated payments.

A new system, the China International Payment System (CIPS), processes cross-border RMB payments.

Banking standards

There is no bank-independent standard for electronic banking services in China.

Bank account structure

China has not adopted IBAN.

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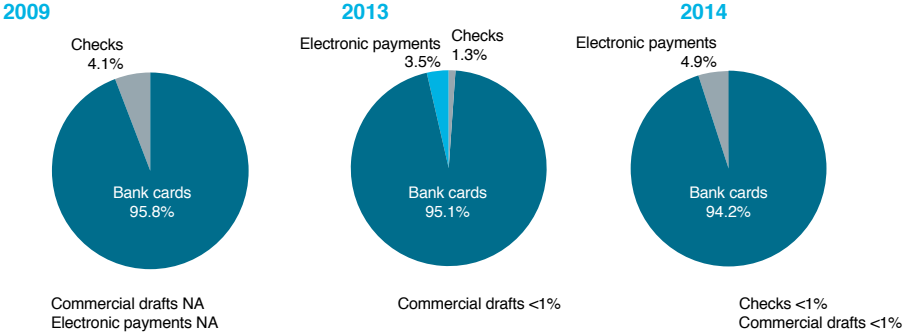
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) RMB billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	854	667	551.8	– 17.3	249	260	243	6.6
Commercial drafts	NA	16.3	18.4	12.9	NA	18.2	19.3	6.0
Bank cards	19,691	47,596	59,573	25.2	166	423	449	6.0
Electronic payments	NA	1,758	3,075	74.9	NA	29.8	39.9	33.9
Total	**20,545**	**50,037**	**63,218**	**26.3**	**415**	**731**	**751**	**2.7**

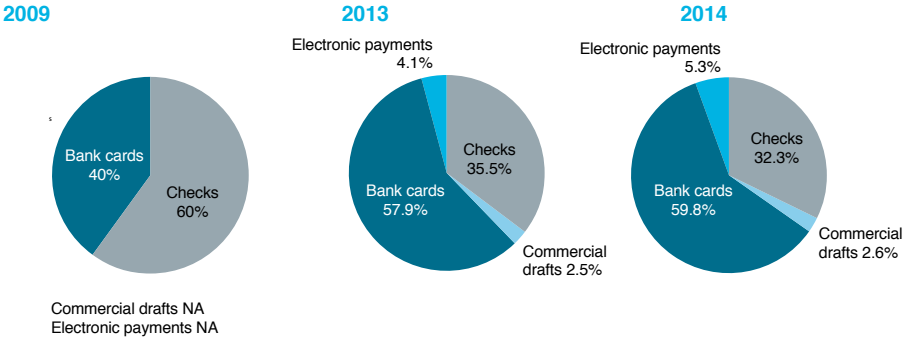
Source: PBC Payment System Report, 2015.

Payment statistics

Number of transactions



Transaction values



Source: PBC Payment System Report, 2015.

Czech Republic

Currency: Czech koruna (CZK)

Electronic payment systems

	CERTIS
Payments processed	All payments denominated in CZK.
Value threshold	None.
Settlement type	RTGS
Settlement cycle	High-priority payments must be settled on a same-day basis. Low-priority transactions are not always settled on the same day.
Access to system	Through the telecommunications network. The CERTIS Message Transfer System (CERTIS-MTS) enables the electronic submission and processing of data without intervention from the CNB.
Links to other systems	None.

Other payment clearing systems

EBA Clearing's Pan-European STEP2 processes SEPA credit transfers and direct debits. Cross-border EUR transfers can also be processed via EBA Clearing's EURO1 or STEP1.

Banking standards

There is no bank-independent standard for electronic banking in the Czech Republic. However, the local version of MultiCash and the domestically developed Gemini (by BSH Praha) are the most common electronic banking packages.

Bank account structure

All Czech bank accounts are represented by a 24 digit alpha-numeric code:

CZ-dd-bbbb-aaaaaaaaaaaaaaaa

Where:

- CZ is the two digit ISO Country Code for the Czech Republic;
- dd are two IBAN check digits;
- bbbb represents the bank code; and
- aaaaaaaaaaaaaaaa is the prefix and basic account number.

e.g. the IBAN for the above number could be:

CZ-56-1045-000034 0002405067

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Use of payment and collection instruments

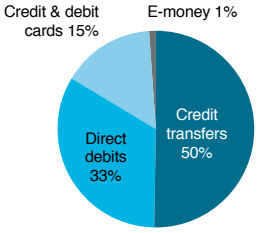
	Transactions (million)			% change	Traffic (value) CZK billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.28	0.6	0.54	-10	30	35	34	– 2.6
Credit transfers	422	553	571	3.3	131,594	32,194	35,648	10.7
Direct debits	29	148	142	-3.9	85	446	539	20.9
Debit cards	160	333	416	25.1	160	273	316	15.6
Credit cards	16	52	68	29.2	83	46	55	20.8
E-money payments	58	9	9	3	0.7	1.03	1.86	80.6
Other payment instruments	-	0.72	0.99	37.5	-	66	122	85.8
Total	**626**	**1,096**	**1,207**	**10.2**	**131,951**	**33,061**	**36,716**	**11.1**

Source: ECB Payment Statistics, October 2015.

Payment statistics

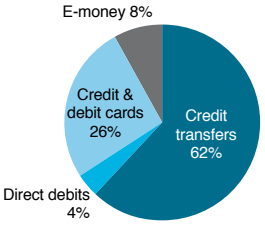
Number of transactions

2004



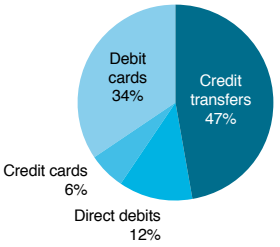
Checks <1%
Other <1%

2009



Checks <1%
Other none

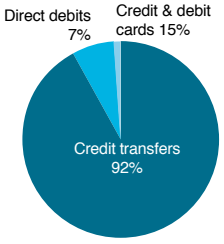
2014



Checks <1%
e-money <1%
Other <1%

Transaction values

2004

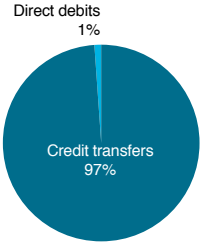


Checks <1%
Card-based e-money <1%
Other <1%

2009

Checks <1%
Direct debits <1%
Credit & debit cards <1%
Card-based e-money <1%
Other none

2014



Checks <1%
Credit cards <1%
Debit cards <1%
Card-based e-money <1%
Other <1%

Sources: ECB Payment Statistics and Blue Book.

Denmark

Currency: Danish krone (DKK)

Electronic payment systems

	TARGET2	KRONOS
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	High-value/urgent payments in DKK.
Value threshold	None.	None.
Settlement type	RTGS	RTGS
Settlement cycle	Settlement in real time with immediate finality.	Settlement in real time with immediate finality, but can also be deferred for up to 14 days (participants with SWIFT).
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Banks can connect via either a dedicated KRONOS terminal, which uses its own IP-based KRONOS network (Basic module), or SWIFT (Poseidon Module).
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states, plus the European Central Bank.	Kronos settles payments on behalf of the Sumclearing (Sumclearingen), Intradagclearing and Straksclearing systems.

Other payment clearing systems

There are also the Sumclearing (Sumclearingen), Intradagclearing (Intradagclearingen) and Straksclearing (Straksclearingen) systems, which process all retail transactions.

Banking standards

Danish banks support electronic data interchange (EDI) and can accept messages in both the banks' own proprietary formats and the EDIFACT format (PAYMUL, CONTRL, FINSTA, DEBMUL, CREMUL, FINCAN).

The bankers' associations of Denmark, Finland, Norway and Sweden have developed XML-based MIGs (Message Implementation Guidelines) for customer credit transfers payment cancellation requests and payment status reports.

Denmark is also implementing the ISO 20022 XML standard for financial messaging.

Bank account structure

All Danish bank accounts are represented by an 18 digit alpha-numeric code (IBAN):

DK-dd-bbbb-aaaaaaaaaa

Where:

- DK is the two digit ISO Country Code for Denmark;
- dd are two IBAN check digits;
- bbbb represents the bank identifier code; and
- aaaaaaaaaa is the 10 digit account number.

e.g. the IBAN for the above number could be:

DK-62-0140-0020375921

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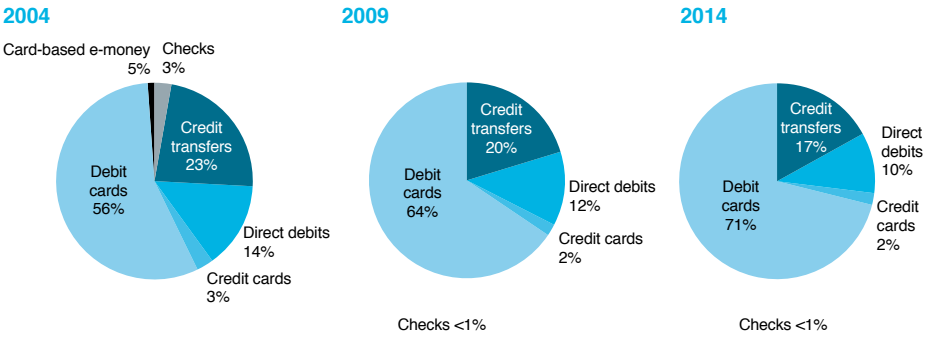
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) DKK billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	10	3	2	– 33.3	170	37	24	– 35.1
Credit transfers	289	317	346	9.2	4,300	4,866	5,711	17.4
Direct debits	178	216	207	– 4.2	591	671	678	1.0
Debit cards	919	1,318	1,467	11.3	301	379	404	6.6
Credit cards	33	46	49	6.5	23	32	34	6.3
Total	**1,429**	**1,900**	**2,071**	**9.0**	**5,385**	**5,985**	**6,851**	**14.5**

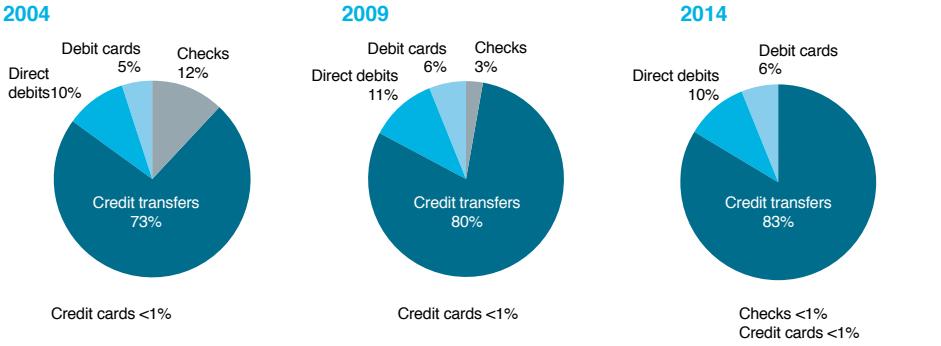
Source: ECB Payment Statistics, October 2015.

Payment statistics

Number of transactions



Transaction values



Source: ECB Payment Statistics.

Finland

Currency: Euro (EUR)

Electronic payment systems

	TARGET2- Suomen Pankki	POPS
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	Domestic customer-initiated express transfers, large-value checks and bank drafts.
Value threshold	None.	If the bilaterally agreed net debit limit is reached, a transfer is made via TARGET2-Suomen Pankki.
Settlement type	RTGS	Bilateral net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement on same-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Access via the Banks' Online Data Communications Network (POLT).
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states, plus the European Central Bank.	TARGET2-Suomen Pankki.

Other payment clearing systems

EBA Clearing's Pan-European STEP2 processes SEPA credit transfers and direct debits. Cross-border EUR payments can also be processed via EBA Clearing's EURO1 or STEP1.

Banking standards

Electronic banking standards have been agreed by Finnish banks in concert with the Federation of Finnish Financial Services. Domestic standards have been superseded by the adoption of the ISO 20022 XML standard (SEPA). Banks use a common security standard for securing data transfers to their customers. Following the introduction of SEPA, the FTP file transfer protocol and the previous PATU security protocol have been gradually replaced with the international Web Services (WS) and Public Key Infrastructure (PKI) standards.

Bank account structure

All Finnish bank accounts are represented by an 18 digit alpha-numeric code:

FI-dd-bbbbbb-aaaaaaaa

Where:

- FI is the two digit ISO Country Code for Finland;
- dd are two IBAN check digits;
- bbbbbb represents the bank and branch identifier code; and
- aaaaaaaa is the eight digit account number.

e.g the IBAN for the above number could be:

FI-45-920304-00175623

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.5	0.3	0.2	– 33.3	21	8	6	– 25.0
Credit transfers	773	1,157	867	– 25.1	4,144	3,932	2,601	– 33.9
Direct debits	84	72	3	– 95.8	44	45	2	– 95.6
Debit cards	835	1,111	1,205	8.5	26	33	36	9.1
Credit cards	64	112	125	11.6	4	6	7	16.7
Total	**1,757**	**2,452**	**2,200**	**10.3**	**4,239**	**4,024**	**2,652**	**– 34.1**

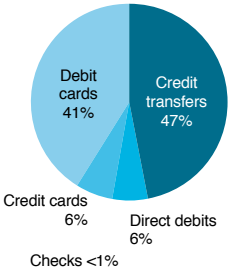
* With the migration to SEPA in 2014, payment service providers in Finland have to a large extent replaced the legacy national direct debit instrument by an e-invoicing solution, which utilizes the SEPA Credit Transfer.

Source: ECB Payment Statistics, October 2015.

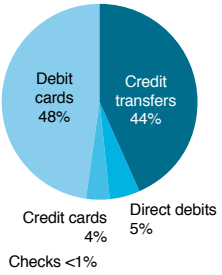
Payment statistics

Number of transactions

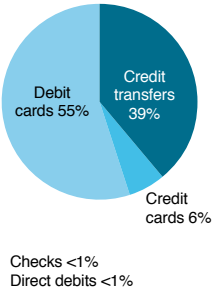
2004



2009

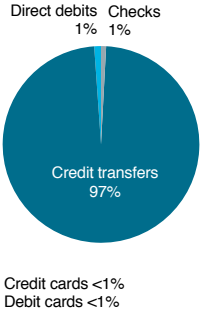


2014

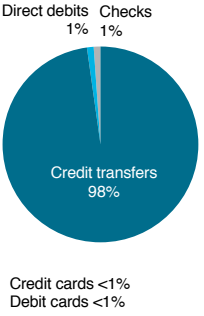


Transaction values

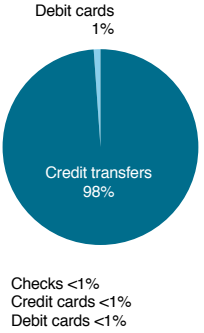
2004



2009



2014



Source: ECB Payment Statistics.

France

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BF (TARGET2-Banque de France)	CORE
Payments processed	High-value and urgent electronic credit transfers, both domestic and cross-border.	Low-value and non-urgent electronic and paper-based payments, both domestic and cross-border, including SEPA payments. Paper-based payments (primarily checks) must be truncated into electronic items before processing.
Value threshold	None.	Maximum EUR 800,000.
Settlement type	RTGS	Multilateral deferred net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement on a same-day or next-day basis, depending on the instrument being processed.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Banks access via data processing centers that connect to its technical platform.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2-BF.

Other payment clearing systems

STET intends to launch a new CSM for the Single Euro Payment Area, entitled SEPA.EU, in November 2016. SEPA.EU will be accessible via SWIFTNet. There will be multiple intraday clearing cycles, while settlement will take place via TARGET2.

EBA Clearing's Pan-European STEP2 processes SEPA credit transfers and direct debits. Cross-border EUR transfers can also be processed via EBA Clearing's EURO1 or STEP1.

Banking standards

The French banking community uses the German, SEPA-compliant Electronic Banking Internet Communication Standard (EBICS), a secure transfer protocol for the online exchange of XML files, or SWIFT for Corporates for large multinational companies.

Bank account structure

All French bank accounts are represented by a 27 digit alpha-numeric code:

FR-dd-bbbbbbbbbb-aaaaaaaaaaa-cc

Where:

- FR is the two digit ISO Country Code for France;
- dd are two IBAN check digits;
- bbbbbbbbbb represents the bank and branch identifiers;
- aaaaaaaaaaa is the 11 digit account number; and
- cc are the two check digits.

e.g. the IBAN for the above number could be:

FR2430024200120600031P07635

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	3,303	2,621	2,483	– 5.3	1,835	1,320	1,217	– 7.8
Credit transfers	2,790	3,250	3,417	5.1	20,513	23,198	24,046	3.7
Direct debits	3,266	3,108	3,541	14.0	1,069	1,399	1,514	8.2
Debit & credit cards	6,923	8,964	9,438	5.3	340	438	443	1.1
Card-based e-money	36	51	53	4.7	0.08	0.11	0.24	118.2
Other payment instruments*	106	93	26	– 72.0	396	330	0.98	– 99.7
Total	**16,281**	**18,086**	**18,958**	**4.8**	**23,757**	**26,687**	**27,221**	**2.0**

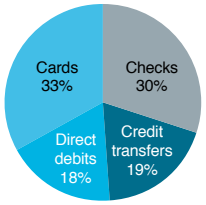
* Bills of exchange and promissory notes until 2013. Money remittances and transactions via telecommunication, digital or IT devices from 2014.

Source: ECB Payment Statistics, October 2015.

Payment statistics

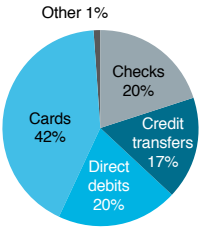
Number of transactions

2004



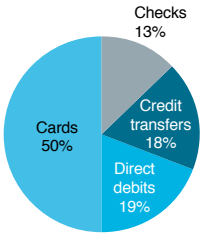
Card-based e-money <1%
Other none

2009



Card-based e-money <1%

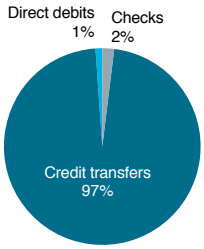
2014



Card-based e-money <1%
Other <1%

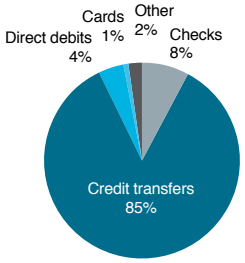
Transaction values

2004



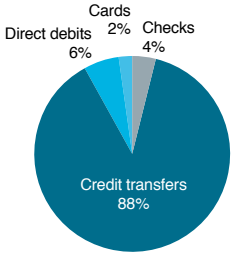
Cards <1%
Card-based e-money <1%
Othe none

2009



Card-based e-money <1%

2014



Card-based e-money <1%
Other <1%

Sources: ECB Payment Statistics and Blue Book.

Germany

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BBk (TARGET2-Bundesbank)	EMZ
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	Low-value and non-urgent electronic and paper-based payments, both domestic and cross-border.
Value threshold	None.	None.
Settlement type	RTGS	Gross settlement.
Settlement cycle	Payments are settled in real time with immediate finality.	There are two processing windows – evening and morning. Payments are usually settled on a next-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types. Users can access data via SWIFTNet InterAct Browse or via a virtual private network.	The Electronic Banking Internet Communication Standard (EBICS) protocol can be used for SEPA credit transfers (SCTs) and direct debits (SDDs).
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states, plus the European Central Bank.	The Bundesbank's KTO2 home account RTGS system. EBA's STEP2 system for pan-European retail payments, plus several other European countries' retail payment systems.

Other payment clearing systems

Deutsche Postbank and the networks of savings and cooperative banks all operate their own payment clearing systems.

EBA Clearing's Pan-European STEP2 processes SEPA credit transfers and direct debits. Cross-border EUR payments can also be processed via EBA Clearing's EURO1 or STEP1.

The European Clearing Cooperative (ECC), registered on June 23, 2015, is a new European payment platform founded by six European ACHs. The ECC is expected to commence operations by the end of 2016. It will facilitate optimized central ACH interoperability, via a multi-cycle model with final settlement at TARGET2. The six ACHs together with ACHs operated by Deutsche Bundesbank (e.g. EMZ), Banca d'Italia and Oesterreichische Nationalbank will together process cross-ACH transactions.

Banking standards

MultiCash, a bank-neutral electronic banking system developed in Germany, acts as a de facto national electronic banking platform. Most commercial banks also offer the MultiWeb online banking solution. MultiCash and MultiWeb can be used alongside one another, as both support the SEPA-compliant EBICS, a secure transfer protocol for the online exchange of XML files. SWIFT for Corporates is also available to large multinational companies.

Customers purchasing from online retail stores can effect payment through Giropay. Giropay is offered by a number of German banks. It allows customers to authorize payment to the retailer via a link between the retailers' website and the customers' bank website.

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Bank account structure

All German bank accounts are represented by 22 digit alpha-numeric code:

DE-dd-bbbbbbbb-aaaaaaaaaa

e.g. the IBAN for the above number could be:

DE-13-22070020-2340002154

Where:

- DE is the two digit ISO Country Code for Germany;
- dd are two IBAN check digits;
- bbbbbbbb represents the Bankleitzahl; and
- aaaaaaaaaa is the 10 digit account number.

Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	57	31	30	– 4.9	316	199	189	– 4.8
Credit transfers	5,81	6,272	5,924	– 5.6	55,154	57,058	52,983	– 7.1
Direct debits	8,424	9,932	8,667	– 12.7	11,374	13,089	3,369	– 74.3
Debit cards	1,980	2,952	2,575	– 12.8	42	59	95	61.0
Credit cards	442	714	671	6.5	114	165	162	– 1.5
Card-based e-money	43	32	38	21.0	0.15	0.11	0.46	318.2
Total	**16,763**	**19,934**	**17,994**	**– 9.7**	**67,001**	**70,570**	**56,799**	**– 19.5**

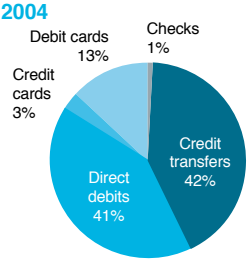
* Credit/debits to/from accounts by simple book-entry were excluded from payment statistics in 2014. 2014 direct debit statistics include electronic direct debits initiated by payment card, which were included in payment card statistics up to 2013.

Source: ECB Payment Statistics, October 2015.

Payment statistics

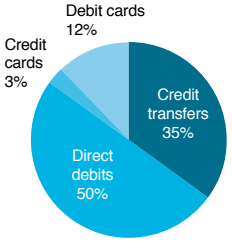
Number of transactions

2004



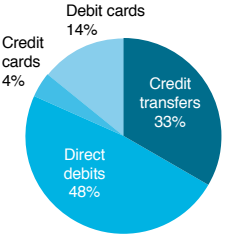
Card-based e-money <1%

2009



Checks <1%
Card-based e-money <1%

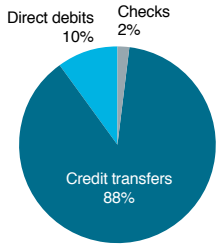
2014



Checks <1%
Card-based e-money <1%

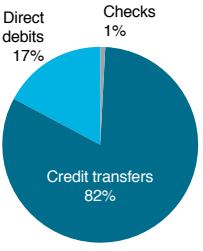
Transaction values

2004



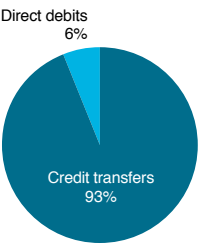
Credit cards <1%
Debit cards <1%
Card-based e-money <1%

2009



Credit cards <1%
Debit cards <1%
Card-based e-money <1%

2014



Checks <1%
Credit cards <1%
Debit cards <1%
Card-based e-money <1%

Source: ECB Payment Statistics.

Hong Kong

Currency: Hong Kong dollar (HKD)

Electronic payment systems

	HKD CHATS	USD CHATS
Payments processed	High-value and urgent electronic payments. Low-value bulk electronic payments.	High-value and urgent electronic payments. Low-value bulk clearing items.
Value threshold	None.	None.
Settlement type	RTGS	RTGS
Settlement cycle	Settlement in real time and with immediate finality.	Settlement on a same-day basis with immediate finality.
Access to system	Through Member Bank Terminal (MBT) system.	Through Member Bank Terminal (MBT) system.
Links to other systems	USD CHATS and EUR CHATS.	HKD CHATS, EUR CHATS and Ringgit RTGS in Malaysia and the Baht RTGS system in Thailand.

Other payment clearing systems

There are also the EUR CHATS, RMB CHATS, Paper Check Clearing (CLG) and Electronic Clearing (ECG) systems. The EUR CHATS and RMB CHATS are high-value RTGS systems for designated foreign currency. The CLG and ECG are low-value payment systems, with CLG clearing paper-based instruments and the ECG clearing bulk electronic items.

Since the end of 2013, an Electronic Bill Presentment and Payment (EBPP) platform processes domestic and cross-border electronic bill payments denominated in HKD, USD and RMB.

Banking standards

There is no bank-independent standard for electronic banking services in Hong Kong.

Bank account structure

Hong Kong has not adopted IBAN.

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) HKD billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	113*	105	103	-2.0	6,346	7,922	8,449	6.6
Electronic credit transfers	NA	NA	NA		NA	NA	NA	
Paper-based credit transfers	NA	NA	NA		NA	NA	NA	
Direct debits	NA	NA	NA		NA	NA	NA	
Debit cards	101	114	118	3.8	167	234	248	6.0
Credit cards	338	462	482	4.3	302	480	519	8.1
Total	**552**	**681**	**704**	**3.2**	**6,815**	**8,636**	**9,216**	**6.7**

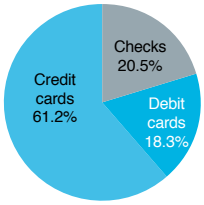
* HKD denominated checks.

Source: CPSS – Red Book statistical update, December 2015.

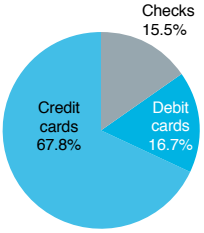
Payment statistics

Number of transactions

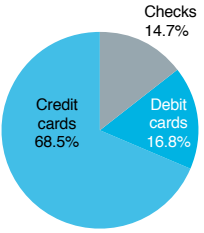
2009



2013

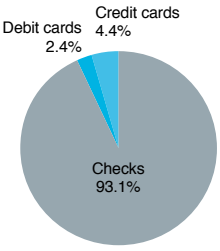


2014

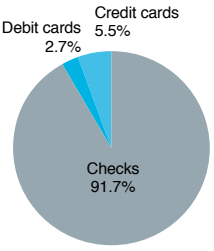


Transaction values

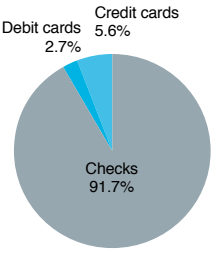
2009



2013



2014



Source: CPSS – Red Book statistical update, December 2015

India

Currency: Indian rupee (INR)

Electronic payment systems

	NG-RTGS	NEFT
Payments processed	High-value and urgent payments.	Low-value electronic credit transfers
Value threshold	All payments must be above INR 200,000.	No value threshold for the majority of payments, but cash-based remittances and individual transfers to Nepal are restricted to INR 50,000.
Settlement type	RTGS	Deferred net settlement.
Settlement cycle	Settlement in near real time, with a maximum of two hours.	T+0 or T+1; 12 daily settlement cycles each weekday. Six daily settlement cycles each Saturday.
Access to system	Via 120,000 branches in over 30,000 centers.	Participant branches must link to a central service branch in Mumbai.
Links to other systems	Carries out final settlement of Multilateral Net Settlement Batch (MNSB) files from India's other clearing houses.	NA

Other payment clearing systems

India operates several other payment systems for processing paper-based and retail electronic instruments. They include a Check Truncation System, the Electronic Clearing System (for processing of bulk credit and debit items), and, from 2016, the Bharat Bill Payment System (BBPS), which processes electronic giro payments.

Banking standards

There is no bank-independent standard for electronic banking services in India.

Bank account structure

India has not adopted IBAN.

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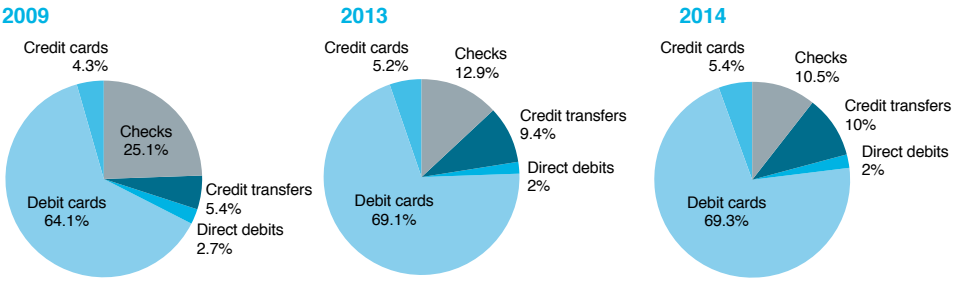
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) INR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	1,379	1,254	1,196	-4.6	104,099	93,438	85,439	-.8.6
Credit transfers	298	910	1,136	24.8	645,086	780,626	815,855	4.5
Direct debits	149	193	226	17.2	698	1,268	1,740	37.2
Debit cards	3,518	6,712	7,873	17.3	8,743	20,589	25,737	25.0
Credit cards	237	512	619	21.0	644	1,557	1,923	23.5
Total	**5,481**	**9,714**	**11,360**	**16.9**	**759,270**	**897,560**	**930,907**	**3.7**

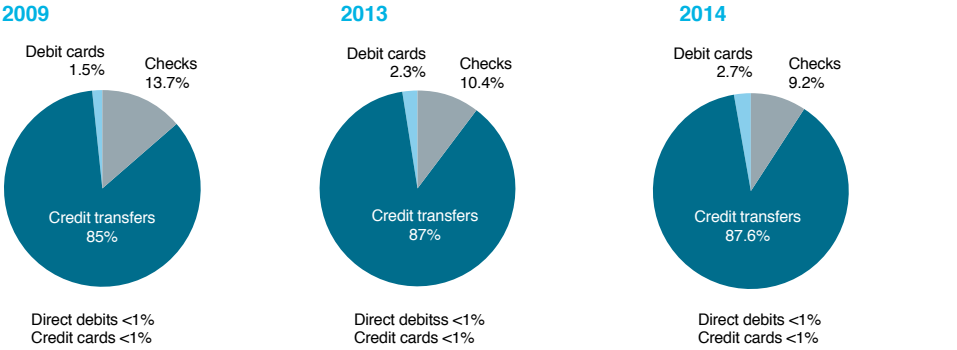
Source: CPSS – Red Book statistical update, December 2015.

Payment statistics

Number of transactions



Transaction values



Source: CPSS – Red Book statistical update, December 2015.

Ireland

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-IE	STEP2
Payments processed	High-value and urgent electronic credit transfers, both domestic and cross-border.	Low-value credit transfers and direct debits, both domestic and cross-border.
Value threshold	None.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement in batches on a same-day or next-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Banks can connect via SWIFT.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2, EURO1 and STEP1.

Other payment clearing systems

The IPCC is a deferred net settlement system for check payments in Ireland. Settlement takes three days, although value is backdated to day two.

Certain high-value checks can be cleared and settled the same day via "special presentation" to some Dublin branches of banks participating directly in TARGET2. These are truncated and cleared by TARGET2 as electronic items.

EBA Clearing's Pan-European STEP2 processes SEPA credit transfers and direct debits. Cross-border EUR transfers can also be processed via EBA Clearing's EURO1 or STEP1.

Banking standards

There is no bank-independent electronic banking standard in Ireland. SWIFT for Corporates is available to large multinational companies.

Bank account structure

All Irish bank accounts are represented by a 22 digit alpha-numeric code (IBAN):

IE-dd-cccc-bbbbbb-aaaaaaaa

Where:

- IE is the two digit ISO Country Code for Ireland;
- dd are two IBAN check digits;
- cccc is a four letter bank identifier. This uses the first four letters of the SWIFT Bank Identifier Code (BIC);
- bbbbbb is a six numeric digit bank and branch identifier (sorting code); and
- aaaaaaaa is the eight numeric digit account number.

e.g. the IBAN for the above number could be:

IE-23-INGB-537212-00205314

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Use of payment and collection instruments

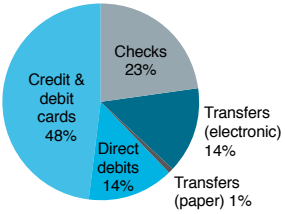
	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	102	69	40	- 41.5	545	285	140	- 50.8
Electronic credit transfers	146	141	150	6.7	161	180	464	158.1
Paper-based credit transfers	44	13	17	35.2	561	28	186	555.7
Direct debits	127	109	89	- 18.0	98	96	65	- 32.5
Debit cards	214	341	355	4.2	12	17.60	17.67	0.4
Credit cards	109	96	73	- 23.6	12	10	6	- 39.9
Total	**742**	**768**	**734**	**- 4.4**	**1,388**	**617**	**880**	**42.7**

Source: ECB Payment Statistics, October 2015.

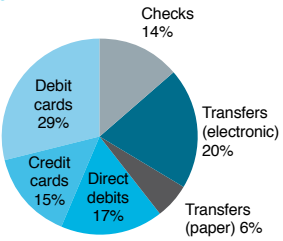
Payment statistics

Number of transactions

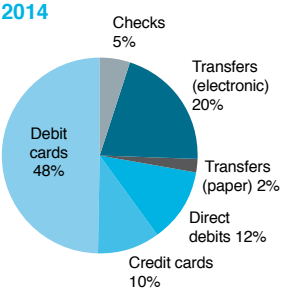
2004



2009

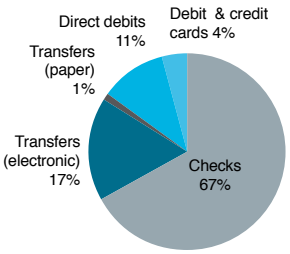


2014

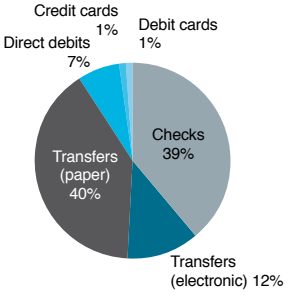


Transaction values

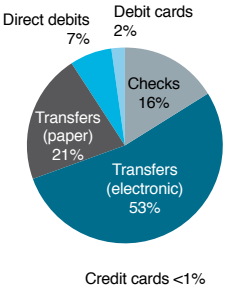
2004



2009



2014



Sources: ECB Payment Statistics and Blue Book.

Italy

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BI (TARGET2 Banca d'Italia)	BI-COMP Rete Dettaglio
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	BI-COMP's Rete Dettaglio subsystem processes low-value and non-urgent electronic credit transfers, electronic bank receipts (RIBAs), direct debits, and ATM and POS payments. It also processes truncated, low-value checks and bankers' drafts.
Value threshold	None.	Maximum EUR 500,000 for credit transfers. Checks below EUR 3,000 and bankers' drafts below EUR 12,500, which are truncated.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Transactions are settled in real time with immediate finality.	Payments are usually settled in a minimum of two days, though this can vary, depending on the bank and payment instrument.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Via the system's four Centri Applicativi (clearing houses). Payments are submitted in the national interbank network (RNI) format.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2-BI. EBA's STEP2 system for pan-European retail payments, plus several other European countries' retail payment systems.

Other payment clearing systems

BI-COMP's Recapiti Locali subsystem processes non-truncated, high-value checks and bankers' drafts. Payments are usually cleared in two days at the clearing houses in Milan and Rome.

Cross-border EUR payments can be processed via EBA Clearing's EURO1, STEP1 or STEP2.

The European Clearing Cooperative (ECC), registered on June 23, 2015, is a new European payment platform founded by six European ACHs, including Italy's ICBPI. The ECC is expected to commence operations by the end of 2016. It will facilitate optimized central ACH interoperability, via a multi-cycle model with final settlement at TARGET2. The six ACHs together with ACHs operated by Banca d'Italia (e.g. BI-COMP), Deutsche Bundesbank and Oesterreichische Nationalbank will together process cross-ACH transactions.

Banking standards

The bank-independent Customer to Business Interaction (CBI) Consortium electronic banking standards are standards developed by the Italian Bankers' Association (ABI) and the major Italian banks. CBI Consortium's online platform is mandatory for banks in Italy.

Bank account structure

All Italian bank accounts are represented by a 27 digit alpha-numeric code:

IT-dd-c-bbbbbbbbbb-aaaaaaaaaaa

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Where:
- IT is the two digit ISO Country Code for Italy;
- dd are two IBAN check digits;
- c is the domestic check letter;
- bbbbbbbbbb represents the bank and branch codes; and
- aaaaaaaaaaaa is the 12 digit account number.

e.g. the IBAN for the above number could be:
IT-47-P-1032045002-000034050643

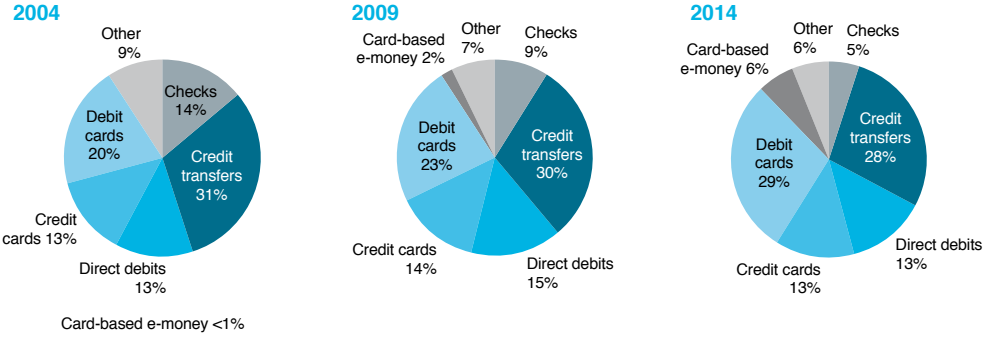
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	335	252	232	– 8.3	909	582	533	– 8.4
Credit transfers	1,205	1,261	1,347	6.8	7,224	8,034	7,291	– 9.3
Direct debits	576	624	608	– 2.6	354	357	317	– 11.2
Debit cards	902	1,226	1,390	13.4	63	79	88	12.2
Credit cards	569	587	644	9.6	56	51	54	6.0
Card-based e-money	90	244	291	19.4	5	12	13	14.8
Other instruments	281	292	281	– 4.0	683	650	618	– 5.0
Total	**3,957**	**4,487**	**4,793**	**6.8**	**9,293**	**9,764**	**8,914**	**– 8.7**

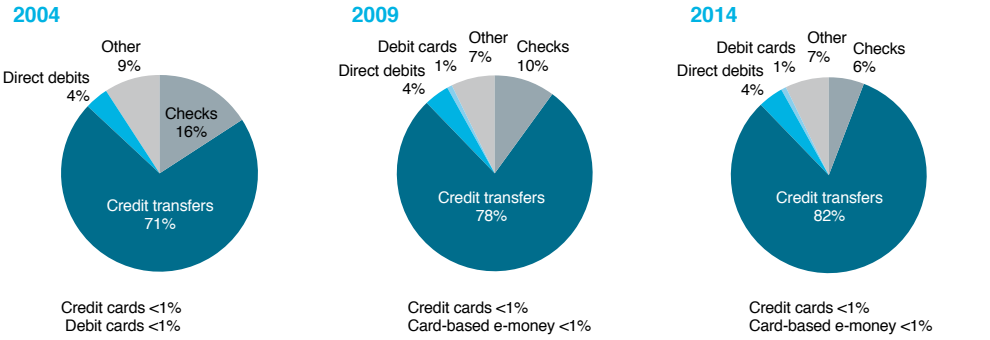
Source: ECB Payment Statistics, October 2015.

Payment statistics

Number of transactions



Transaction values



Sources: ECB Payment Statistics and Blue Book.

Japan

Currency: Yen (JPY)

Electronic payment systems

	BOJ-NET	FXYCS
Payments processed	High-value and urgent domestic electronic payments.	All JPY legs of cross-border electronic payments, including import and export settlement payments. All JPY transactions involving non-residents and JPY-denominated bond transactions.
Value threshold	None.	The system places sender net debit caps on each participant based on the system's risk exposure to that participant.
Settlement type	RTGS	RTGS
Settlement cycle	Payments are settled on a same-day basis and with immediate finality.	Payments are settled on a same-day basis and with immediate finality.
Access to system	Through a dedicated bank terminal or a direct link to the Bank of Japan's computer network.	Data format is similar to SWIFT.
Links to other systems	Interface connects to Zengin System, routing large value payments to BOJ-NET for real-time settlement.	NA

Other payment clearing systems

The Zengin Data Telecommunications System processes low-value and non-urgent domestic electronic payments, clearing both single retail transactions and bulk electronic credits between resident accounts.

The Bills and Checks Clearing System (BCCS) is a network of regional clearing houses, which clear paper-based instruments such as checks and promissory notes.

Banking standards

There is no national bank-independent electronic banking standard in Japan.

Bank account structure

Japan has not adopted IBAN.

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Use of payment and collection instruments

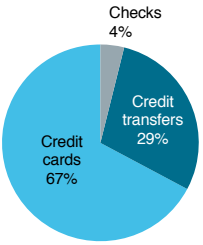
	Transactions (million)			% change	Traffic (value) JPY billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	96	73	69	-5.7	374	366	333	-9.2
Credit transfers	1415	1522	1558	2.4	2434	2913	2968	1.9
Direct debits	NA	NA	NA	NA	NA	NA	NA	NA
Debit cards	13.0	12.41	11.4	-7.9	0.7	0.5	0.5	-6.1
Credit cards	NA	NA	NA	NA	NA	41.79	NA	NA
Card-based e-money	1510	3453	4235	22.6	1.3	3.4	4.2	25.4
Total	**3034**	**5061**	**5874**	**16.1**	**2809**	**3325**	**3305**	**-0.6**

Source: BIS – Red Book statistical update, December 2015.

Payment statistics

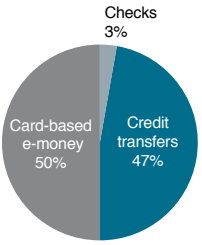
Number of transactions

2004



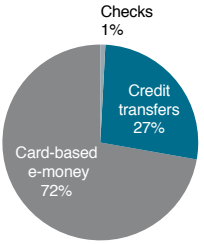
Debit cards <1%
Card-based e-money NA

2009



Credit cards NA

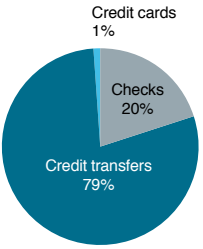
2014



Credit cards NA

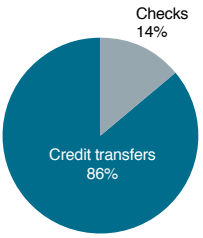
Transaction values

2004



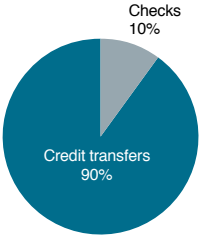
Debit cards <1%
Card-based e-money <1%

2009



Debit cards <1%
Credit cards NA
Card-based e-money <1

2014



Debit cards <1%
Credit cards NA
Card-based e-money <1%%

Source: Bank for International Settlements, CPSS – Red Book statistical December 2015 update.

Luxembourg

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-LU	STEP2
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	Low-value credit transfers and direct debits, both domestic and cross-border.
Value threshold	None.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement in batches on a same-day or next-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Banks can connect via SWIFT.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2, EURO1 and STEP1.

Other payment clearing systems

None.

Banking standards

MultiLine, Luxembourg's version of the German MultiCash system, offers companies access to the electronic banking services of multiple participant banks via a single common technology platform. MultiLine supports the SEPA-compliant Electronic Banking Internet Communication Standard (EBICS), a secure transfer protocol for the online exchange of XML files. SWIFT for Corporates is also available to large multinational companies.

Bank account structure

All Luxembourg bank accounts are represented by a 20 digit alpha-numeric code:

LU-dd-bbb-aaaaaaaaaaaaa

Where:

- LU is the two digit ISO Country Code for Luxembourg;
- dd are two IBAN check digits;
- bbb represents a three digit bank code; and
- aaaaaaaaaaaaa is the 13 numeric digit account number.

e.g. the IBAN for the above number could be:

LU-19-423-6035062300010

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Use of payment and collection instruments

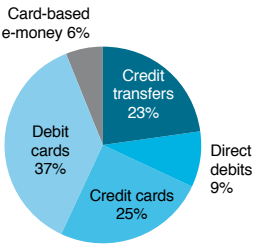
	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.21	0.29	0.28	- 3.4	NA	NA	0.97	-
Credit transfers	65	69	58	- 15.9	940	1,459	1,377	- 5.6
Direct debits	14.9	15.4	14.9	- 3.1	7	11	15	46.5
Debit cards	34	48	52	8.9	2.2	2.8	3.0	6.0
Credit cards	20	42	50	19.2	2.0	3.8	4.3	13.1
Total	**135**	**174**	**175**	**0.5**	**951**	**1,476**	**1,400**	**- 5.1**

Source: ECB Payment Statistics, March 2016.

Payment statistics

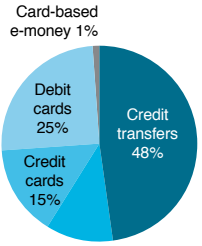
Number of transactions

2004



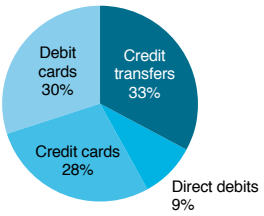
Checks <1%

2009



Checks <1%

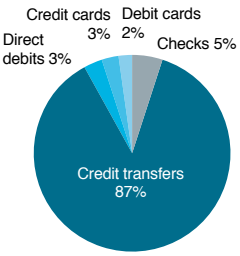
2014



Checks <1%
Card-based e-money <1%

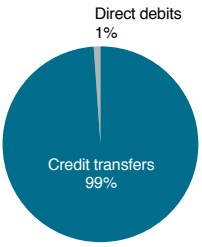
Transaction values

2004



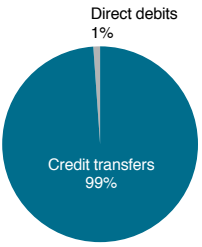
Card-based e-money <1%

2009



Credit cards <1%
Debit cards <1%
Card-based e-money <1%

2014



Checks <1%
Credit cards <1%
Debit cards <1%
Card-based e-money <1%

Sources: ECB Payment Statistics and Blue Book.

Mexico

Currency: Mexican peso (MXN)

Electronic payment systems

	SPEI	SICAM
Payments processed	High–value and urgent interbank and commercial payments.	Low–value interbank electronic payments, including non–urgent credit transfers (TEFs), direct debits (DOMIs) and truncated checks processed by CECOBAN.
Value threshold	None.	None.
Settlement type	RTGS	Deferred multilateral net settlement system.
Settlement cycle	Settlement on a same-day basis.	Next day.
Access to system	NA	Originating banks submit electronic files, which are processed in batches and then submitted to recipient banks for validation. Checks are truncated into electronic items by the receiving bank and then cleared in the same way as other low-value items
Links to other systems	SIAC	SIAC

Other payment clearing systems

CECOBAN, a consortium of Mexican banks, owns and operates CCEN (Cámara de Compensación Electrónica Nacional), a clearing system for retail payments. SIAC (Sistema de Atención a Cuentahabientes de Banco de México) is another system which settles interbank transfers and clearing obligations from Mexico's payments systems across the current accounts held at the central bank by banks, brokerage houses, pension fund administrators and some public sector entities.

Banking standards

In Mexico, a standard protocol has been adopted (Clave Bancaria Estandarizada – CLABE) for interbank funds transfers by the Mexican Bankers' Association, CECOBAN and Banco de México.

Bank account structure

The Mexican Bankers' Association, CECOBAN and Banco de México have adopted an 18 digit code (Clave Bancaria Estandarizada – CLABE) for all interbank electronic funds transfers.

The CLABE consists of:

- a three numeric digit code identifying the bank;
- a three numeric digit branch code;
- an 11 numeric digit account number; and
- a final numeric control digit.

International Bank Account Number (IBAN)

Mexico has not adopted IBAN.

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) MXN billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks*	135.5	98.0	90.5	– 7.7	3,373.8	2,688.9	2,526.2	– 6.1
Credit transfers (total)	132.8	367.7	428.2	16.5	164,047.1	256,280.7	268,419.2	4.7
– High value	62.2	217.5	262.9	20.9	128,506.1	207,597.4	233,369.9	7.6
– Low value	70.6	150.2	165.3	10.1	35,541.0	48,683.3	45,049.3	–7.5
Direct debits	9.9	17.8	21.0	18.0	29.5	68.8	79.8	16.0
Debit cards	471.7	867.0	1,020.3	17.7	335.5	489.4	578.3	18.2
Credit cards	254.6	418.5	440.7	5.3	210.1	357.3	359.3	0.6
Total	**1,004.5**	**1,769.0**	**2,000.7**	**13.1**	**167,996.0**	**259,885.1**	**271,961.8**	**4.7**

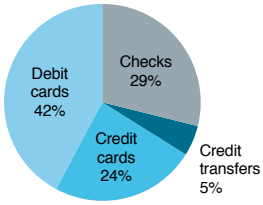
* Both MXN and USD.

Source: Banco de Mexico, July 2015.

Payment statistics

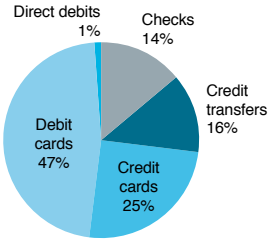
Number of transactions

2005

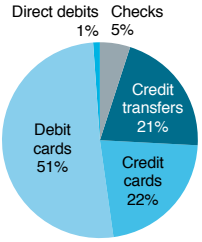


Direct debits <1%

2009

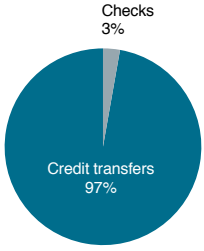


2014



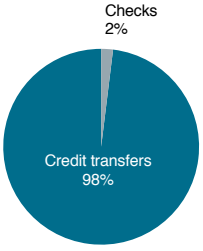
Transaction values

2005



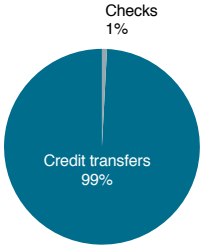
Credit cards <1%
Debit cards <1%
Direct debits <1%

2009



Credit cards <1%
Debit cards <1%
Direct debits <1%

2014



Credit cards <1%
Debit cards <1%
Direct debits <1%

Source: Banco de Mexico.

The Netherlands

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BNL	Equens Clearing and Settlement System
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	BI-COMP's Rete Dettaglio subsystem processes low-value and non-urgent electronic credit transfers, electronic bank receipts (RIBAs), direct debits, and ATM and POS payments. It also processes truncated, low-value checks and bankers' drafts.
Value threshold	None.	Maximum EUR 500,000 for credit transfers. Checks below EUR 3,000 and bankers' drafts below EUR 12,500, which are truncated.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Transactions are settled in real time with immediate finality.	Payments are usually settled in a minimum of two days, though this can vary, depending on the bank and payment instrument.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Via the system's four Centri Applicativi (clearing houses). Payments are submitted in the national interbank network (RNI) format.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states.	TARGET2-NL, EBA's STEP2 system for pan-European retail payments, plus several other European countries' retail payment systems.

Other payment clearing systems

The European Clearing Cooperative (ECC), registered on June 23, 2015, is a new European payment platform founded by six European ACHs. The ECC is expected to commence operations by the end of 2016 and will facilitate optimized central ACH interoperability, via a multi-cycle model with final settlement at TARGET2. The six ACHs together with ACHs operated by Deutsche Bundesbank (e.g. EMZ), Banca d'Italia and Oesterreichische Nationalbank will together process cross-ACH transactions.

Banking standards

Dutch banks have never adopted a common electronic banking standard. Although electronic banking solutions are currently proprietary, Dutch banks offer SWIFT for Corporates as a bank-neutral means of company–bank communication.

Bank account structure

All Dutch bank accounts are represented by an 18 digit alpha-numeric code:

NL-dd-bbbb-aaaaaaaaaa

Where:

- NL is the two digit ISO Country Code for the Netherlands;
- dd are two IBAN check digits;
- bbbb represents the bank identifier code (this is the first four letters of the SWIFT Bank Identifier Code); and
- aaaaaaaaaa is the 10 digit account number (leading zeroes are added to Postbank account numbers).

e.g. the IBAN for the above number could be:

NL-13-INGB-0395003821

Use of payment and collection instruments

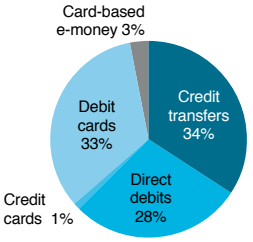
	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	NA	0.19	0.19	0	NA	1.6	1.9	16.6
Electronic credit transfers	1,373	1,948	1,981	1.7	5,256	17,041	17,239	6.8
Paper-based credit transfers	124	66	62	– 5.4	169	146	135	– 7.6
Direct debits	1,272	1,330	1,163	–12.5	278	278	219	– 21.3
Debit cards	1,978	2,765	3,037	9.9	78	92	97	6.1
Credit cards	90	121	131	8.3	10	11	12	6.7
Card-based e-money	177	122	77	– 36.6	0.5	0.3	0.1	– 5.5
Total	**4,837**	**6,352**	**6,453**	**11.6**	**5,790**	**17,570**	**17,704**	**0.8**

Source: ECB Payment Statistics, October 2015.

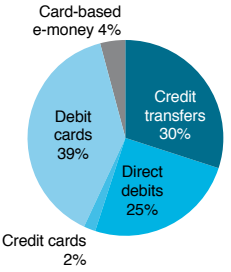
Payment statistics

Number of transactions

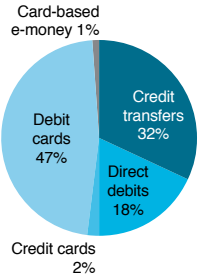
2004



2009

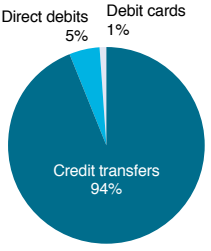


2014



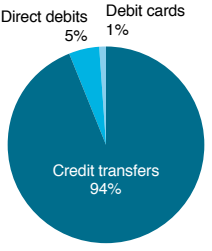
Transaction values

2004



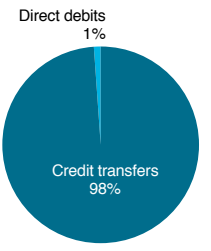
Credit cards <1%
Card-based e-money <1%
Debit cards <1%

2009



Credit cards <1%
Card-based e-money <1%
Other <1%

2014



Credit cards <1%
Debit cards <1%
Card-based e-money <1%

Sources: ECB Payment Statistics and Blue Book.

Norway

Currency: Norwegian Krone (NOK)

Electronic payment systems

	NBO	NICS
Payments processed	High-value and urgent electronic payments.	High-value and retail electronic and paper-based (transferred into electronic formats by banks) payments.
Value threshold	None.	Payments above NOK 25 million are processed by NICS Gross/RTGS. Payments up to NOK 25 million are processed by NICS Netting (NICS Netto).
Settlement type	RTGS	RTGS/Multilateral net settlement.
Settlement cycle	Settlement in real time with immediate finality.	Settlement on a same-day basis.
Access to system	SWIFT or a web based interface (NBO Online).	SWIFT
Links to other systems	Norwegian Interbank Clearing System (NICS) and CLS.	NBO

Other payment clearing systems

There are other local clearing systems, such as the DND Bank (for smaller banks) and Sparebank1 SMN (largely patronized by mid-sized mutual savings banks).

Banking standards

There is no nationwide electronic banking standard in Norway. However most electronic banking systems adhere to SWIFT or EDIFACT standards. Multinational companies also use the SWIFT for Corporates messaging standards. Formats used for file transfers include, among others, the Nets format (direkte remittering) and a bank format (TelePay). Most electronic banking systems support both formats.

Norway is implementing the ISO 20022 XML standard for financial messaging. The Norwegian Banking Standardisation Bureau (BSK) is expected to replace national, proprietary formats and standards for payment messages based on, among others, Telepay and Edifact, for the ISO 20022 XML standard by the end of 2016.

The bankers' associations of Denmark, Finland, Norway and Sweden have developed XML-based MIGs (Message Implementation Guidelines) for customer credit transfers (based on the SWIFT C2B payment initiation message), payment cancellation requests and payment status reports.

Bank account structure

All Norwegian bank accounts are represented by a 15 digit alpha-numeric code (IBAN):

NO-dd-bbbb-aaaaaaa

Where:

- NO is the two digit ISO Country Code for Norway;
- dd are two IBAN check digits;
- bbbb represents the bank/branch code; and
- aaaaaaa is the six digit account number plus the check digit.

e.g. the IBAN for the above number could be:

NO-19-3304-0056391

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Use of payment and collection instruments

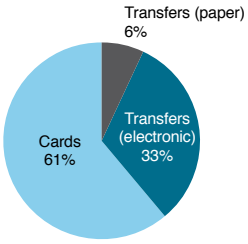
	Transactions (million)			% change	Traffic (value) NOK billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.3	0.1	0.1	0.0	12	7	5	– 28.6
Electronic giros	444	511	524	2.5	10,681	13,725	14,822	8.0
Paper-based credit giros	32	17	15	– 11.8	160	119	110	– 7.6
Direct debits	60	85	93	9.4	187	249	254	2.0
Card payments	1,160	1,671	1,816	8.7	466	633	681	7.6
Total	**1,696**	**2,284**	**2,448**	**7.2**	**11,506**	**14,733**	**15,872**	**7.7**

Source: Norges Bank, March 2016.

Payment statistics

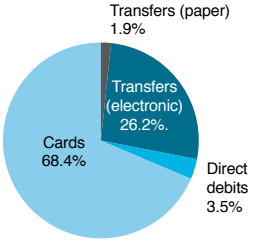
Number of transactions

2005



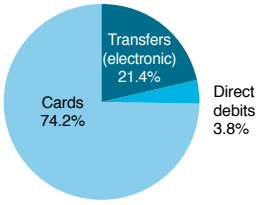
Checks <1%

2009



Checks <1%
Transfers - paper-based <1%

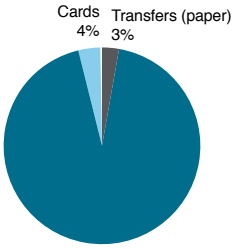
2014



Checks <1%
Transfers - paper-based <1%

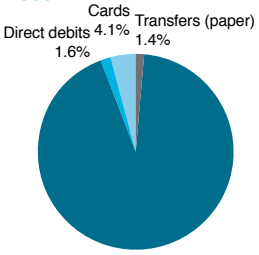
Transaction values

2005



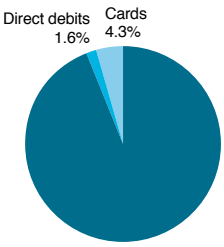
Checks <1%
Direct debits NA

2009



Checks <1%
Transfers - paper-based <1%

2014



Checks <1%
Transfers - paper-based <1%

Source: Norges Bank.

Poland

Currency: Polish zloty (PLN)

Electronic payment systems

	SORBNET	TARGET2-NBP (TARGET2-National Bank of Poland)
Payments processed	Urgent, high-value domestic credit transfers denominated in PLN.	High-value and urgent payments in EUR.
Value threshold	Above PLN 1 million.	None.
Settlement type	RTGS	RTGS
Settlement cycle	Transactions are processed individually in real time and funds are available for same-day value.	Transactions are settled in real time with immediate finality.
Access to system	Payments submitted using EDIFACT standards, via the EXATEL-operated TCP/IP network if interbank instructions. SORBNET also accepts instruction via internet or disk. Paper-based items must be truncated prior to submission.	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.
Links to other systems	ELIXIR for final settlement of domestic retail payments.	The TARGET2 system links payment systems in all 24 participating EU member states.

Other payment clearing systems

ELIXIR clears domestic and cross-border credit transfers, checks and direct debits in PLN and EUR. There is a PLN 1 million maximum value threshold in place for domestic credit transfers and direct debits.

Express ELIXIR enables immediate transfers in PLN 24 hours a day. The maximum value threshold for Express ELIXIR payments is PLN 100,000.

Cross-border EUR payments can be processed via EBA Clearing's EURO1, STEP1 or STEP2.

The European Clearing Cooperative (ECC), registered on June 23, 2015, is a new European payment platform founded by six European ACHs. The ECC is expected to commence operations by the end of the first half of 2016. It will facilitate optimized central ACH interoperability, via a multi-cycle model with final settlement at TARGET2. The six ACHs together with ACHs operated by Deutsche Bundesbank (e.g. EMZ), Banca d'Italia and Oesterreichische Nationalbank will together process cross-ACH transactions.

Banking standards

There is no common communication standard for electronic banking services in Poland. Many Polish companies use the bank-independent MultiCash software package.

The PayByNet Service is a 24/7 online payment application provided by KIR, allowing for secure retail purchases and bill payments over the internet from bank accounts via credit transfer.

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Bank account structure

All Polish bank accounts are represented by a 28 digit alpha-numeric code:

PL-dd-bbbbbbbb-aaaaaaaaaaaaaaaa

e.g. the IBAN for the above number could be:

PL-83-02370145-0001700435290021

Where:

- PL is the two digit ISO Country Code for Poland; and
- All other digits are as above and numerical.

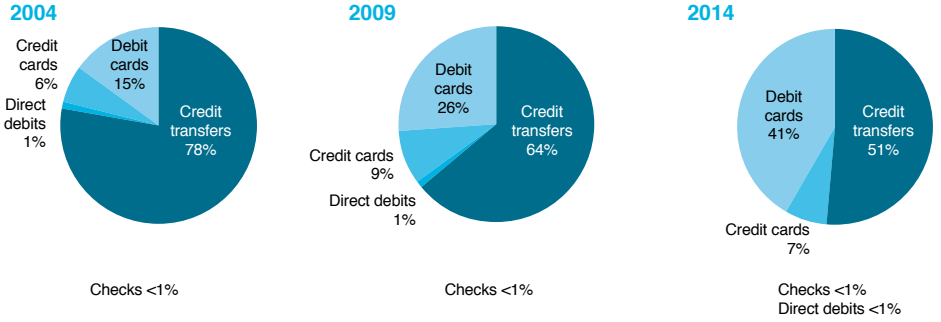
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) PLN billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.25	0.10	0.11	10.0	2	1	1	0
Credit transfers	1,315	1,843	1,977	7.3	25,265	35,495	37,250	4.9
Direct debits	23	23	24	2.1	18	20	21	5.7
Debit cards	529	1,204	1,599	32.8	54	101	123	21.4
Credit cards	175	245	274	11.9	24	32	34	5.8
Total	**2,041**	**3,314**	**3,874**	**16.9**	**25,363**	**35,648**	**37,428**	**5.0**

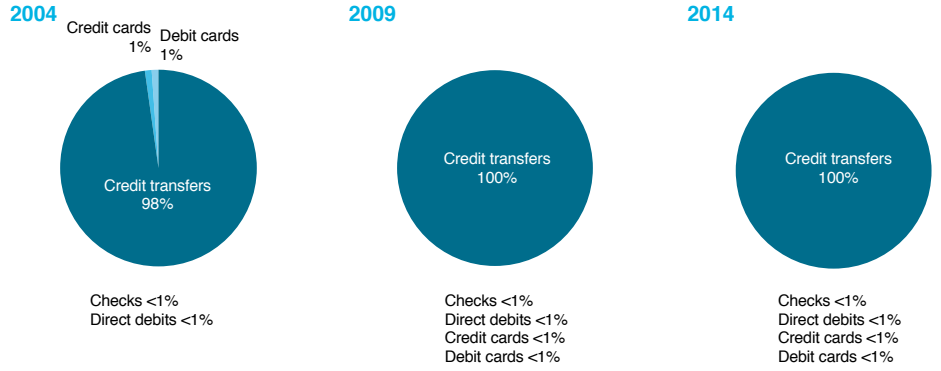
Source: ECB Payment Statistics, October 2015.

Payment statistics

Number of transactions



Transaction values



Sources: ECB Payment Statistics and Blue Book.

Russia

Currency: Russian ruble (RUB)

Electronic payment systems

	BESP (Bank Electronic Speed Payment) system	Central Bank of the Russian Federation electronic net settlement system
Payments processed	Large-value and urgent credit transfers.	Largely non-urgent cashless payments. Electronic funds transfers and paper-based instruments are processed.
Value threshold	None.	None.
Settlement type	RTGS	Net settlement system.
Settlement cycle	Payments are settled irrevocably in real-time with immediate finality.	Each of the Central Bank's 74 processing centers clears payments continuously. Intraregional transfers are usually available to the beneficiary on the same day; interregional transfers are typically available within two working days.
Access to system	A BESP-SWIFT Link Subsystem is in place, allowing for the transmission of messages via SWIFT.	Payment instructions can be submitted electronically, by tape/disc, or via a paper-based instruction. Most payments are initiated by the presentation of payment instructions at commercial bank branches.
Links to other systems	NA	NA

Other payment clearing systems

Sberbank processes mainly retail and bulk payments on behalf of individuals and corporate customers, as well as other banks.

Banking standards

There is no common standard for electronic banking services; multi-bank functionality is limited and integration with ERP systems can be labor-intensive. The bank-independent MultiCash electronic banking platform is offered by a number of banks.

Bank account structure

Russia has not adopted IBAN.

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) RUB billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.01	neg	neg	-	3.5	0.1	neg	-
Credit transfers*	2,011	2,833	2,840	0.3	372,330	557,398	640,799	15.0
Direct debits	136	84.8	84.6	- 0.2	2,227	1,555	1,843	18.6
Debit card payments	641	4,150	6,101	47.0	1,157	7,412	11,023	48.7
Credit card payments	36	434	715	64.5	99	723	1,036	43.2
E-money	48	564	1,014	79.6	34	591	862	45.9
Other payment instruments	856	1,712	1,895	10.7	4,789	5,444	6,571	20.7
Total	**3,728**	**9,779**	**12,650**	**29.4**	**380,639**	**573,123**	**662,134**	**15.5**

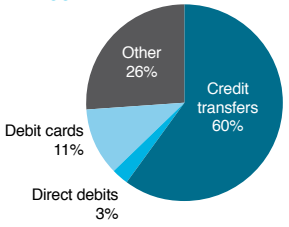
* Including postal transactions.

Sources: Bank for International Settlements, CPMI Red Book statistical update, September 2015 & Central Bank of the Russian Federation, 2014 Annual Report.

Payment statistics

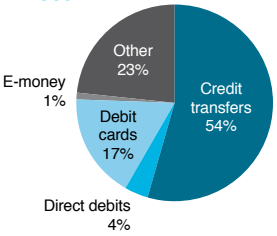
Number of transactions

2007



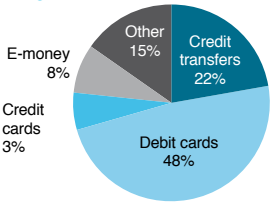
Checks <1%
Credit cards <1%
E-money <1%

2009



Checks <1%
Credit cards <1%

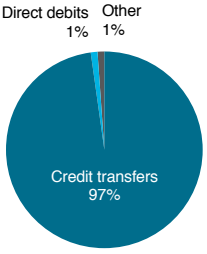
2014



Checks <1%
Dkrect debits <1%

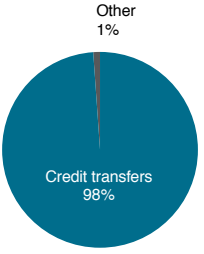
Transaction values

2007



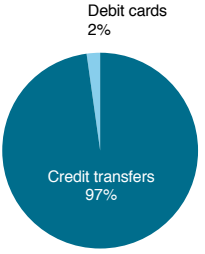
Checks <1%
Debit cards <1%
Credit cards <1%
E-money <1%
Card-based e-money <1%

2009



Checks <1%
Direct debits >1%
Debit cards <1%
Credit cards <1%
E-money <1%

2014



Checks <1%
Direct debits <1%
Credit cards <1%
E-money <1%
Other <1%

Sources: Central Bank of the Russian Federation and BIS Payment Statistics.

Saudi Arabia

Currency: Saudi riyal (SAR)

Electronic payment systems

	SARIE	mada
Payments processed	High-value and urgent electronic and paper-based payments.	All card payments.
Value threshold	None.	None.
Settlement type	RTGS	Automated payments network.
Settlement cycle	Settlement in real time and with immediate finality.	Settlement on a same-day basis with immediate finality.
Access to system	Payments are submitted using SWIFT standard message types	NA
Links to other systems	System combines the settlement results of the SPAN, TADAWUL, ACH and other clearing house systems.	GCC-Net ATM network.

Other payment clearing systems

SADAD is a national Electronic Bill Presentment and Payment (EBPP) system processing one-off payments and high-volume regular payments. Saudi Arabia has three Automated Clearing Houses (ACH), which process checks electronically before final settlement takes place via SARIE. There are also seven manual check-clearing houses located across Saudi Arabia.

Banking standards

There is no bank-independent standard for electronic banking services in Saudi Arabia.

Bank account structure

All Saudi Arabian bank accounts are represented by a 24 digit alpha-numeric code (IBAN):

SA-dd-bb-aaaaaaaaaaaaaaaaaa

Where:

- SA is the two digit ISO Country Code for Saudi Arabia;
- dd are two IBAN check digits;
- bb represents a two digit bank code; and
- aaaaaaaaaaaaaaaaaa is the 18 numeric digit account number.

e.g. the IBAN for the above number could be:

SA-19-42-038294710483729310

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Use of payment and collection instruments

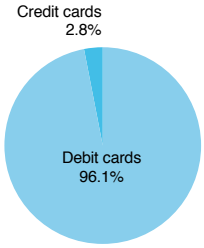
	Transactions (million)			% change	Traffic (value) RIs billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	7	7.1	6.8	-4.2	656	879	897	2.1
Credit transfers	3	7.2	8.4	16.7	2,894	4,570	5,179	13.3
Direct debits	2	1.4	1.6	14.2	0.4	0.5	0.6	20
Debit cards	1,067	1,697	1,962	15.6	468	803	892	11.2
Credit cards	31	67	68	1.5	14	33	27	-16.6
Total	**1,110**	**1,780**	**2,047**	**15.0**	**4,032**	**6285**	**6996**	**11.3**

Source: CPSS Red Book statistical update, December 2015.

Payment statistics

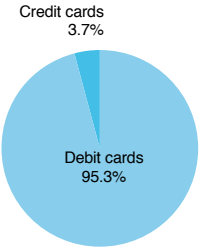
Number of transactions

2009



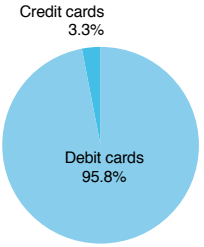
Checks <1%
Credit transfers <1%
Direct debits <1%

2013



Checks <1%
Credit transfers <1%
Direct debits <1%

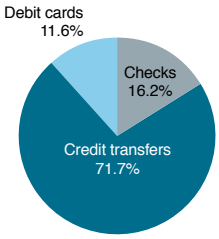
2014



Checks <1%
Credit transfers <1%
Direct debits <1%

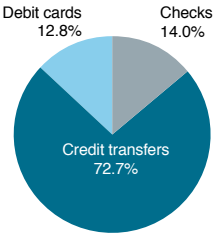
Transaction values

2009



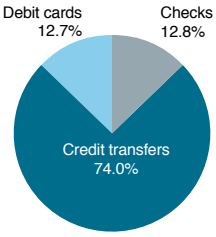
Direct debits <1%
Credit cards <1%

2013



Direct debits <1%
Credit cards <1%

2014



Direct debits <1%
Credit cards <1%

Source: CPSS Red Book statistical update, December 2015.

Singapore

Currency: Singapore dollar (SGD)

Electronic payment systems

	MEPS+	SGDCTS
Payments processed	Large-value interbank electronic fund transfers.	Truncated checks.
Value threshold	None.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Same day.	Two daily.
Access to system	SWIFT message formats and network.	ADSL, leased line.
Links to other systems	Direct interface with SCHA.	MEPS+

Other payment clearing systems

There is also US Dollar Check Truncation System (USDCTS) which processes truncated USD checks drawn on Singapore banks. Singapore has an interbank giro system that processes low-value, non-urgent bulk electronic credit and debit transfers. A Network for Electronic Transfers (NETS) has been established by three large domestic banks in Singapore. NETS processes CashCard payments and payments initiated through ATMs and EFTPOS terminals.

The eGiro system processes SGD–denominated, low-value, non-urgent bulk electronic credit and debit transfers.

The Fast And Secure Transfers (FAST) system is a new electronic fund transfer system that processes SGD fund transfers between participating banks.

Banking standards

There is no bank-independent standard for electronic banking services in Singapore.

Bank account structure

Singapore has not adopted IBAN.

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Use of payment and collection instruments

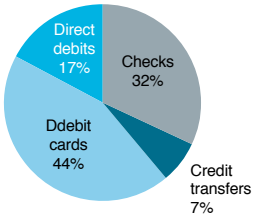
	Transactions (million)			% change	Traffic (value) SGD billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	79	72	69	– 3.9	585	724	701	– 3.3
Credit transfers	32	43	41	– 4.9	158	232	243	5
Debit cards	205	258	294	13.8	22	31	32	4.5
Credit cards	NA	251	287	14.3	26	43	46	7.1
Direct debits	53	57	57	0.2	59	85	92	7.4
Total	**369**	**681**	**748**	**9.8**	**850**	**1115**	**1113**	**– 0.1**

Source: CPSS – Red Book statistical update, December 2015.

Payment statistics

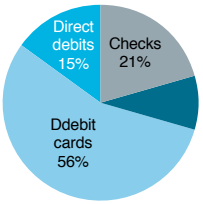
Number of transactions

2004



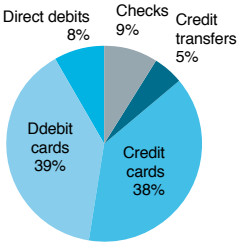
Credit cards NA

2009



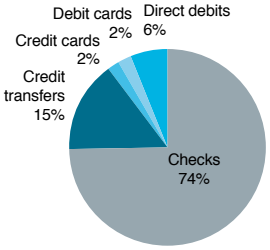
Credit cards NA

2014

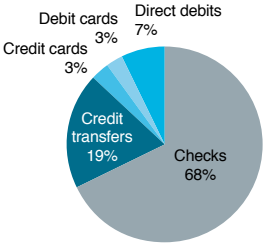


Transaction values

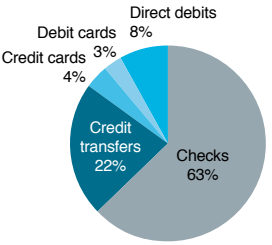
2004



2009



2014



Source: CPSS Red Book statistical update.

South Korea

Currency: South Korean won (KRW)

Electronic payment systems

	BOK-Wire+	Check and Bill Clearing
Payments processed	High-value and urgent electronic payments, both domestic and cross-border, as well as government and treasury payments.	The system processes two types of checks (cashier's checks and current account checks), and two kinds of bills (promissory notes and bills of exchange).
Value threshold	Minimum KRW 1 billion for transfer entries of third-party funds.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Payments processed by BOK-Wire+ are settled on a same-day, first-in, first-out basis with immediate finality. The net obligations from South Korea's retail payment systems are settled at designated times throughout each day.	Checks are delivered to one of 50 regional clearing houses after business hours (17:00) on the day of deposit for overnight clearing. Clearing occurs until one hour before the start of the next business day.
Access to system	Using international SWIFT standards.	All checks and bills are processed electronically via the Check Truncation System.
Links to other systems	DVP and PVP Systems.	NA

Other payment clearing systems

Other retail payment clearing systems operated by Korea Financial Telecommunications and Clearing Institute (KFTC). They include:

- Bank Giro – processes three types of giros (paper-based credit transfers; electronic giros – direct debits, credit transfers, standing orders; and internet giros).
- Interbank Funds Transfer Network (IFTNET) – processes cash, cashier's checks, irregular credit transfers and cashier's checks information queries.
- Electronic Banking/Firm Banking System (HOFINET) – processes payments and banking transactions made via the electronic banking system through personal computers.
- Interbank Cash Dispenser/Automated Teller Machine (CDNET) System – processes cash withdrawals, cash advances on credit cards, funds transfers and giro payments, as well as KRW cashier's checks and withdrawals made through CD/ATM terminals.
- Electronic Funds Transfer at the Point of Sale (EFTPOS) System – processes purchases made with a bank-issued debit card at POS terminals.
- Cash Management Service (CMS) – allows participating companies to manage their funds held with several different banks without having to go to the bank physically by interconnecting their computers to their banks through an intermediary system at the KFTC.
- Local Banks Shared (BANKLINE) System – processes funds transfers and other transactions such as account enquiries for local banks.
- K-Cash (E-money card) – processes debits and credits for financial institutions arising from electronic money card transactions associated with the corresponding K-Cash card.

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- BANKPAY – a payment gateway services enabling account transfers for electronic commerce.
- Cash Card Network – allows cash card customers to use CDs and ATMs to pay for goods and services.

Banking standards

There is no bank-independent standard for electronic banking services in South Korea.

Bank account structure

South Korea has not adopted IBAN.

Use of payment and collection instruments

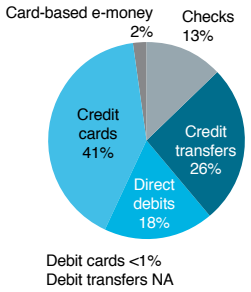
	Transactions (million)			% change	Traffic (value) KRW billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	932	346	311	–10.2	8,144,309	6,442,222	6,005,765	– 6.7
Credit transfers	2,431	3438	3700	7.6	55,387,648	71,586,886	75,294,317	5.2
Direct debits	683	973	953	– 2.1	63,681	91,182	89,738	– 1.6
Debit cards	1	3443	4399	27.7	45	96,151	113,836	18.4
Credit cards	4,880	8154	8857	8.6	466,358	570,643	581,964	2
Debit transfer	NA	1702	1700	– 0.1	NA	180,450	177,671	– 1.5
Card-based e-money	105	13.4	8.4	– 37.3	91	18	12	– 32.8
Total	**9,032**	**18,056**	**19,919**	**10.3**	**64,062,132**	**78,967,552**	**82,263,303**	**4.2**

Source: The Bank of Korea, ECOS Economic Statistics System, May 2015.

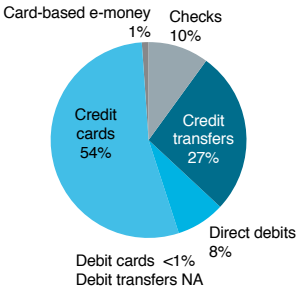
Payment statistics

Number of transactions

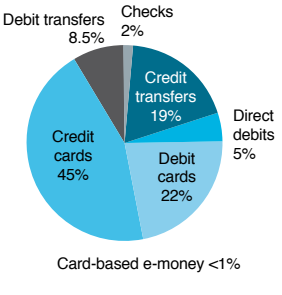
2009



2013

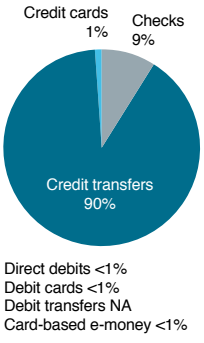


2014

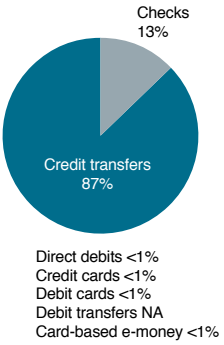


Transaction values

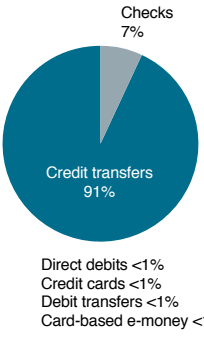
2009



2013



2014



Sources: The Bank of Korea, ECOS Economic Statistics System and KTFC statistics.

Spain

Currency: Euro (EUR)

Electronic payment systems

	TARGET2-BE (TARGET2 Banco de España)	SNCE
Payments processed	High-value and urgent electronic payments, both domestic and cross-border.	Retail payments in EUR.
Value threshold	None.	There is no maximum threshold.
Settlement type	RTGS	Bilateral net settlement.
Settlement cycle	Payments are settled in real time with immediate finality.	Settlement on a next-day basis.
Access to system	Banks connect via SWIFTNet FIN Y-Copy service. Payments are submitted using SWIFT standard message types.	Bilateral electronic transmission.
Links to other systems	The TARGET2 system links payment systems in all 24 participating EU member states, plus the European Central Bank.	NA

Other payment clearing systems

Cross-border EUR payments can be processed via EBA Clearing's EURO1, STEP1 or STEP2.

The European Clearing Cooperative (ECC), registered on June 23, 2015, is a new European payment platform founded by six European ACHs. The ECC is expected to commence operations by the end of 2016. It will facilitate optimized central ACH interoperability, via a multi-cycle model with final settlement at TARGET2. The six ACHs together with ACHs operated by Deutsche Bundesbank (e.g. EMZ), Banca d'Italia and Oesterreichische Nationalbank will together process cross-ACH transactions.

Banking standards

Domestic standards have been superseded by the adoption of the ISO 20022 XML standard (SEPA).

Bank account structure

All Spanish bank accounts are represented by a 24 digit alpha-numeric code (IBAN):

ES-dd-bbbbbbbb-cc-aaaaaaaaaa

Where:

ES is the two digit ISO Country Code for Spain;

- dd are two IBAN check digits;
- bbbbbbbb represents the bank and branch codes;
- cc are the two domestic check digits; and
- aaaaaaaaaa is the 10 digit account number.

e.g. the IBAN for the above number could be:

ES-21-3100-2520-34-0034002567

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Use of payment and collection instruments

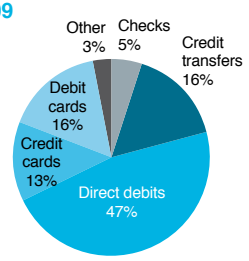
	Transactions (million)			% change	Traffic (value) EUR billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	113	76	77	1.3	598	344	346	0.6
Credit transfers	809	886	908	2.5	10,630	10,167	11,515	13.3
Direct debits	2,431	2,431	2,092	– 13.9	839	779	527	– 32.3
Debit cards	952	1,175	1,387	18.0	41	48	56	16.7
Credit cards	1,169	1,310	1,372	4.7	57	61	66	8.2
Card-based e-money	0.4	-	-	-	< 1	-	-	-
Other payment instruments	47	20	441	2,105.0	237	102	377	269.6
Total	**5,521**	**5,898**	**6,277**	**6.4**	**12,402**	**11,501**	**12,887**	**12.1**

Source: ECB Payment Statistics, October 2015.

Payment statistics

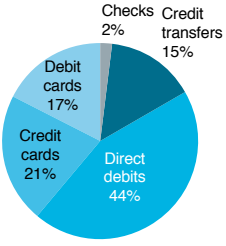
Number of transactions

2009



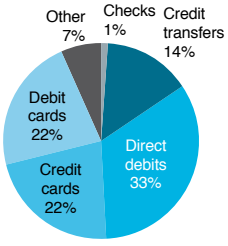
Card-based e-money <1%

2013



Card-based e-money <1%
Other <1%

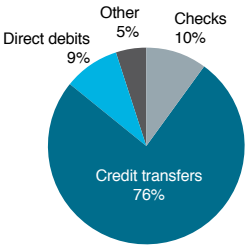
2014



Card-based e-money <1%

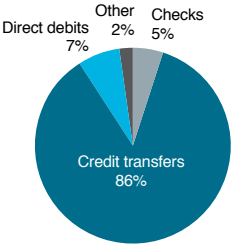
Transaction values

2009



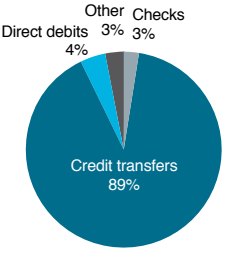
Credit cards <1%
Debit cards <1%
Card-based e-money <1%

2013



Credit cards <1%
Debit cards <1%
Card-based e-money <1%

2014



Credit cards <1%
Debit cards <1%
Card-based e-money <1%

Source: ECB Payment Statistics.

Sweden

Currency: Swedish krona (SEK)

Electronic payment systems

	RIX	Bankgiro
Payments processed	High-value and urgent electronic payments in SEK, both domestic and cross-border.	Low-value and non-urgent giro payments in SEK and EUR.
Value threshold	None.	Maximum SEK 9.999 billion for individual transactions.
Settlement type	RTGS	Bilateral gross settlement.
Settlement cycle	Settlement in real time and with immediate finality.	Settlement on a same-day or next-day basis.
Access to system	Via SWIFT FINCopy or RIX Online.	Via the SWIFT File Act system.
Links to other systems	None (previously TARGET system).	None.

Other payment clearing systems

There is Bankgiro's Data Clearing system which is a retail payment system for low-value, non-urgent electronic items and paper-based instrument. Unlike Bankgiro, Data Clearing is a bilateral net settlement system and processes payments denominated in SEK only. Real-Time Payments (BiR), Bankgiro's new platform, is able to process payments in real time 24 hours a day.

There is also Nordea's internal PlusGirot system, which processes payments denominated in both SEK and EUR.

Domestic electronic payments denominated in EUR can be processed via the Finnish or German element of the TARGET2 system. Cross-border EUR payments can be processed via EBA Clearing's EURO1, STEP1 or STEP2.

Banking standards

There is no electronic banking standard in Sweden. Most electronic banking systems adhere to EDIFACT standards.

The bankers' associations of Denmark, Finland, Norway and Sweden have developed XML-based MIGs (Message Implementation Guidelines) for customer credit transfers (based on the SWIFT C2B payment initiation message), payment cancellation requests and payment status reports.

Multinational companies also use the SWIFT for Corporates messaging standards.

Bank account structure

All Swedish bank accounts are represented by a 24 digit alpha-numeric code (IBAN):

SE-dd-bbb-aaaaaaaaaaaaaaaa-c

Where:

- SE is the two digit ISO Country Code for Sweden;
- dd are two IBAN check digits;
- bbb represents the bank code;
- aaaaaaaaaaaaaaaa is the 16 digit account number; and
- c is a further check digit.

e.g. the IBAN for the above number could be:

SE-35-916-3040506022036732-3

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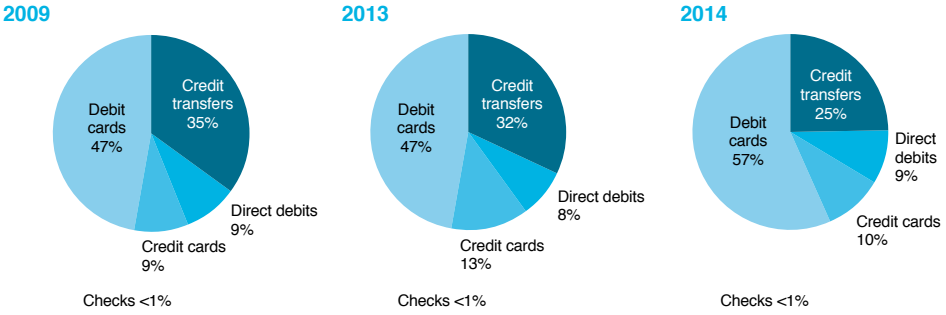
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) SEK billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.7	0.1	0.02	– 80.0	42	13	7	– 46.2
Credit transfers	908	894	957	7.1	10,615	14,175	14,769	4.2
Direct debits	241	312	323	3.5	469	553	558	0.9
Debit cards	1,337	2,029	2,214	9.1	570	693	755	9.0
Credit cards	360	369	406	10.0	175	207	225	8.7
Total	**2,847**	**3,604**	**3,900**	**8.2**	**11,871**	**15,641**	**16,314**	**4.3**

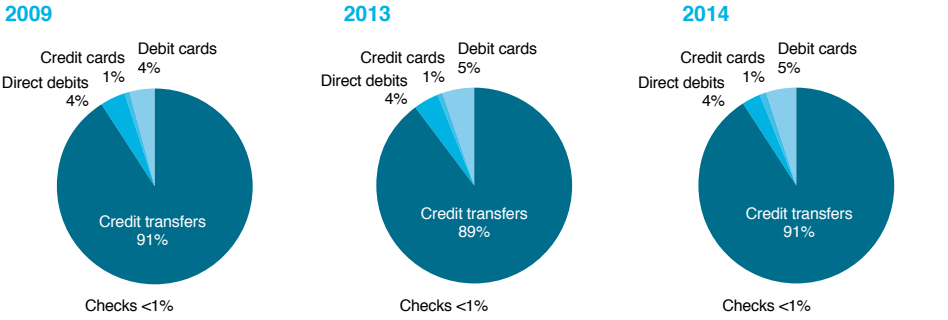
Source: ECB Payment Statistics, October 2015.

Payment statistics

Number of transactions



Transaction values



Source: ECB Payment Statistics.

Switzerland

Currency: Swiss franc (CHF)

Electronic payment systems

	SIX Interbank Clearing (SIC)	PostFinance
Payments processed	High-value and urgent electronic payments, both domestic and cross-border, plus low-value credit transfers, direct debits, card payments and paper-based instruments, including checks. The euroSIC sub-system for EUR payments can process SEPA payments.	Credit transfers and direct debits.
Value threshold	None.	None.
Settlement type	RTGS	Bilateral clearing system.
Settlement cycle	Settlement on a same-day basis.	Mostly bilateral, but urgent payments can be settled on a same-day basis via SIC.
Access to system	Payments are submitted online, using SIC and SWIFT formats, either directly or through computer centers.	Payments are submitted via PostFinance's proprietary format, EZAG, or on diskette.
Links to other systems	Germany's national component of TARGET2 (TARGET2-Bbk), Germany's EMZ retail payment system, STEP1 and STEP2, and the Netherlands' Equens CSS for retail payments.	SIC

Other payment clearing systems

None.

Banking standards

No national technology standard exists for electronic banking in Switzerland, but use of UN/EDIFACT standards for electronic communication between companies and banks is common.

Bank account structure

All Swiss bank accounts are represented by a 21 digit alpha-numeric code:

CH-dd-bbbbb-aaaaaaaaaaaa

Where:

- CH is the two digit ISO Country Code for Switzerland;
- dd are two IBAN check digits;
- bbbbb represents the five digit bank and branch code; and
- aaaaaaaaaaaa is the12 digit account number. This is the same as the domestic account number. If the domestic account number is shorter than 12 digits, leading zeros are added.

e.g. the IBAN for the above number could be:

CH-13-36020-000350102914

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Use of payment and collection instruments

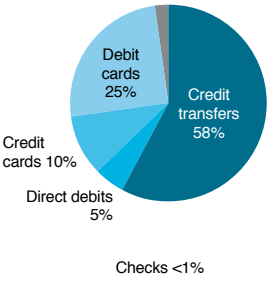
	Transactions (million)			% change	Traffic (value) CHF billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	0.7	0.2	Neg	–	2	1	Neg	–
Credit transfers	703	950	961	1.2	3,970	3,951	4,003	1.3
Direct debits	44	57	58	1.7	62	85.4	85.1	– 0.4
Debit cards	372	461	509	10.4	55	34	36	5.1
Credit cards	149	240	270	12.3	26	33	35	5.5
Card-based e-money	16	1	NA	–	0.07	0.01	NA	–
Total	**1,269**	**1,709.76**	**1,797.75**	**5.1**	**4,116**	**4,104**	**4,159**	**1.3**

Sources: Bank for International Settlements, CPMI Red Book statistical update, December 2015.

Payment statistics

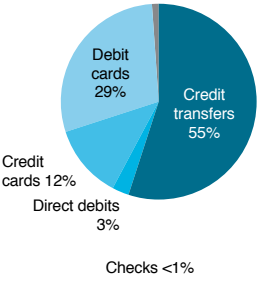
Number of transactions

2004



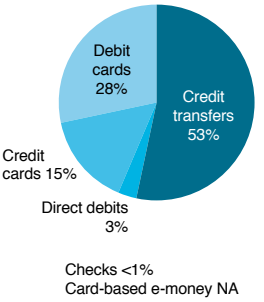
Checks <1%

2009



Checks <1%

2014



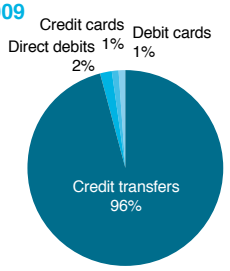
Checks <1%
Card-based e-money NA

Transaction values

2004

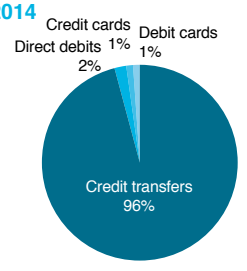
Checks <1%
Direct debits <1%
Credit cards <1%
Debit cards <1%

2009



Checks <1%
Card-based e-money <1%

2014



Checks <1%
Credit cards <1%
Debit cards <1%
Card-based e-money NA

Source: Bank for International Settlements.

Taiwan

Currency: New Taiwan dollar (TWD)

Electronic payment systems

	CIFS	IRS
Payments processed	High-value and urgent electronic payments.	Non-urgent, high-value and low-value electronic payments.
Value threshold	None.	None.
Settlement type	RTGS	Net settlement.
Settlement cycle	Same-day and with immediate finality.	Same-day basis.
Access to system	Through dedicated terminals.	Through any participating financial institution location.
Links to other systems	None	None.

Other payment clearing systems

The Automated Clearing House System (ACH) processes direct debits with a two-day settlement cycle. There is also the Taiwan Clearing House System (TCH), which processes paper-based items.

Banking standards

There is no common standard for electronic banking in Taiwan.

Bank account structure

Taiwan has not adopted IBAN.

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Use of payment and collection instruments

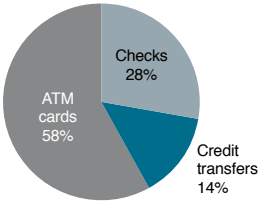
	Transactions (million)			% change	Traffic (value) TWD billion			% change
	2010	2014	2054	2015/2014	2010	2014	2015	2015/2014
Checks	123	109	105	-4.1	19,008	18,468	18,044	-2.3
Credit transfers	87	98	100	1.8	106,296	116,644	118,999	2.0
Credit cards	NA	NA	NA	NA	1,538	2,068	2,232	7.9
ATM cards	328	413	439	6.4	5,768	7,385	7,688	4.1
Total	**538**	**620**	**644**	**3.8**	**132,610**	**144,565**	**146,963**	**1.7**

Source: Central Bank of the Republic of China (Taiwan).

Payment statistics

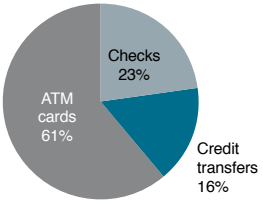
Number of transactions

2009



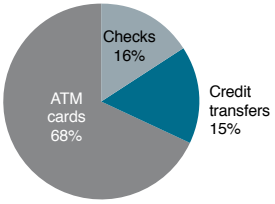
Credit cards NA

2013



Credit cards NA

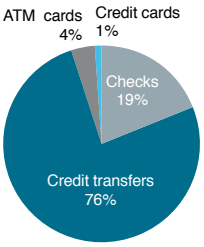
2014



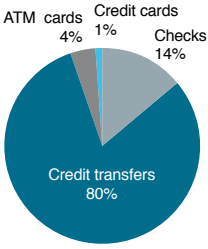
Credit cards NA

Transaction values

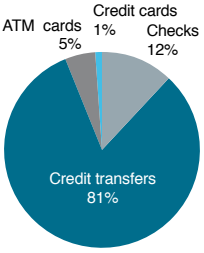
2009



2013



2014



Source: Central Bank of the Republic of China (Taiwan).

Turkey

Currency: Turkish lira (TRY)

Electronic payment systems

	EFT3 system
Payments processed	EFT3 system
Value threshold	Domestic transfers (regardless of value) and interbank obligations resulting from participant banks' transactions in the ICHs and BKM.
Settlement type	None.
Settlement cycle	RTGS
Access to system	Transactions are settled continuously and irrevocably in real time and with immediate finality.
Links to other systems	NA

Other payment clearing systems

The Ankara and Istanbul Interbank Clearing Houses (ICHs) clear all domestic check payments. Checks are MICR-encoded and payments are processed electronically. The majority of participant banks use truncation.

The BKM (Bankalararasy Kart Merkezi/ Interbank Card Center) clears all payment card transactions involving its participating institutions.

Banking standards

There is no national bank-independent electronic banking standard in Turkey.

Bank account structure

All Turkish bank accounts are represented internationally by a 26 digit alpha-numeric code:

TR-dd-ccccc-b-aaaaaaaaaaaaaaaa

Where:

- TR is the two digit ISO Country Code for Turkey;
- dd are two IBAN check digits;
- ccccc represents the five digit bank code;
- b is the reserved field; and
- aaaaaaaaaaaaaaaa is the 16 digit national bank account number.

e.g. the IBAN for the above number could be:

TR3300061005197864578413 26 (electronic format); or
TR33 0006 1005 1978 6457 8413 26 (paper format)

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Use of payment and collection instruments

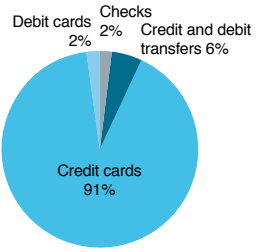
	Transactions (million)			% change	Traffic (value) TRY billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	22	17	17	1.2	260	350	404	15.5
Credit and debit transfers	129	232	269	15.9	23,704	40,246	46,702	16.0
Debit cards	813	1,524	1,751	15.6	188	370	428	15.6
Credit cards	1,842	2,705	2,798	12.3	205	428	480	12.3
Total	**2,805**	**4,479**	**4,836**	**8.0**	**24,356**	**41,394**	**48,015**	**16.0**

Sources: Bank for International Settlements, CPMI Red Book statistical update, December 2015, and Interbank Card Center.

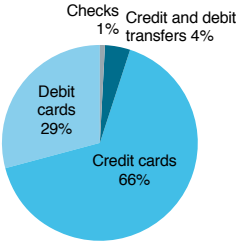
Payment statistics

Number of transactions

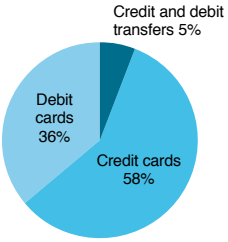
2009



2013

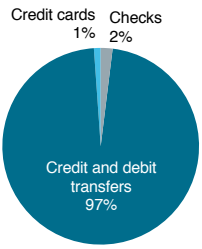


2014



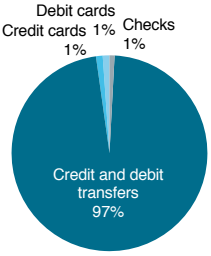
Transaction values

2009

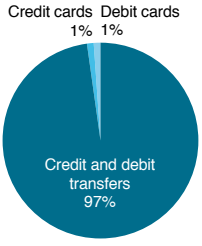


Direct cards <1%

2013



2014



Checks <1%

Sources: Bank for International Settlements, CPMI Red Book statistical update, December 2015, and Interbank Card Center.

United Arab Emirates

Currency: Emirati dirham (AED)

Electronic payment systems

	UAEFTS	ICCS
Payments processed	High-value and urgent credit transfers.	Low-value and non-urgent payments. Primarily checks and demand drafts.
Value threshold	None.	None.
Settlement type	RTGS	Net settlement.
Settlement cycle	Settlement in real time and with immediate finality.	Settlement on a same-day basis.
Access to system	Using SWIFT format.	Checks are truncated into electronic items before processing.
Links to other systems	None.	None.

Other payment clearing systems

The Wages Protection System (WPS) processes electronic salary payments in the UAE.

The UAE Direct Debit System (UAEDDS) processes direct debit payments, which was introduced in October 2013.

Interbank card payments are processed by the national UAE SWTICH ATM network.

Banking standards

There is no bank-independent standard for electronic banking services in UAE.

Bank account structure

All UAE bank accounts are represented by a 23 digit alpha-numeric code: (IBAN):

AE-dd-bbb-aaaaaaaaaaaaaaa

Where:

- AE is the two digit ISO Country Code for the UAE;
- dd are two IBAN check digits;
- bbb represents a three digit bank code; and
- aaaaaaaaaaaaaaa is the 16 numeric digit account number.

e.g. the IBAN for the above number could be:

AE-19-423-3792017482839017

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Use of payment and collection instruments

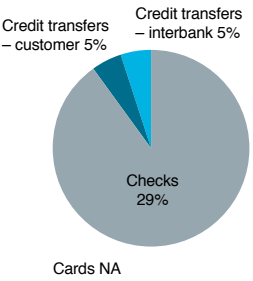
	Transactions (million)			% change	Traffic (value) AED billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	28,939	30,724	32,140	4.6	1,036	1,382	1,608	16.4
Credit transfers – customers	1,481	17,336	20,688	19.3	22	2,100	2,453	16.8
Credit transfers – interbank	1,687	371	411	10.8	9,337	6,024	6,242	3.6
Direct debits	–	9	795	8733.3	–	0.26	2.2	746.2
Card transactions*	NA	496,411	574,262	15.7	NA	479	542	13.2
Total	**32,107**	**544,851**	**628,296**	**15.3**	**10,395**	**9,985**	**10,847**	**8.6**

* Includes ATM and POS transactions. Source: Central Bank of the UAE Annual Report 2015 and Payment Statistics.

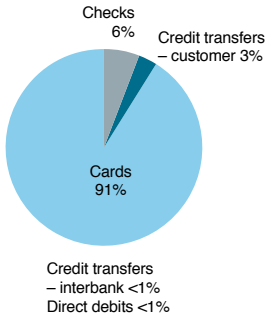
Payment statistics

Number of transactions

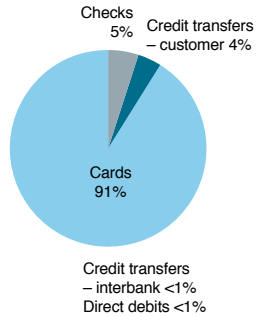
2009



2013

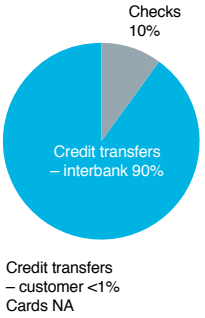


2014

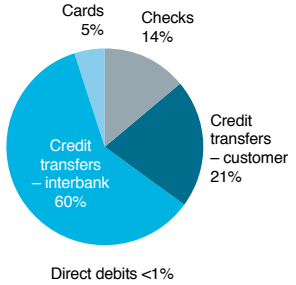


Transaction values

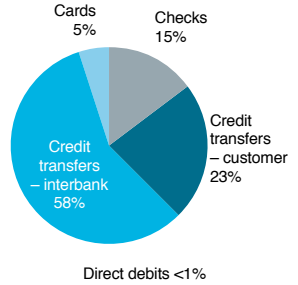
2009



2013



2014



Source: Central Bank of the UAE Annual Report 2015.

United Kingdom

Currency: Pound sterling (GBP)

Electronic payment systems

	CHAPS	BACS
Payments processed	High-value and urgent electronic credit transfers.	Low-value and non-urgent electronic payments, such as credit transfers, direct debits and standing orders.
Value threshold	None.	None.
Settlement type	RTGS	Multilateral net settlement.
Settlement cycle	Payments are settled in real time with immediate finality, on a first-in-first-out basis.	Payments are settled in batches in three days.
Access to system	Using SWIFT message formats and the SWIFTNet Internet Protocol network.	Corporate customers can use BACSTEL-IP, a secure online connection service, which can track payment status online.
Links to other systems	NA	NA

Other payment clearing systems

The Faster Payments Service processes one-off, customer-initiated electronic credit transfers, as well as standing orders.

The Cheque and Credit Clearing Company (C&CC) system processes paper-based payment instruments, such as checks and paper-based credit transfers, in Great Britain (England, Scotland and Wales). Paper-based payments in Northern Ireland are settled on a bilateral basis by the Belfast Bankers Clearing Company.

In addition, some USD-denominated paper-based payment instruments (i.e. checks, drafts and mandated currency debits) which are drawn on, or payable, at City of London branches of five UK clearing banks, can be cleared by the Currency Clearings Committee scheme.

Cross-border EUR payments can be processed via EBA Clearing's EURO1, STEP1 or STEP2.

Banking standards

No bank-neutral electronic banking standard has been developed in the UK.

PayWithMyBank (formerly eWise payo) is an online payment application, allowing for secure retail purchases and bill payments over the internet from bank accounts via credit transfer.

Paym, a cell phone payment service enabling security-protected payments between account holders of participating banks without disclosing account details, was launched by the Payments Council in April 2014.

Bank account structure

All UK bank accounts are represented by a 22 digit alpha-numeric code:

GB-dd-cccc-bbbbbb-aaaaaaaa

Where:

- GB is the two digit ISO Country Code for the UK;
- dd are two IBAN check digits;
- cccc is a four letter bank code
- bbbbbb represents the bank identifier code; and
- aaaaaaaa is the eight digit account number.

e.g. the IBAN for the above number could be:

GB-33-BANK-20560260403128

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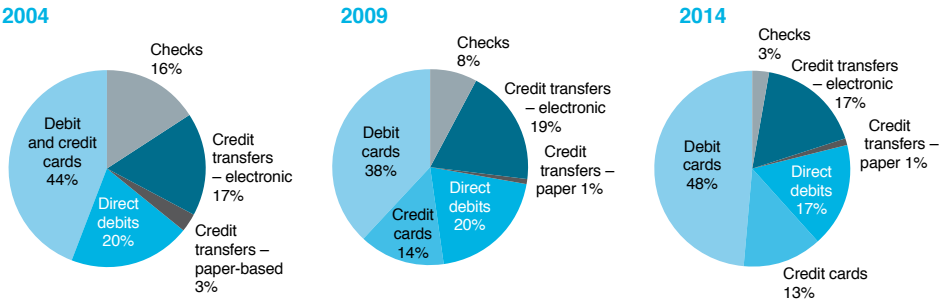
Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) GBP billion			% change
	2009	2013	2014	2014/2013	2009	2013	2014	2014/2013
Checks	1,282	718	644	– 10.3	1,279	733	694	– 5.4
Electronic credit transfers	3,055	3,540	3,653	3.2	67,696	73,377	71,356	– 2.8
Paper-based credit transfers	220	331	287	– 13.4	124	172	161	– 6.4
Direct debits	3,149	3,525	3,672	4.23	886	1,115	1,167	4.7
Debit cards	6,017	9,040	10,227	13.1	277	401	439	9.5
Credit cards	2,168	2,568	2,783	8.4	145	159	167	4.6
Total	**15,891**	**19,722**	**21,266**	**7.8**	**70,405**	**75,959**	**73,985**	**– 2.6**

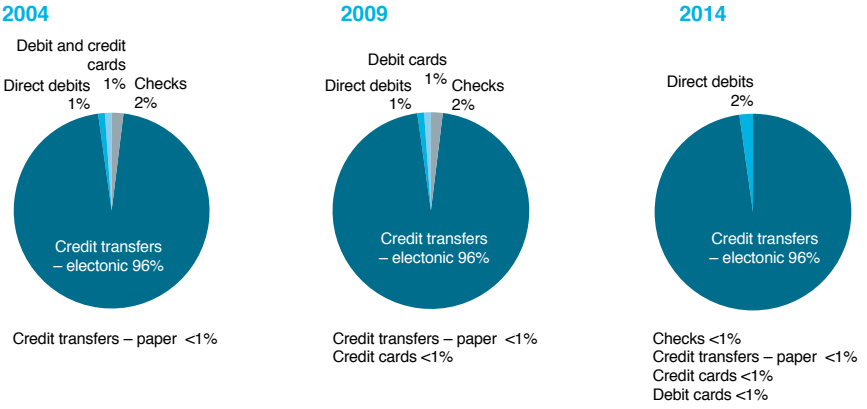
Source: ECB Payment Statistics, October 2015.

Payment statistics

Number of transactions



Transaction values



Sources: ECB Payment Statistics and Blue Book.

USA

Currency: US dollar (USD)

Electronic payment systems

	Fedwire	CHIPS
Payments processed	Domestic high-value and urgent electronic payments.	High-value and urgent electronic payments, both domestic and cross-border. Typically, foreign exchange settlements, commercial payments, offshore investments.
Value threshold	None.	None.
Settlement type	RTGS	Real-time net settlement.
Settlement cycle	Payments are settled on a same-day basis with immediate finality.	Payments are settled on a same-day basis with immediate or end-of-day finality.
Access to system	Online via PC or offline via telephone.	Online via PC.
Links to other systems	NA	NA

Other payment clearing systems

As well as the two main systems, there is the Automated Clearing House System (ACH), which processes low-value or high-value payment transactions that are not time critical. There are also four different methods for clearing checks.

Banking standards

Although the USA does not have an electronic banking standard, electronic banking services are widely available and include balance reporting, transaction initiation, payables and receivables tracking and image capabilities. Most banks transmit transaction and balance data using the Bank Administration Institute (BAI) format. Using BAI, users are able to carry out a number of functions, including accessing intra-day and end-of-day balance and transaction reports, initiating payments and tracking payments and receivables.

The Association for Financial Professionals (AFP) has published a standard format and standard service codes for the account analysis report. Most US cash management banks adhere to this standard. The account analysis is also available from major banks in the ANSI (American National Standards Institute) ASC X12 822 account analysis format.

Bank account structure

When making a check or ACH payment to a US bank account, banks can be identified by the use of a nine digit ABA (American Bankers' Association) Routing Number. A bank's check Routing Number will typically differ from its ACH Routing Number.
The Routing Number consists of three elements:

- a four digit code representing the Federal Reserve district and territory in which the bank is located;
- a four digit code identifying the bank; and
- a check digit.

Each bank account held at the bank will be identified by an account number, whose structure will be determined by the bank.

International Bank Account Number (IBAN)

The USA has not adopted IBAN.

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Use of payment and collection instruments

	Transactions (million)			% change	Traffic (value) USD billion			% change
	2012	2013	2014	2014/2013	2012	2013	2014	2014/2013
Checks	18,334	16,319	14,338	– 12.1	26,033	24,177	21,703	– 10.2
Fedwire transfers	131	134	135	0.6	599,200	713,310	884,551	24.0
CHIPS transfers	97	103	109	6.1	364,818	379,984	390,695	2.8
ACH credits	8,493	9,026	9,463	4.8	69,404	74,297	101,200	36.2
ACH debits	12,821	13,574	14,389	6.0	61,793	63,225	75,363	19.2
Debit cards	51,717	56,020	59,539	6.3	1,975	2,130	2,279	7.0
Credit cards	26,221	28,199	30,573	8.4	2,441	2,631	2,876	9.3
Total	**117,817**	**123,378**	**128,549**	**4.2**	**1,125,667**	**1,259,757**	**1,478,671**	**17.4**

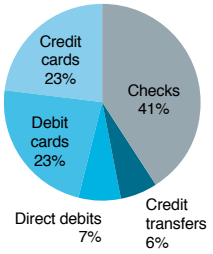
Due to a detailed study conducted by the Federal Reserve in 2012 previously reported on-us ACH values are not valid, and therefore trend comparisons with prior years are not valid for on-us and total ACH Value.

Source: BIS – CPMI – Red Book statistical update, December 2015.

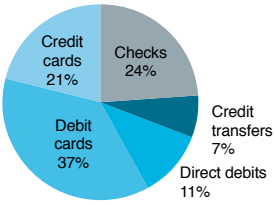
Payment statistics

Number of transactions

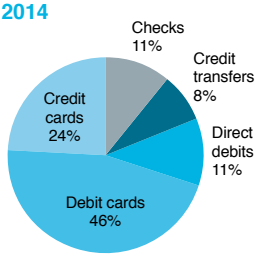
2004



2009

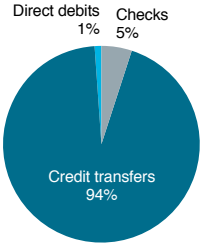


2014



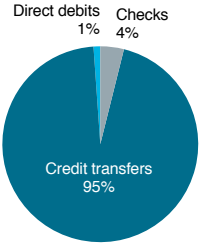
Transaction values

2004



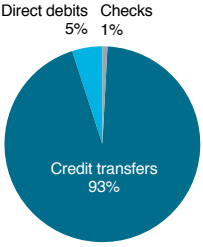
Debit cards <1%
Credit cards <1%

2009



Debit cards <1%
Credit cards <1%

2014



Debit cards <1%
Credit cards <1%

Source: BIS – CPMI – Red Book statistical update.

Venezuela

Currency: Venezuelan bolivar fuerte (VEF)

Electronic payment systems

	LBTR	SWIFT
Payments processed	Large-value interbank and third-party electronic funds transfers.	Large-value interbank electronic funds transfers.
Value threshold	None.	None.
Settlement type	RTGS	Same-day gross settlement.
Settlement cycle	Settlement on a same-day basis and with immediate finality.	Same-day settlement.
Access to system	SWIFT Y-COPY standard message format.	SWIFT standard message format.
Links to other systems	SWIFT	Interbank Transfer System (Sistema de Transferencias Interbancarias – STI).

Other payment clearing systems

Other payment systems in Venezuela include the Funds Transfer Electronic System for Interbank Loans (SET), which handles large-value interbank electronic funds transfers and the CCE (Electronic Check Clearing System), which processes checks and low-value, non-urgent electronic credit and debit transfers.

Payment orders sent via the proprietary SWIFT closed users group are processed through the STI.

Banking standards

There is no bank-independent electronic banking standard in Venezuela.

Bank account structure

Venezuelan bank accounts can be identified by the use of:

- a four digit code identifying the bank;
- a four digit code identifying the branch;
- a two digit control code; and
- a ten digit account number.

A Venezuelan bank account number has the following structure:

xxxx-xxxx-xx-xxxxxxxxxx

International Bank Account Number (IBAN)

Venezuela has not adopted IBAN.

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Use of payment and collection instruments

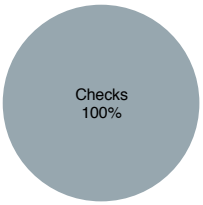
	Transactions (million)			% change	Traffic (value) VEF million			% change
	2012	2013	2014	2014/2013	2012	2013	2014	2014/2013
Checks	108	94	89	- 5.1	1,000,705	2,899,001	4,778,688	64.8
Automated credit transfers†	0.66	0.65	0.85	30.8	3,206,495	4,138,065	6,900,477	66.8
Manual credit transfers‡	0.030	0.014	0.017	21.4	492,295	75,260	30,942	-58.9
Low-value credit transfers	27	85	120	40.6	225,194	877,540	1,962,102	123.6
Direct debits	0.630	0.324	0.354	9.3	868	896	1,167	30.2
Debit cards	NA	NA	NA	–	NA	NA	NA	–
Credit cards	NA	NA	NA	–	NA	NA	NA	–
Total	**136**	**180**	**210**	**16.6**	**4,925,557**	**7,990,762**	**13,673,376**	**71.7**

† Automated credit transfers include proprietary SWIFT and SET.
‡ Manual credit transfers include letters of instruction and certified telex. Source: Banco Central de Venezuela, 2016.

Payment statistics

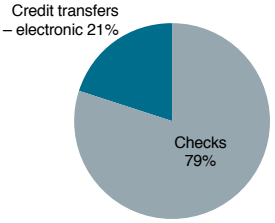
Number of transactions

2004



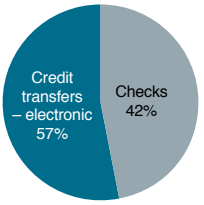
Credit transfers – electronic <1%
Credit transfers – paper <1%
Direct debits <1%
Debit cards NA
Credit cards NA

2009



Credit transfers – paper <1%
Direct debits <1%
Debit cards NA
Credit cards NA

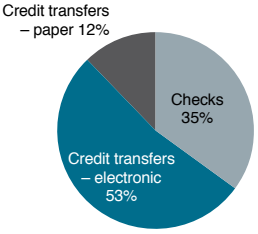
2014



Credit transfers – paper <1%
Direct debits <1%
Debit cards NA
Credit cards NA

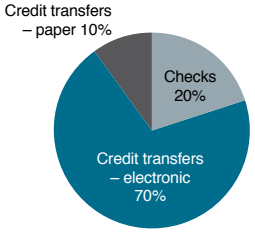
Transaction values

2004



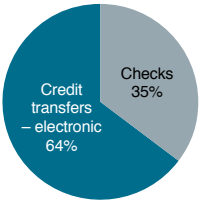
Direct debits <1%
Debit cards NA
Credit cards NA

2009



Direct debits <1%
Debit cards NA
Credit cards NA

2014



Credit transfers – paper <1%
Direct debits <1%
Debit cards NA
Credit cards NA

Source: Banco Central de Venezuela.

A Glossary of Treasury Technology Terminology.

Treasury Technology Terminology.

Access Management The guidelines regulating system access and passwords usage. Access management is a key component of any IT security policy and is an important aspect of risk management in treasury.

Accredited Standards Committee (ASC X12) A non-profit body, the Accredited Standards Committee has been chartered by the American National Standards Institute to develop, maintain, interpret, publish and promote the proper use of American National and UN/EDIFACT International Electronic Data Interchange Standards.

ACK The acknowledgement message sent by SWIFT signifying that a message has been successfully received and accepted for further transmission to a specified addressee.

Alliance Lite 2 Provides a cloud-based method for companies to gain direct SWIFT access.

ANSI X12 Standard The domestic US EDI Standard developed by the American National Standards Institute (ANSI).

API See application programming interface.

Application Programming Interface (API) A set of autonomous functions that allow software applications to send several instructions to another software application in one single message thereby facilitating straight through processing.

Application Service Provider (ASP) A third-party provider of software-based application services via remote browser-based access. ASPs allow organizations to outsource some or all of their treasury services.

ASC X12 See Accredited Standards Committee.

ASP See application service provider.

Authentication Security process that allows a receiver to determine the identity of the sender and the validity of a message and its transmission method.

Back Office System General term that refers to any system that is used to automate back office processes such as settlements, confirmation and reconciliation. See front office system.

Bank Administration Institute (BAI) A USA-based institution that defines and publishes common balance reporting codes for the US marketplace.

Bank Cash Management System A software package/system primarily focused on enabling treasury to control its cash (often across the group).

Bank Fee Software A software solution focused on maintaining control over bank accounts and signatories, which also helps treasurers minimize bank fees paid.

Blockchain Technology A distributed database of digital records which allows multiple members of a network access to data simultaneously.

Bureau Service Provider A company specializing in the provision of corporate outsourcing services ranging from payroll to treasury services.

Cash Management System Software package that facilitates the management of an organization's cash balances, cash flow and short-term liquidity.

Cloud Computing The provision of computational services – hardware, software and data – offsite and accessed via the internet or computer network i.e. WAN.

Confidentiality Confidentiality is an important aspect in all communications emanating from treasury. This is frequently ensured by the use of encryption and decryption hardware and/or software.

Configuration The tailoring of a system to the specific needs of a client without rewriting any code.

Confirmation Matching Systems Matches trade confirmations issued by both parties to a trade before settlement.

Counterparty Management System Any system that facilitates the management of counterparty risk by integrating and automating all counterparty information including credit-related data.

Cryptocurrency A cryptocurrency is an alternative digital currency which uses blockchain technology to verify transfer of funds.

Cryptographic Keys Security protocols using cryptography. Keys can be symmetric or asymmetric. See public key infrastructure.

Customization The changing of a core system by rewriting code to provide a unique solution for a small number of users.

Data Integrity The accuracy of automated data and its conformity to its expected value, especially after being transmitted or processed.

Dealing System A software package that allows partial or total automation of financial market transactions. Dealing systems normally have external links to bank and broker systems and internally to the treasury management system and back office system. Dealing

systems can be used for foreign exchange, securities (including mutual funds) and commodities transactions.

Decryption The hardware and/or software that enables the interpretation of an encrypted/scrambled message. See confidentiality.

Digital Signature The electronic equivalent of a handwritten signature, digital signatures can authenticate the identity of sender of the message or the signer of the document as well as ensure that the integrity of the content of the message in the sent document has not been interfered with during the transmission process.

Disaster Recovery The recovery of the organization to operational activity including the recovery of all critical business systems after a disaster effects the organization, i.e. fire, earthquake, bomb, etc. See disaster recovery plan.

Disaster Recovery Plan This is a developed and tested plan to ensure that business continuity continues in the case of a disaster. All IT systems which are critical to the successful operation of the organization should be included in a disaster recovery plan. The plan should specify the actions that should be taken if part or the whole of the IT system is rendered inoperative. The plan should be founded in a risk analysis of the potential threats that could be encountered and the means available to continue operation. The disaster recovery procedures should be layered to tackle the different levels of problem that might occur.

Document Preparation System A software package/system to enable users to prepare the necessary documentation and track the progress of transactions.

EAI See enterprise application integration.

eBAM See electronic bank account management.

EBPP See electronic bill presentment and payment.

EBS See electronic banking system.

ebXML See electronic business XML.

EDI See electronic data interchange.

EDIFACT Standards See UN/EDIFACT standards.

EFT See electronic funds transfer.

EIPP See electronic invoice presentment and payment.

Electronic bank account management (eBAM) Electronic bank account management systems enable corporate treasury departments to manage bank accounts held by separate group entities from a single location.

Electronic Banking A general term that refers to any form of banking that is effected remotely by electronic means. This can include banking by telephone (either fixed or mobile), PC banking or internet banking. In a corporate context, it generally refers to banking using electronic banking systems.

Electronic Banking System (EBS) Any type of software package that is generally, but not necessarily, provided by a bank that allows the customer to link into the bank system, check outstanding balances, generate balance reports and initiate transactions. Electronic banking systems can be either workstation or browser-based.

Electronic Bill Presentment and Payment (EBPP) The methods and processes that allow invoices (bills) to be created, sent and paid via the internet.

Electronic Business XML (ebXML) A modular suite of XML-based specifications aimed at enabling organizations to conduct business via the internet regardless of their size or geographical location. ebXML is jointly developed by the Organization for the Advancement of Structured Information Standards (OASIS) and the UN/CEFACT agency.

Electronic Commerce Defined by the UN/CEFACT as any business that is effected electronically. This includes the sharing of standardized unstructured or structured business information by any electronic means (such as electronic mail or messaging, internet technology, electronic bulletin boards, smart cards, electronic funds transfers, electronic data interchange, and automatic data capture technology) among suppliers, customers, governmental bodies and other partners in order to conduct and execute transactions in business, administrative and consumer activities.

Electronic Data Interchange (EDI) The electronic exchange of data relating to a number of standard message categories, such as orders, invoices, customs documents, remittance advices and payments between or within commercial entities (including their agents or intermediaries) and/or public administrations, in a standard format. EDI messages are messages sent in structured data formats that can be processed by computers. This means that data can be transferred without them having to be re-keyed. This data is sent through public data transmission networks or banking systems channels. Any movement of funds initiated by EDI is reflected in payment instructions flowing through the banking system. EDIFACT, a United Nations body, has established standards for electronic data interchange. In addition, there are a number of national EDI standards, the most important being the ANSI standards.

Electronic Funds Transfer System (EFT) A software system, provided by a bank that enables companies/organizations to process incoming and outgoing payments electronically.

Electronic Invoice Presentment and Payment (EIPP) The methods and processes that allow invoices (bills) to be created, sent, received, processed and paid via the internet. See electronic bill presentment and payment (EBPP).

Encipherment See encryption.

Encryption A process whereby a message is electronically scrambled so that only parties that have compatible decryption hardware and/or software can interpret the message. Sometimes referred to as encipherment. See confidentiality.

Enterprise Application Integration (EAI) Generic term referring to any process or program that aims to integrate, streamline and upgrade all existing applications and databases in a company.

Enterprise Resource Planning (ERP) Company-wide software module that automates and integrates all functions of a business, including support functions such as human resources, thereby allowing a company better to identify, plan and manage its resources. ERP is particularly prevalent in the manufacturing industry.

ERP See enterprise resource planning.

eXtensible Business Reporting Language (XBRL) Developed by an international not-for-profit consortium, XBRL is an open and royalty-free XML-based reporting standard that facilitates the creation, exchange and comparison of business-related reporting information.

eXtensible Markup Language (XML) A meta-language for web-based data that enables inter-application data transmission, validation and interpretation. The use of XML facilitates STP (straight through processing). XML is a simplified subset of the standard generalized markup language (SGML).

Extranet A wide area network (WAN) in which two or more organizations share information using internet protocols with access limited to the participants.

FEDI See financial EDI.

Financial EDI (FEDI) The electronic exchange of financial data in a standard format between business partners. See electronic data interchange.

Financial Information eXchange Protocol (FIX) A messaging standard aimed to facilitate the real-time electronic exchange of securities transactions.

Financial Products Markup Language (FMpL) An XML-based information exchange standard for electronic dealing and processing of financial derivatives instruments.

Financial Technology (FinTech) A general term describing all technology companies operating in the financial sector.

FinTech See financial technology

FIX See financial information eXchange protocol.

FMpL See financial products markup language.

Front Office System Generic term that refers to any system that allows automation of front office dealing processes, particularly dealing. See back office system.

HTML See hyper-text markup language.

Hyper-Text Markup Language (HTML) A subset of SGML that functions as the basic meta-language for the internet.

IDL See interactive data language.

IFX See interactive financial eXchange forum.

In-house Banking System A software package that enables a treasury to operate an in-house bank for a group.

Integrity Relates to the completeness and accuracy of data stored in a computer, especially after it has been manipulated in some way. See data integrity.

Interactive Data Language (IDL) A commercial language that allows numerical analysis and permits visualization of data.

Interactive Financial eXchange Forum (IFX) Established by the world's leading financial service and technology providers, IFX aims to design a standard XML-based financial message protocol.

Interface In a treasury system context, refers to any automated link established between different systems. The more interfaces that can be established between related application processes, the greater the STP potential.

Internet A worldwide wide area network (WAN) to which anyone with the appropriate hardware, software and communication links has access.

Internet Protocol (IP) The standardized method used to transmit information via the internet. With IP, messages are divided into packets that are sent individually to the delivery address using interconnecting computers. Upon delivery, the data packages are re-assembled using the transmission control protocol (TCP).

Intranet A private network based on internet protocols, but designed for information management within a company or organization. Its uses include such services as document distribution, software distribution, access to corporate databases and use of corporate applications. An intranet is so called because it looks like a World Wide Web site and is based on the same technologies, yet it is strictly internal to the organization. Some intranets also offer access to the internet, but such connections are directed through a firewall that protects the internal network from the external web.

Investment Portals Enable investors to access a number of different money market funds from one location.

IP See internet protocol.

IP-Address (Internet Protocol Address) A 32-bit (4-byte) binary number that uniquely identifies a host (computer) connected to the internet

to other internet hosts, for the purposes of communication through the transfer of packets. An IP address is expressed in 'dotted quad' format, consisting of the decimal values of its 4 bytes, separated with periods; for example, 126.1.0.1. The first 1, 2, or 3 bytes of the IP address identify to which network the host is connected; the remaining bits identify the host itself. The 32 bits of all 4 bytes together can signify almost 232, or roughly 4 billion hosts.

Integrated Services Digital Network (ISDN) An international communications standard for voice, video and data over digital and normal telephone wires.

ISDN See integrated services digital network.

ISO 20022 ISO 20022 is an internationally accepted messaging standard for the financial industry. It is XML-based.

LAN See local area network.

Local Area Network (LAN) Computers and other devices dispersed over a relatively limited area, commonly within one building, and connected by a communications link that enables any device to interact with any other on the network. LANs commonly include PCs and shared resources such as laser printers and large hard disks. The devices on a LAN are known as nodes, and the nodes are connected by cables through which messages are transmitted.

MA-CUG See member administrated closed user group.

MAC See message authentication code.

Market Information Systems Provide access to real-time market prices and information, as well as historical data.

Member Administrated Closed User Group (MA-CUG) A secure intranet established between a SWIFT member bank and its corporate customers using the private SWIFT network.

Message Authentication Code (MAC) A unique sequence/code of digits generated by a mathematical combination of a message's cryptographic key and a message's content which allows message authentication and integrity verification.

Message Standards Standards used in the electronic transmission on which most message types are based. Among the most widely used international standard messages are SWIFT messages as well as the UN/EDIFACT standards. In addition, some countries have domestic message standards of which the most important one is the USA-based ANSI X12 standard for financial EDI.

Middleware Software that connects or acts as intermediary between two or more different software programs.

Multi-bank Dealing Portal Multi-bank dealing systems enable treasurers to manage a transaction from initiation through to settlement on a

straight through processing basis. These systems are integrated into market makers/banks in the asset classes covered, giving the treasurer access to real-time pricing direct from the market maker. Most systems are configurable so that a corporate treasury dealer can only see market makers which are listed as approved counterparties.

Multilateral Netting System A software package that aggregates intra-group payments between participating group entities to enable settling on a net basis.

Non-repudiation Part of the security process that establishes that a message has effectively been sent and received.

OAG/OAGi See open application group.

OASIS See Organization for the Advancement of Structured Information Standards.

Open Application Group (OAG/OAGi) A non-profit consortium that promotes best practices and processes based on XML content for e-business and application integration.

Organization for the Advancement of Structured Information Standards (OASIS) Founded in 1993, OASIS is a global non-profit consortium that seeks to encourage the development, convergence, and adoption of e-business standards. Together with UN/CEFACT, it focuses in particular on the development and promotion of ebXML standards.

Payment Factory The central management of payments on behalf of a group's participants to external third parties.

PKI See public key infrastructure.

Portal A website that acts as a gateway to a wide range of web-based services.

Public Key Infrastructure (PKI) The system used to register and verify the identity of the users of a security application. The system is based on asymmetric cryptographic keys: one of the keys is in the public domain (i.e. known to all users); the other key is private to the originator who uses it to generate a digital signature which can be verified by the recipient using the public key. See cryptographic keys.

RDBMS See relational database.

Relational Database A database or database management system that stores information in tables – rows and columns of data – and conducts searches by using data in specified columns of one table to find additional data in another table. In a relational database, the rows of a table represent records and collections of information about separate items and the columns represent fields. In conducting searches, a relational database matches information from a field in one table with information in a corresponding field of another table to produce the combined requested data from two or more

tables. For example, if one table contains the fields counterparty ID, deal ID, deal amount, deal currency and another contains the fields counterparty ID, counterpart SWIFT details, a relational database can match the counterparty ID fields in the two tables to find such information as the SWIFT details for all deals. In other words, a relational database uses matching values in two tables to relate information in one to information in the other.

Risk Management System A software package/system to enable treasury to manage the risk inherent in cash flows and portfolios. It can be standalone or integrated with other treasury systems.

SaaS See software as a service.

SCORE See standardized corporate environment.

Secured Socket Layer (SSL) A security protocol that allows encrypted files to be sent electronically via the internet by using a private key.

Server Farm A collection of networked servers in one location.

SGML See Standard Generalised Markup Language.

Software as a Service (SaaS) Development from the ASP solution and with a complete and integrated treasury solution hosted centrally and typically provided over the internet and accessed through a web browser.

Standard Generalized Markup Language (SGML) A standard meta-language that allows specification of a document markup language or tag set such as XML or HTML.

Standardized Corporate Environment (SCORE) Managed by SWIFT, enables a registered company to manage all its communication with banks.

STP See straight through processing.

Straight Through Processing (STP) The end-to-end processing of automated data without manual intervention. See XML.

SSL See secured socket layer.

SWIFT Service Bureau A third-party organization which manages connections to SWIFT Net on behalf of corporations and smaller banks.

SWIFT FIN A store and forward messaging service offered by SWIFT that allows the exchange of financial data between financial institutions.

SWIFT Messages Standardized message types developed by SWIFT covering the following categories: Category 1 standards (customer payments and cheques); Category 2 standards (financial institutions transfers); Category 3 standards (treasury markets, foreign exchange, money markets and derivatives); Category 4 standards (collections and cash letters); Category 5 standards (securities markets); Category 6 standards (treasury markets, syndication and precious metals); Category 7 standards (documentary credit and guarantees); Category 8 standards

(travellers checks); Category 9 standards (cash management and customer status); and Category n standards (common messages).

SWIFT Net The internet protocol (IP)-based communications network used by SWIFT to transmit its messages.

TCP See transmission control protocol.

TMIS/TMS See treasury management information system/treasury management system.

Trade Finance System A software package/system to enable treasury and other parts of a company to manage its trade deals. It can cover just document preparation or wider supply chain finance.

Transmission Control Protocol (TCP) Method that enables the reconstruction upon delivery of messages that have been sent via the internet protocol transmission method.

Treasury Management Information System (TMIS)/Treasury Management System (TMS) A configuration of hardware, software that is linked to internal and external information sources that allow an organization's treasury to collect all the necessary financial information regarding the organization in a uniform format. TMIS/TMS allows the automation of a variety of treasury tasks from routine calculations to transaction initiation. It also greatly facilitates analysis, forecasting of treasury and risk management. It contributes to greater STP, particularly if it is linked to various front and back office applications or integrated into an ERP solution.

Treasury Workstation A personal computer that is fitted with a software package capable of collecting and collating reporting information, which can be on a next-day, end-of-day or intraday basis, from both internal and external sources, which can then be analyzed for decision-making purposes. In most cases, the software also offers some transaction initiation capability.

Treasury Workstation Integration Standards (TWIST) An initiative by the major treasury service providers that aims to develop common XML-based standards for financial market participant communications so as to facilitate straight through processing (STP).

TWIST See treasury workstation integration standards.

UN/CEFACT United Nations Centre for Trade Facilitation and Electronic Business.

UN/EDIFACT Standards United Nations Rules for EDI for Administration, Commerce and Transport. UN/EDIFACT comprises a set of internationally agreed-upon standards, directories, and guidelines for the electronic interchange of structured data related to trade.

Value-Added Network (VAN) A private network provider that offers various additional services to users.

VAN See value-added network.

Virtual Private Network (VPN) Method whereby a public telecommunications infrastructure such as the internet is used to offer remote users access to an organization's network while safeguarding the privacy and security of the transmitted messages.

VPN See virtual private network.

WAN See wide area network.

WAP See wireless application protocol.

Wide Area Network (WAN) A network that connects computers and LANs within a wide geographical area.

Wireless Application Protocol (WAP) Communication protocols for wireless appliances (such as cell phones) which facilitate access to internet-based services.

World Wide Web Consortium (W3C) A worldwide non-profit consortium whose mission is to bring the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability.

XBRL See eXtensible business reporting language.

XML See eXtensible markup language.

This glossary is an updated version of the Systems and Technology Terminology section of the *Guide to Treasury Best Practice & Terminology* published in 2004.

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Bloomberg TRM is supported by knowledgeable and experienced treasury professionals. Its solution is built to do the job without the need for extensive customization and configuration. Corporate treasury teams benefit from rapid setup and a tangible, positive impact on their day-to-day activities; shifting from data management and re-keying to a focus on risk and the needs of their business.

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Bloomberg TRM delivers the tools to enable treasury to add real value – all for one price that may surprise from a highly trusted provider.

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KEN LILLIE

Ken Lillie is an independent treasury consultant who has over 25 years' experience of providing treasury consultancy, working for companies and organizations in Europe, USA, Middle East, India and South Africa and ten years' previous experience in corporate treasury. Ken has assisted some of the world's largest organizations and companies select and implement new treasury technology.

Previously, Ken was responsible for group treasury at a major UK-based shipping line, moving on to become the director responsible for treasury and investment at a London-based investment bank.

Ken is a fellow of the Association of Corporate Treasurers in the UK. He is also a member of the Association of Corporate Treasurers of Southern Africa. Ken wrote and edited the publication *The International Directory and Buyer's Guide to Treasury Management Systems*. Other publications include this *Guide to Treasury Technology*.

He regularly writes, speaks and runs training courses on treasury and treasury technology.

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