Europe Economics

Costs and benefits of migration to ISO 20022 in SEPA

Final report

November 2016

Europe Economics Chancery House 53-64 Chancery Lane London WC2A IQU

Tel: (+44) (0) 20 7831 4717 Fax: (+44) (0) 20 7831 4515

www.europe-economics.com

Europe Economics is registered in England No. 3477100. Registered offices at Chancery House, 53-64 Chancery Lane, London WC2A IQU.

Contents

Exec	cutive Summary	I
	Migration costs	1
	Indirect costs	2
	Benefits	2
	Implementation	2
I	Our Approach	
	I.I Introduction	
	I.2 Assessing the costs and benefits of migration	
	1.3 Assessment of implementation	5
	1.4 Evidence gathering process	6
	1.5 Structure of the report	
2	Overview of the SEPA Regulation and ISO 20022 XML	
	2.1 Introduction	
	2.2 What is SEPA?	
	2.3 The SEPA Regulation requirements	
	2.4 Standards used in the UK for euro-denominated transactions prior to SEPA	
	2.5 The ISO 20022 XML standard	
	2.6 Potential future developments	
3	Migration costs	
	3.1 Costs of industry migration planning, communication and monitoring	
	3.2 Organisation-specific migration costs	
	3.3 Summary of migration costs	
4	Indirect costs	
	4.1 Risk of competition for relevant resources	
	4.2 Risks to system stability	
	4.3 Risks with the use of conversion services	
	4.4 Risks of parallel running and delays	
	4.5 Risks of differing interpretations of the messaging standard	
	4.6 Risk of technological lock-in	
	4.7 Risks associated with wider changes to the payments industry	
	4.8 Summary of indirect costs	
5	Benefits	
	5.1 Core product benefits	61
	5.2 Interoperability benefits	
	5.3 Functionality benefits	
	5.4 Summary of benefits	74

Implementation	75
6.1 Migration planning	75
6.2 The role of the co-ordination bodies	77
6.3 Lessons learnt	78
Key findings	82
7.1 Migration costs	82
7.2 Indirect costs	83
7.3 Benefits	84
7.4 Implementation	85
endix	87
Overview of country sample	88
	Implementation 6.1 Migration planning 6.2 The role of the co-ordination bodies 6.3 Lessons learnt Key findings 7.1 Migration costs 7.2 Indirect costs 7.3 Benefits 7.4 Implementation endix Overview of country sample

Executive Summary

Europe Economics was commissioned by the Payments Systems Regulator (PSR) to undertake a study on "Costs and benefits of migration to ISO 20022 in SEPA". The project assesses ex post the impact of the introduction of the SEPA Regulation, with a specific focus on the ISO 20022 XML messaging standard in the Single Euro Payments Area (SEPA).

SEPA is a payment integration initiative in the Single Market, part of which is to replace existing national euro-denominated direct debit (DD) and credit transfer (CT) schemes with the common SEPA Credit Transfer (SCT) and SEPA Direct Debit (SDD) schemes. A key part of the SEPA Regulation is the use of the ISO 20022 messaging standard in XML syntax during payment processing. ISO 20022 is a system for defining financial messages, covering both the content and format of a financial transaction. The purpose is to replace the numerous national legacy standards with a single common messaging standard.

This project assesses the costs and benefits of adopting the SEPA Regulation, with a specific focus on the costs and benefits of ISO 20022 XML. It considers both the costs and benefits already incurred, as well as the costs and benefits which may be incurred in the future. It broadly follows a bottom-up methodology, by considering the costs and benefits incurred by individual stakeholder types.

The evidence base of this study is a detailed review of existing (largely ex ante) literature and data, a questionnaire survey of firms in seven SEPA countries (five Eurozone and two non-Eurozone) and an indepth interview programme. The stakeholders surveyed included payment service providers (PSPs), payment service users (PSUs), central infrastructure providers, technology providers to the payments industry and coordinating bodies. The analysis covered migration costs, indirect costs, benefits and the implementation process, with the key findings of each summarised in turn.

Migration costs

The migration process was characterised by firms either updating internal systems or making use of conversion services to convert between the new ISO 20022 XML standard and the old legacy standard on which firm's internal systems still operated. Around two-thirds of PSPs, as well the larger PSUs, typically updated their internal systems for both SCT and SDD (often by upgrading their existing application with proprietary software), while many smaller PSUs make use of conversion services, and continue to do so on an ongoing basis, as a means of limiting the costs of migration.

For PSUs, migration costs were typically less than 10 per cent of their annual payment processing costs, whilst for PSPs they typically represent over 70 per cent, with systems costs being the key one-off cost driver. The migration to SDD was more expensive for both PSPs and PSUs than the migration to SCT, with the additional costs attributed to the complexity of the SDD scheme. ISO 20022 XML was found to be the most significant cost driver within the SEPA Regulation, although the SDD mandates were a relatively significant cost driver for larger PSUs offering direct debits to their customers. A significant proportion of PSUs were not materially affected by the migration (due to the screen based payment solutions they have with their bank or a third party), but they collectively account for only small fraction (in the order of 10 per cent) of total transaction volumes. Total transition costs to the SEPA Regulation are estimated at \pounds 10.2bn, of which \pounds 3.1bn is SCT and \pounds 7.1bn is SDD. Approximately 90 per cent of the total cost is estimated to have fallen on PSPs, while two-thirds of the total costs are attributed to ISO 20022 XML.

Average migration times were around 24 months, with most respondents suggesting that the transition times allowed had been adequate and that a longer implementation period would only serve to increase

costs. It was largely agreed that the migration of euro-based transactions would make future migration of other currencies to the same standard proportionately cheaper due to the leveraging of existing expertise.

Indirect costs

Competition for external resources was a particularly common issue raised amongst PSP survey respondents, with evidence of migration delays caused by this and the common end date resulting in a spike in demand and bottlenecks in the provision of relevant services.

Despite much discussion of the risks to system stability *ex ante*, there is very little evidence that any significant risks have materialised. There is also very little evidence of risks emerging with respect to conversion services. However, risks were felt to be more likely to materialise where PSUs or PSPs took the opportunity to enlarge the use of ISO 20022 XML to non-SEPA payment transactions.

There appear still to be national "flavours" with respect to the implementation of SEPA (e.g. in the case of bank account reporting standards and treatment of R-transactions), so that although the switch to ISO 20022 XML has indeed contributed to greater standardisation, interoperability remains imperfect.

Benefits

Prior to the SEPA Regulation, cross-border credit transfers and direct debits in the euro area often took a long time to be completed and incurred significant interbank fees. The SEPA regulation has effectively created a new class of SCT and SDD payments, completed in a guaranteed time with no deductions from the amounts transferred and much lower transaction fees for cross-border transactions (of order 95 per cent plus lower). This not only improves the efficiency of financial transactions but also allows small and medium-sized Enterprises (SMEs) the opportunity to more fully exploit the Single Market, as they now receive payments from other Single Market countries on a similar basis to their domestic payments.

The balance of survey responses suggested an increase in competition at all levels of the value chain, particularly at the PSP level (in attracting the business of larger PSUs by offering additional services). Interview evidence on the impact on competition at the central infrastructure level was more mixed, with some suggesting a decrease in infrastructure charges while others suggested little change. Although it is widely agreed that the common messaging standard has lowered an important competitive barrier, it is thought that other important barriers still remain – but that ISO 20022 XML nevertheless represents an important step in the direction of travel towards greater standardisation and competition in payments. On the other hand, there does seem to have been an increase in competition among PSPs, particularly.

The survey evidence suggests that the facilitation of systems consolidation and centralisation has been the most important interoperability benefit of ISO 20022 XML. The impact on transactions costs and times is unclear, with a significant minority of survey respondents indicating transactions times had *increased* (perhaps due to the ISO 20022 switch to a "t+1" transaction basis versus the previous standards' same day basis). There was moderate evidence of improved cash management and liquidity, but evidence of improved anti-money-laundering processes appears weak.

The most important functionality benefit of ISO 20022 XML relates to the enhanced structured payments data and its ability to support innovative products and services (e.g. banks offering a digital exchange of the invoice document (i.e. e-invoicing) between a supplier and buyer).

Implementation

Effective migration planning includes achieving an early consensus among stakeholders that change is necessary, centralised governance structures to oversee the process, implementation guidelines, a detailed

migration plan and a clear end-date (to ensure PSU migration). Coordinating bodies were an essential part of achieving this, providing four key functions: developing scheme rules; monitoring implementation; formulating strategies to support needs; and working groups covering practical aspects. A fundamental aspect throughout the implementation was the need to engage with all the different types of stakeholder (particularly SMEs) at all stages of the implementation process through a diverse range of education and communication strategies.

1 Our Approach

1.1 Introduction

1.1.1 Rationale for study

The Payment Systems Regulator (PSR) was established on I April 2015 to promote effective competition in the markets for payments systems and services in the interests of all service-users. It has the statutory objective of promoting the development of and innovation in payment systems, in particular, the infrastructure used to operate those systems.

As part of their Infrastructure Market Review (IMR), the PSR is considering the introduction of ISO 20022 for the Bacs and FPS systems. Therefore, to have a better understanding of the possible approaches and the related costs and benefits, the PSR have commissioned this work on the adoption of ISO 20022 as part of the SEPA Regulation. The SEPA Regulation can be seen as the most relevant case of adoption of ISO 20022.

In this section we present an overview of our approach to conducting this assessment. The section concludes by setting out the remaining structure of this report.

1.1.2 Scope of study

The scope of Europe Economics' study is to assess the costs and benefits of the migration of eurodenominated transactions from legacy payment schemes to the new SEPA payment scheme. The SEPA payment scheme is discussed in detail in section 2.3. The term "payment scheme" here refers to the set of interbank rules, practices and standards necessary for the functioning of payment services.¹

The findings of this report may be used by the PSR to inform their thinking on remedies as part of the IMR, specifically the remedy of adopting a common international messaging standard for the UK interbank payment systems. That said, it is beyond the scope of this report to provide any assessment of the expected costs and benefits of the adoption of a common messaging standard for sterling transactions in the UK.

1.2 Assessing the costs and benefits of migration

The assessment of costs and benefits of migration is divided into three key areas:

- Assessment of migration costs.
- Assessment of indirect costs.
- Assessment of benefits.

The approach to each is discussed in turn.

1.2.1 Assessment of migration costs

The migration costs are those costs directly incurred in adapting from legacy standards and rules to the new SEPA rulebooks and the ISO 20022 XML messaging standard. This includes both the one-off costs of the migration process and any incremental ongoing costs caused by this migration.

¹ European Payments Council (2011), "Interoperability Of Payment Schemes Is Not Feasible".

The objectives of this part of the study are to analyse, understand and describe:

- how stakeholders responded to the regulation;
- the one-off migration costs incurred in undertaking these responses;
- the ongoing costs incurred as a result; and
- how these incremental costs are derived and the main cost drivers for different types of stakeholders.

The focus of this study is in providing "bottom-up" estimates of these compliance costs. This is favoured over a "top-down" approach which models the impact directly on the relevant population in aggregate and, as such, does not consider differences in the types of firms affected.

The compliance costs in this report have been modelled for PSPs and payment system users (PSUs). Migration costs have been reported on a per transaction basis, using the volume of euro transactions undertaken by the respondent parties. Responses from technology providers to the payments industry have been used to sense-check the estimates provided by PSPs and PSUs.

1.2.2 Assessment of indirect costs

Indirect costs may arise as a result of the migration and are therefore important to consider as part of the cost-benefit analysis. These may arise either during the migration process, or as a result of the migration.

Such effects are explored through a combination of desk research and feedback from stakeholders gathered through the questionnaires and structured interviews. The indirect costs are explored in qualitative terms.

1.2.3 Assessment of benefits

There are three key strands to our assessment of the benefits associated with the adoption of the SEPA Regulation and, specifically, the ISO 20022 XML messaging standard. The first strand relates to the core product benefits offered by the adoption of the SEPA Regulation. The second and third strands relate more specifically to the messaging standard: the second strand relates to the benefits associated with the move to a **common** interoperable messaging standard; and the third strand relates to the benefits associated with a move to a functionally **superior** messaging standard.

Given that organisations in Eurozone SEPA economies were only forced to be compliant by August 2014 and organisations in non-Eurozone SEPA economies by October 2016, it is important to recognise that many of the anticipated benefits may not yet have manifested. Indeed, it is often recognised that initiatives in payment systems are characterised by large upfront costs and longer term benefits. Therefore, our assessment of the benefits considers both what benefits have been realised to date and what benefits are expected to accrue in the future.

As with the indirect costs, the benefits are explored through a combination of desk research and feedback from stakeholders gathered through the questionnaires and structured interviews. The benefits are primarily explored in qualitative terms, with some quantitative estimates provided where possible.

1.3 Assessment of implementation

The assessment of implementation considers the key stages of the implementation process from initial planning and development through to the communication and monitoring of the determined migration plan. It considers the role of coordinating bodies, as well as other committees, associations and the wider stakeholder community. It draws on evidence from a range of SEPA countries, from the SEPA-wide coordinating and monitoring bodies, i.e. the European Payments Council (EPC) and European Central Bank (ECB), and from coordinating bodies in other jurisdictions outside SEPA.

1.4 Evidence gathering process

Our analysis is based on the findings of two main evidence gathering processes:

- desk-based research; and
- a stakeholder engagement programme.

These are described in turn below.

1.4.1 Desk-based research

The purpose of the desk-based research was to inform and supplement the information gathered via the stakeholder questionnaires and structured interviews. This was particularly important in the case of assessing the benefits as, given that the regulation has only recently come into force, many of the anticipated benefits have not yet materialised and were, therefore, more difficult for firms to assess (relative to the costs of migration which have already been incurred).

The desk-based research also proved useful in understanding the various migration models that stakeholders could adopt and the types of costs involved in these different approaches. That said, no "bottom-up" quantitative evidence on migration costs was found in existing published literature. The migration cost estimates provided in this report are, therefore, a significant contribution to the existing field of work on the costs and benefits of adoption of the ISO 20022 XML messaging standard.

1.4.2 Stakeholder engagement programme

We adopted a two-strand stakeholder engagement process consisting of:

- a small number of structured interviews with selected stakeholders; and
- a larger scale questionnaire programme of relevant stakeholders.

These two strands complemented and reinforced one another to provide for a richer analysis. The structured interviews helped provide greater depth and colour to findings, while the questionnaire programme provided greater breadth – in terms of coverage of countries and stakeholder types. The structured interviews also helped us unlock, and add further colour to, the responses received through the larger scale questionnaire programme.

The stakeholder engagement programme sought evidence on all key aspects of our analysis, namely: migration costs; indirect costs; benefits; and the implementation processes. As can be seen in Table 1.1, different questionnaires were developed to focus on these different aspects of the analysis.

Country selection

The countries selected for the stakeholder engagement exercise in this study were:

- Belgium;
- Denmark;
- France;
- Finland;
- Ireland;
- Netherlands; and
- UK.

This study also involved engagement with a small number of stakeholders outside these countries, as explained in more detail in the 'stakeholder types' section below.

These countries were selected for their comparability with the UK in the payments context. France, for example, was chosen because the proportion of total transactions that are credit transfers and direct debits (18.0 per cent and 18.7 per cent respectively) are very similar to those in the UK (18.5 per cent and 17.3 per cent respectively).

An Appendix contains full details on why these countries were chosen and provides further background on the payment schemes in place in these countries prior to when the SEPA payment schemes came into effect.

Stakeholder types

The following types of stakeholders were targeted for the interview programme:

- payment service providers (PSPs);
- payment service users (PSUs), including corporates and government bodies;
- central infrastructure providers²;
- technology providers to the payments industry; and
- coordinating bodies.

For PSPs and PSUs, the study sought to cover both small- or medium-sized market participants and large market participants, as desk-based research suggests size is a key driver of costs and benefits.

With regard to PSUs, it was important to engage with those organisations likely to have a high volume of direct debits (e.g. utility providers who charge customers using direct debit) and credit transfers (e.g. government bodies who pay benefits, pensions etc. through credit transfer, and large corporate employers who pay salaries through credit transfer), as the expectation was that they would be more affected by the SEPA Regulation.

With regard to PSPs, it was important to engage with both direct PSPs, who access the central infrastructure directly, and indirect PSPs, who access the central infrastructure through one of the direct PSPs. Typically, it is the larger PSPs who have direct access to the central infrastructure and smaller PSPs who access indirectly through a larger PSP.

It is important to note that the country selection is only relevant in the case of the PSPs, PSUs and central infrastructure providers, as the emphasis for these stakeholders is in understanding the costs and benefits specific to the countries in which they operate. In the case of technology providers, it was informative to engage with organisations based outside the sample of countries chosen providing that they offer services to PSPs, PSUs and/or central infrastructure providers in the country selection. Similarly, it was useful to engage with some coordinating bodies outside of the sample of countries, in order to understand how their implementation processes may have differed and any key lessons learnt from their chosen implementation processes.

Questionnaire development

Five types of questionnaire were designed for the stakeholder engagement process. Table 1.1 summarises the questionnaire types and whom they were targeted at.

² Central infrastructure providers are also often referred to as clearing and settlement mechanism (CSM) providers. In this report, the term central infrastructure provider is typically used.

Questionnaire Type	Stakeholders Targeted
Full costs and benefits	UK PSPs only
Cost-focussed	UK PSUs and non-UK PSPs and PSUs
Benefit-focussed	UK PSUs and non-UK PSPs and PSUs
Migration cost-focussed	Suppliers
Costs and benefits to payments industry	Central infrastructure providers and coordinating bodies

Table 1.1: Summary of questionnaire types

The rationale for developing separate cost-focussed and benefit-focussed questionnaires is that a full questionnaire on costs and benefits would have been too time-consuming for stakeholders to complete and, therefore, would have been likely to have reduced the number of responses. This is particularly true in the case of non-UK stakeholders for whom there was likely to be less incentive to respond. Furthermore, so as to ensure, as far as practically possible, an even split between responses to the cost- and benefit-focussed questionnaires, the sample of relevant UK PSUs were split into two, with half receiving the cost-focussed questionnaire and half receiving the benefit-focussed questionnaire. The same approach was used for non-UK PSUs.

In order to help amalgamate the findings from the different questionnaire types, a list of common questions were included at the start of all questionnaire types. These were designed as general high-level questions about the costs and benefits of migration to ISO 20022 in SEPA.

The full questionnaires can be found in an Annex accompanying this report.

Stakeholder engagement process

The stakeholder engagement process was conducted in two waves, the first with a deadline of Wednesday 14th September and the second with a deadline of Wednesday 28th September.

Relevant stakeholders were identified through three key channels:

- Existing relevant contacts of Biotos Payments Consulting.
- Relevant contacts from the SIBOS³ attendee database.
- Relevant contacts identified through desk-based research.

Where relevant email addresses were not available through desk-based research, relevant stakeholders were contacted by phone to seek the contact details of relevant individuals within those organisations.

Initial approach emails were made in the week commencing 5th August. This email included details of the study including who we are, the aims of the study and how the research is to be used, as well as a copy of the accreditation letter from the PSR. Reminder emails were sent two weeks later, including links to the relevant questionnaire for each stakeholder. Stakeholders received both a link to the online questionnaire and a link to a PDF version of the questionnaire, the latter allowing them to view the entire questionnaire offline and share with relevant colleagues internally in preparing their response.

The second wave commenced on the week commencing 12th August, with links to the relevant questionnaires included from the outset. As part of this second wave, increased response rates were sought by also contacting regulators, coordinating bodies and relevant trade associations for their help in circulating the study amongst their relevant stakeholders/members.

Stakeholders interested in responding to the questionnaire were asked if they were also willing to participate in an interview to discuss their responses in more detail. These interviews were arranged for a date after the stakeholder had submitted their questionnaire response, such that during the interview

³ The world's premier financial service event, held this year in Geneva. See: <u>https://www.sibos.com/.</u>

stakeholders could be asked for more details on (e.g. the reasons underpinning) their responses to certain questions in the questionnaire.

Stakeholder responses

Table 1.2 and Table 1.3 below show the breakdown of respondents to the questionnaire and interview programmes respectively. For the questionnaire this is categorised by stakeholder type and whether Eurozone or non-Eurozone.

Table 1.2: Questionnaire sample

	Non-Eurozone	Eurozone	Total
PSPs	П	8	19
PSUs	7	16	23
Central infrastructure providers	I	2	3
Technology providers	2	7	9
Coordinating bodies	0	2	2
Total	21	35	56

As shown in Table 1.2, a total of 56 survey responses have been received. The country coverage is: Belgium -10; Denmark -5; France -10; Finland -3; Ireland -2; Netherlands -4; UK -16; and other -6.

Table 1.3 below shows the sample of interview respondents. It shows that a total of 16 interviews were conducted, covering all key categories of stakeholder.

Table 1.3: Interview sample

PSP	7
PSU	I
Central infrastructure providers	3
Technology providers	3
Coordinating bodies	2
Total	16

Controlling for potential biases in survey responses

When using survey evidence, it is important to recognise the limits of what this evidence can show and, in particular, the potential for biases – both those caused by an unbalanced sample of respondents and those caused by potential biases of individual stakeholder responses.

Unbalanced samples of respondents may arise as a result of certain types of stakeholders having strong incentives to reply to the questionnaire. This may, for example, occur if a certain stakeholder believes they were more detrimentally impacted by the regulation. Unbalanced samples may also arise where certain types of respondents are strongly opposed to, or in support of, regulatory decisions that could be made as a result of certain survey findings.

There are two key methods that have been employed to help minimise the biases described above. Firstly, the stakeholder engagement strategy has been focussed on engaging as wide a range of stakeholders as possible, and focusing later engagements in those areas where there was initially an under-representation of respondents. Secondly, the sample of respondents is stratified into relevant types of stakeholders.

With regard to the second point, the sample should be stratified into the relevant types of stakeholders in the overall population. However, when doing so, the extent of stratification should be guided by the

number of responses received, as, for a given number of survey responses, too granular a stratification would reduce the robustness of the results estimated (due to smaller sample sizes in each group).

The stratification of responses in this report is on the basis of whether the respondents are based in non-Eurozone countries, i.e. UK or Denmark, or Eurozone countries, and then on the basis of stakeholder type, i.e. PSPs or PSUs. A more granular stratification of respondents is not possible for reasons of confidentiality and robustness.

The **bias of individual stakeholder responses** is more difficult to control for. The underlying rationales for such biases may be similar to those underpinning an unbalanced sample of respondents, i.e. because certain stakeholders believe they were more detrimentally impacted, and/or may be more impacted by subsequent decisions that may rely, to some extent, on the survey findings. In order to minimise the impact of individual response biases, as part of the stakeholder engagement exercise we have engaged with technology providers on the 'supply side' of the payments market, as a means of sense-checking the information provided by PSPs and PSUs, in particular their migration cost estimates.

Use of survey evidence

The survey evidence, from both interview and questionnaire responses, is incorporated in Sections 3-6 of the report. Thus the survey evidence is not presented separately but rather incorporated into the assessment of costs and benefits along with the findings from the desk-based research.

Quantitative estimates have been provided in Section 3 on migration costs and Section 5 on benefits. Estimates are provided as averages for the stakeholder types, on a per transaction basis.

1.5 Structure of the report

The remainder of the report is structured as follows:

- Section 2: Overview of the SEPA Regulation and ISO 20022 XML. This section sets out the requirements of the SEPA Regulation, the ISO 20022 XML standard and legacy UK systems.
- Section 3: Migration costs. This section assesses the costs of migration and provides preliminary quantitative analysis based on the survey responses received to date.
- Section 4: Indirect costs. This section provides our assessment of the indirect costs that have arisen or are expected to arise during, or as a result of, the migration.
- Section 5: Benefits. This section provides our assessment of the benefits that have arisen or are expected to arise as a result of the migration, focusing on interoperability and functionality.
- Section 6: Implementation. This contains a discussion of the implementation processes followed for the SEPA regulation including, in particular, planning, the role of coordinating bodies and lessons learnt.
- Section 7: Summary of findings. This section draws on the analysis of Sections 3-6, to present overall key findings on the adoption of ISO 20022 XML, as part of the wider SEPA Regulation.
- Appendix: provides an overview of the other countries included in this study.

2 Overview of the SEPA Regulation and ISO 20022 XML

2.1 Introduction

Since the establishment of the European Economic Community in 1958, the movement towards a more integrated European financial market has been marked by several events. The Single Euro Payments Area (SEPA) project is one such event representing a major step towards European financial integration.

An integral part of the SEPA project involves the use of a common messaging standard (i.e. ISO 20022 in XML format) for all euro-denominated credit transfers (CTs) and direct debits (DDs) in SEPA countries.

In the UK, the implementation of a common messaging standard is being considered as a possible remedy to create a more level-playing field, in light of the PSR's Infrastructure Market Review (IMR) identifying potential barriers to entry in the UK payments landscape due to the current use of different legacy rules and messaging standards in payment systems.

The aim of this introductory section is to:

- describe SEPA and the key requirements of the SEPA Regulation;
- set out the UK messaging landscape for euro-denominated CTs and DDs prior to SEPA;
- analyse the ISO 20022 XML standard and its key features; and
- discuss the potential future developments around ISO 20022 XML.

2.2 What is SEPA?

As a key part of the European Commission's vision of a Single Market, SEPA constitutes a paymentintegration initiative aiming to harmonise the way euro-denominated DDs and CTs are made in Europe.⁴ Effectively, this means that existing national euro-denominated DDs and CTs have been replaced by the SEPA Credit Transfer (SCT) and SEPA Direct Debit (SDD) schemes. To achieve the goals of greater transaction speed, safety and efficiency the latest Regulation (EU) No 260/2012 of the European Parliament and of the Council of 14 March 2012 (henceforth the SEPA Regulation) mandates several technical and business requirements for all euro-denominated DDs and CTs in SEPA countries (see section 2.3).⁵

The implementation of SEPA regulation⁶ was planned around three main phases:

- a design phase this part of the SEPA project began in 2004 and involved the design of the SCT and SDD schemes, as well as the frameworks for cards, and clearing and settlement infrastructures. The necessary standards and specification of security requirements were also developed;
- an implementation phase this part of the SEPA project started in 2006 and lasted until the end of 2007. This phase of the project concentrated on making the necessary preparations for the rollout of

⁴ Currently, SEPA covers 34 countries: the EU28 member states plus Iceland, Liechtenstein, Norway, Monaco, San Marino and Switzerland.

⁵ See European Central Bank (2013) "The single euro payments area (SEPA): An integrated retail payments market".

⁶ See European Central Bank (2013) "The single euro payments area (SEPA): An integrated retail payments market".

the new SEPA instruments, standards and infrastructures. Testing exercises were also carried out in this phase with the assistance of national implementation and migration bodies; and

a migration phase — this part of the SEPA project began on a voluntary basis in 2008. In this phase, national payment schemes coexisted temporarily with the SEPA schemes. Customers were offered both "old" national and new SEPA instruments, and the clearing and settlement infrastructures were able to process both instruments. For the euro area, the SEPA migration end date at which time only SEPA-compliant schemes are allowed to operate was I February 2014 (later extended to I August 2014), whereas the deadline for euro-denominated payments in non-euro area countries was 31 October 2016.

Any economic agent (e.g. a citizen, bank, corporate or public administrative organisation) making a eurodenominated electronic CT or DD will be affected by the requirements of the SEPA Regulation. The SEPA Regulation does **not** however apply to the following:

- payment transactions between and within PSPs (including their agents or branches) for their own account;
- payment transactions processed and settled through large-value payment systems (such as TARGET2 and CHAPS), with the exception of direct debit payment transactions which the payer has not explicitly requested to be routed via a large-value payment system;
- payment transactions through a payment card or similar device, including cash withdrawals, unless the payment card or similar device is used only to generate the information required to directly initiate a credit transfer or direct debit to and from a payment account identified by BBAN or IBAN; and
- payment transactions through telecommunication, digital or IT devices, if such payment transactions do not result in a credit transfer or direct debit to and from a payment account identified by BBAN/IBAN.

2.3 The SEPA Regulation requirements

Under the SEPA Regulation, a common set of technical requirements must be applied to all eurodenominated CT and DD transactions.⁷ These are:

• The use of the International Bank Account Number (IBAN) and the Business Identifier Code (BIC) by payers and payees – the IBAN and the BIC allow the identification of any account in the SEPA countries.⁸ A payee accepting credit transfers must communicate the IBAN of the account to which the payment should be credited and the BIC of its payment service provider (PSP). In turn, a payer wishing to make a payment by direct debit must communicate the IBAN of the account which should be debited and the BIC of its PSP. However, since I February 2014 for national payment transactions and I February 2016 for cross-border payment transactions, PSPs do not require PSUs to indicate the BIC of the PSP of a payer or of the PSP of a payee. The main motivation for this amendment was the need to simplify the amount of information provided, as the BIC can easily be derived from the IBAN. Overall, this is amendment expected to reduce processing errors resulting in improved straight through processing (STP).⁹

⁷ Accompanying this set of requirements, are the SCT and SDD rulebooks. The European Payments Council (EPC) describes the SEPA Rulebooks as "instruction manuals" which provide a common understanding on how to abide to the SCT and SDD rules. See: <u>http://www.europeanpaymentscouncil.eu/index.cfm/sepa-customers/sct-sdd-rulebook-release-management-and-scheme-development/</u>.

⁸ The IBAN and the BIC constitute technical standards developed by the International Organization for Standardization (ISO). The IBAN is ISO standard 13616, whereas the BIC is ISO standard 9362.

⁹ For instance, several corporates experienced problems with payments due to the wrong BIC value being indicated.

- The use of the ISO 20022 messaging standard in XML syntax during payments processing in the pre-SEPA euro payments market, different data formats were in place to process payments across different national and European clearing systems in the EU. The SEPA Regulation therefore requires a common set of data to be exchanged in a common syntax. In this respect, the SEPA Regulation mandates the use of the ISO 20022 XML standard when transmitting payment transactions to another PSP or via a retail payment system (see also section 2.5). The same standard shall also be used where a PSU that is not a consumer or a microenterprise initiates or receives individual CTs or DDs which are not transmitted individually, but are bundled together for transmission. PSPs shall, upon the specific request of a PSU, use the ISO 20022 XML standard in relation to that PSU. In this case, the PSU shall receive the transaction processing report, sent by its PSP, based on the same ISO 20022 XML format (thus enabling both automatic reconciliation and e-invoicing). It should be noted, however, that conversion to the ISO 20022 XML format is not mandatory when transactions are between branches of the same PSP.
- The granting of a signed mandate from the payer to the biller prior to the initiation of DDs a mandate authorising the creditor to collect a payment and instructing the debtor's bank to allow this transaction must be signed by the debtor prior to the commencement of the DD. Mandate forms to be completed by debtors are usually provided directly by creditors. In this respect, the EPC has issued a guidance document containing practical information on how mandate information may be used.¹⁰ There is also the possibility to issue a mandate in electronic form (i.e. e-mandates). The e-mandate solution is based on secure online banking services currently offered by debtor banks. From the creditor's perspective, this solution is expected to fully automate end-to-end processing of mandates (i.e. issuing, amendment and/or cancellation). Moreover, the e-mandate process also allows automatic storage and retrieval of e-mandate data. From the debtor's perspective, the e-mandate limits the inconvenience of printing, signing and mailing a paper form to the creditor. In addition, the debtor can simply rely on the security offered in the online banking procedures he is already familiar with in order to initiate a DD.
- The use of the Creditor-driven Mandate Flow (CMF) model in DD transactions this means that the creditor (and not the bank) is responsible for the storage and ongoing management of DD mandates. An alternative model is the Debtor-driven Mandate Flow (DMF) in which the above responsibilities lie with the debtor's bank. The CMF model was used in a large number of EU Member States in the pre-SEPA era (e.g. Austria, Germany, the Netherlands and Spain) where the frequency of DDs was heightened and was, thus, selected. However, in order to meet the preferences of consumers in countries that used the DMF model, the SDD scheme includes various optional features, such as allowing banks to verify a payer's DD mandates, thereby limiting the likely manifestation of fraudulent direct debit collection.
- The abandonment of multilateral interchange fees to direct debit transactions this is to be achieved by I February 2017 for national payments and has already been achieved for cross-border payments since I November 2012. However, a multilateral interchange fee may be applied to transactions which are rejected, refused, returned, reversed, revoked, or requested to be cancelled, provided that certain conditions are complied with.

¹⁰ See e.g. <u>http://www.europeanpaymentscouncil.eu/index.cfm/knowledge-bank/epc-documents/guidelines-for-the-appearance-of-mandates-in-the-sepa-direct-debit-core-scheme/epc392-08-sdd-mandate-layout-guidelines-v20/.</u>

2.4 Standards used in the UK for euro-denominated transactions prior to SEPA

Prior to the SEPA Regulation, euro-denominated CTs in the UK were conducted using the CHAPS and BACS euro systems for wholesale and retail payments.¹¹ However, following the closure of CHAPS Euro in 2008 and Bacs Euro in 2010, the euro bulk debit clearing became the only domestic euro payment system in Great Britain.¹²

2.4.1 The CHAPS Euro system

The UK's interbank clearing system, the CHAPS (i.e. Clearing House Automated Payment System) RTGS system, was designed for high-value wholesale payments (and therefore beyond the scope of this study). CHAPS offered two separate clearings, one in sterling and another in euro. However, as the Bank of England did not participate as a direct member of TARGET2, CHAPS Euro ceased operations by 16 May 2008, once all of its members had migrated to the TARGET2 platform.¹³

When in operation, users of the CHAPS Euro system made use of SWIFT MT103/202 messages which consisted of five blocks of data.¹⁴ These are:

- the Basic Header Block this field includes information on the sender of the message. It is fixed-length and continuous with no field delimiters;
- the Application Header Block this field includes information on the receiver;
- the User Header Block this is an optional feature;
- the Text Block or body this contains the business content of the message; and
- the Trailer Block this element contains technical details related to communications.

The blocks specify the structure of a SWIFT MT message as can be seen in the following figure:

Figure 2.1: Indicative SWIFT MT message

{1:F010ELBATWWAXXX0975000073}]	Basic header block
{2:I103ABNANL2AXXXXU3003}	٦	Application header block
{3:{113:URGT} {108:INTLPMTS}}	٦	User header block
(4: (CrLf)	٦	
:20:494932/DEV (CrLf)		
:23B:CRED (CrLf)		
:32A:030731EUR1958,47 (CrLf)		
:33B:EUR1958,47 (CrLf)		
:50K:FRANZ HOLZAPFEL GMBH (CrLf)		Text block
VIENNA (CrLf)		
:59:H.F. JANSSEN (CrLf)		
LEDEBOERSTRAAT 27 (CrLf)		
AMSTERDAM (CrLf)		
:70:/INV/ 18042 910412 (CrLf)		
:71A:SHA (CrLf)		
-}		
{5:(MAC:12AB90EF}{CHK:123456789ABC}}	С	Trailer block

Source: SWIFT (2009) "Standards Developer Kit I.0".

¹¹ See ECB (2007) "Payment and securities settlement systems in the European union Volume 2: Non-euro area countries".

¹² See e.g. <u>http://www.chequeandcredit.co.uk/banking-industry/other-clearings/euro-cheque-and-euro-cheque-clearing</u>.

¹³ See BIS (2012) "Payment, clearing and settlement systems in the United Kingdom".

¹⁴ See e.g. <u>https://www.c24tech.com/what-is-swift#seven.</u>

Overall, all SWIFT messages include a three-digit number that denotes the message category, group and type. Take, for instance, MT103. The first digit (1) represents the category, which encompasses all relevant financial instruments or services (e.g. cash transfer, treasury, cash management etc.). The category denoted by I suggests a cash transfer. The second digit (0) represents a group of related parts in a transaction life cycle. The group indicated by 0 is a Financial Institution Transfer. The third digit (3) is the type that denotes the specific message. There are several hundred message types across the categories. The type represented by 3 is a notification.

2.4.2 The Bacs Euro system

The Bacs Euro system was used for euro-denominated retail-oriented CTs and DDs. The Bacs Euro payment system operated in a similar way to its sterling service. This meant that payments submitted to Bacs were subject to a three day clearing and processing cycle. The deadline for the receipt of payment instructions from users was 22:30 on day one of the cycle. Data submitted was validated and sorted into bank order by the central infrastructure to be transmitted onwards to the destination account. The destination bank could be either a paying bank or a receiving bank, depending on whether the transaction was a credit transfer or a direct debit. Processing of input transactions was typically completed within four hours – and always completed by 06:00 on day two and forwarded to the relevant institutions. ¹⁵

Amounts were credited/debited on customer accounts (often overnight in batches) on the morning of day three, which is the value date, resulting in a three day overall clearing and settlement cycle. The calculation of the multilateral net settlement figures was communicated at 09:30 on day three to the Bank of England for final settlement.

Bacs uses a proprietary messaging format known as Standard 18.¹⁶ This format has limited fixed character length fields which restrict the amount of information that can be provided. Standard 18 contains two formats for data records:

- Bacs input this format is used by banks and their customers, to send payment data to Bacs by electronic transfer, or other means. After initial validation, the data is forwarded to the relevant bank(s) using Bacs output format. The Bacs input format can be either 100 or 106 bytes. The additional six bytes are used to specify individual processing dates within Bacs.
- Bacs output this format is always 120 bytes. The additional 20 bytes (relative to the 100 bytes limit of Bacs input) contain fields that provide additional information: Error Code, Bacs User Number and Bacs Reference (a unique reference for each payment used by Bacs for query purposes).

The file layout for Bacs messages must be provided in ASCII format (i.e. text file), with each Bacs instruction on a different line. The format is fixed width, without any character separating individual fields which need to be filled mandatorily. Each file is made up of one or more Bacs instruction records followed by a single "CONTRA" record specifying the total amount to be credited to the outbound company's account.¹⁷

¹⁵ See BIS (2012) "Payment, clearing and settlement systems in the United Kingdom",

¹⁶ See Bacs Ltd (2012) "Bacs.ip user guide: A comprehensive guide to Bacs.ip" and KPMG (2014) "UK payments infrastructure: exploring opportunities".

¹⁷ A "CONTRA" record indicates how much in total should be debited (ACH Credit file) or credited (Direct Debit file) to the originator's account and what reference will be printed on the originator's statement.

An example of a file layout is presented below:

Figure 2.2: Indicative Bacs file layout

VOL1 HDR1A6655775	00010001	665577 13197 132270000000	1	
HDR2F		00		
UHL1 1319999999	000000001 DAILY 00	1		
776678786655770997	9-80-78901234/0D50000	0189847TEST COMPANY	5/88778877-KNO	JUDITH KNOTT
667799665677980997	9-80-78901234/3EA0000	0125967TEST COMPANY		JOHN SMITH
6778886778383209979	9-80-78901234/9620000	0200713TEST COMPANY	HHAHDH88991	MEGAN STOKES
5273577424626509979	9-80-78901234/6240000	0118667TEST COMPANY		ALICE WALKER
7980817890123401779	9808178901234 0000	0635194	CONTRA	TEST COMPANY
EOF1A6655775	00010001	13197 132270000000		
EOF2F		00		
UTL100000063519400	000000635194000000100	00004		

Source: https://community.intuit.com/articles/1192026-bacs-file-layouts-uk-only

- The top four rows contain system generated details such as the SUN (Service User Number) detail.
- The body of the file then contains the following details:
 - characters I-6 of row 5 The destination sort code
 - characters 7-14 of row 5 The destination account number
 - characters 15-17 of row 5 System generated transaction code details
 - characters 18-23 of row 5 Outbound sort code (the sort code of the account from which a monetary sum is to be transferred.
 - characters 24-31 of row 5 Outbound account number (the number of the account from which a monetary sum is to be transferred.
 - characters 32-35 of row 5 The system generated real time information (RTI) hash number.¹⁸
 - characters 36-46 of row 5 The amount being credited (the net pay amount) expressed in pence (i.e. €1,898.47)
 - characters 47-64 of row 5 The outbound company name
 - characters 65-82 of row 5 Detail of any destination building society reference/roll number as held on the employee record file.
 - characters 83-100 of row 5 The destination account name.

The bottom rows of data are system generated rows of data required as part of the standard 18 file presentation, including the "CONTRA" record.

¹⁸ Whenever a reported payment is made directly into an individual's bank account via the Bacs system, using an allocated Bacs Service User Number (SUN), the RTI return must include a hash cross reference. This is often simply referred to as the "hash". See e.g. HMRC (2012) "Pay As You Earn (PAYE) Real Time Information (RTI): The Hash Cross Reference Process & Bacs Payments".

2.4.3 The euro bulk debit clearing

Following the closure of Bacs Euro in 2010, the euro bulk debit clearing, managed by Cheque and Credit Clearing Company (C&CCC), became the only domestic euro payment system in Great Britain.¹⁹ This system accounts for presenting and exchanging euro-denominated cheques drawn on a UK account between its members²⁰ and their branches in order to transfer funds to named accounts.²¹ It therefore should be noted at this stage that the C&CCC is not a fully-fledged euro bulk debit clearing system, but rather the closest thing to such currently operating in the UK.

The C&CCC system processes paper debit items (i.e. cheques) and credit items (i.e. bank giro credit transfers).²² C&CCC processes sterling, euro, as well as US dollar debits.

The clearing process for debit items lasts over a period of three days. More specifically, the beneficiary pays the cheque into his bank account and the bank then passes it through the euro cheque clearing system to the drawer's bank which, in turn, debits the funds from the drawer's account. The clearing process for credit items is of a similar nature.²³

Settlement occurs on a multilateral net settlement basis. The SWIFT MT messaging standard is used by C&CCC to transmit information on the multilateral net settlement figures for final settlement.²⁴ In order to settle payments, an account at a commercial bank is used.

¹⁹ The Cheque and Credit Clearing Company is the non-profit industry body managing the cheque clearing system in the UK. C&CCC is not a recognised interbank payment system under the Banking Act 2009.

²⁰ A complete list of members can be found at <u>http://www.chequeandcredit.co.uk/banking-industry/participate-system/our-members</u>

²¹ See Essvale Corporation LTD (2007) "Business Knowledge for It in Retail Banking: The Complete Handbook for IT Professionals".

²² A bank giro credit (BGC) is a standardised paper form specifying the name and account details of an organisation or business. When the form is completed by a customer and handed/posted to a bank with cash or a cheque, it acts as an instruction to that bank to pay the specified sum of money to the organisation or business whose bank details are printed on the bank giro credit.

²³ See BIS (2012) "Payment, clearing and settlement systems in the United Kingdom".

²⁴ See KPMG (2014) "UK Payments Infrastructure: Exploring Opportunities".

2.5 The ISO 20022 XML standard

ISO 20022 XML is an international standard developed by the International Organization for Standardization (ISO) to facilitate electronic data interchange between financial institutions.

To date, the adoption of ISO 20022 XML has not only been seen in Europe, but also more widely across the globe, both in the context of payments and in other contexts (as described in Section 2.5.5). Figure 2.3 below shows the extent of adoption of ISO 20022 in the specific context of payments.



Figure 2.3: Global adoption of ISO 20022 in the context of payments

ISO 20022 XML describes a metadata repository containing descriptions of messages and business processes, and a maintenance process for the repository content. The metadata is transformed into the syntax of messages used in financial networks, with XML Schema being one such syntax.

Setting aside the XML syntax, ISO 20022 is the successor to ISO 15022 and was originally called ISO 15022 2nd Edition. As aforementioned, the SEPA project involves the use of the ISO 20022 XML standard for all euro-denominated CTs and DDs in Europe.

Therefore, the aim of this section is to present the ISO 20022 XML standard along the following dimensions:

- an overview of ISO 20022 XML;
- key functions of ISO 20022 XML;
- the XML format;
- the process of mapping ISO 20022 XML to other standards; and
- other uses of ISO 20022 XML beyond payments.

2.5.1 Overview of ISO 20022 XML

ISO 20022 XML is a methodology for defining financial messages and covers both the content and the format of a financial transaction or service. More specifically, this method is based on the concept of separate layers:

• The top layer provides the key business processes and concepts: this is the definition of the activity or business process, the business roles and actors involved in that activity and the business information needed in order for the activity to occur. For instance, in the case of a CT, this would involve

Source: ISO 20022 Introduction maps, available at: https://www.iso20022.org/adoption.page.

information such as the creditor, the debtor, the creditor agent (i.e. the bank of the creditor), the debtor agent, and the payment itself.

- The middle layer provides logical messages or message models: a logical message is a description of all the information that is needed to perform a specific business activity, independent of format. It is composed of message components organised in a hierarchical structure.
- The bottom layer deals with the format (or more formally, syntax): ISO 20022 uses XML as the primary syntax and specifies how to convert a message model to XML. The message format description is contained in an XML structure which is machine readable, so implementation of new messages, or changes to existing messages, requires less manual effort. In this respect, ISO 20022 XML schemas provide a high level of business validation, reducing the risk of sending or receiving incorrect data (See also Section 2.5.3).

2.5.2 Key functions

ISO 20022 XML is a multipart standard that describes a common platform for the development of standardised messages using:

- a modelling methodology based on UML²⁵ which is syntax-independent;
- a central dictionary of business terms used in communications between financial institutions; and
- a set of XML design rules to convert the messages described in UML into XML schemas.

ISO 20022 XML realises end-to-end processing across domains and geographies that currently use vastly different standards and information formats. In particular, ISO 20022 XML messages are available for the complete end-to-end payments chain, including:

- customer-to-bank (payment);
- bank-to-bank (payment, clearing and settlement); and
- reporting (cash management).

The ability to map different messaging standards (see Section 2.5.4) is an important aspect of interoperability as it allows the execution of a business process by various counterparts with different levels of automation. All of the content is stored in a common repository. A data dictionary forms part of this repository, listing:

- the name of a component;
- its structure (with references to subcomponents that may be described elsewhere in the dictionary); and
- the definition/interpretation of the component.

ISO 20022 XML standardises such components across all messages used in the financial industry, aiming to enhance transparency. The modelling methodology decouples the business rules from the format of the physical message being exchanged.²⁶

More specifically, in the ISO context, the standard describes the agreement on what information is expressed, while the syntax is the format or the language used to express that information. A message

²⁵ The Unified Modelling Language (UML) is a general-purpose modelling language in the field of software engineering that is intended to provide a standard way to visualise the design of a system.

²⁶ This is due to models evolving to meet changing business needs while message formats evolve to take advantage of the latest technological innovations, thus increasing efficiency.

definition provides a clear classification of the information and data formats (field lengths, codes, character sets) that can be exchanged between parties and can be looked at logically.

These logical definitions can be mapped to the business definitions defined in ISO 20022. Although ISO does not dictate the syntax of the messages, XML is the most widely used syntax for message specifications, and XML message schemas are derived from the ISO UML message models.

2.5.3 The XML format

In ISO 20022, the most widely used syntax is eXtensible Mark-up Language (XML). XML is one of the most popular syntaxes to encode messages electronically on the Internet. It is an international open standard, which means that a wide variety of XML editing, document management, validation, and other tools are available. These tools lower the costs of message validation and integration in back-office systems.²⁷

ISO 20022 has specified how to convert a message model to XML as, in particular business domains, a message could be expressed in a syntax different from XML, such as the SWIFT proprietary syntax or the FIX syntax.

An XML schema sets out the permitted structure for an XML message. It defines, amongst other things:

- which elements are allowed in a document;
- the order in which they should appear; and
- which are mandatory and which are optional.

XML schemas can be used by a computer to check whether a message conforms to the XML requirements (and can therefore be read) or not. The ISO 20022 methodology describes how to generate an XML schema from a logical message definition, whereas for messages that will use the XML syntax, XML schemas are provided to define formally the structure of all ISO 20022 XML messages.

XML uses tags set between angled brackets to identify items of information. Each data item is enclosed by a pair of opening and closing tags. The combination of opening and closing tags and the data they contain is called an element. Elements can contain other elements, to group related information together. For example, under XML syntax, the address "53 Chancery Lane, London", would be of the form:

```
<address>

<number>53</number>

<street>Chancery Lane

Street>

<city>London</city>
```

Overall, the use of XML brings significant benefits to ISO 20022. More specifically, the file corresponding to an XML schema is machine readable. This means that implementing new messages, or changing existing messages, requires less effort. It also facilitates manipulation of messages by most modern software, including mapping the information to other formats and standards (see also section 2.5.4).

However there is a trade-off as XML is sometimes criticised for being more verbose than other syntaxes. This may reduce the efficiency of message transmissions and increase storage requirements.²⁸ To overcome

²⁷ See ISO (2004) "ISO 20022 for dummies".

²⁸ See ISO (2004) "ISO 20022 for dummies".

this problem, compression tools could be used, lessening its impact on users in need of a more efficient syntax (e.g. in trade messages for securities exchanges, where microseconds matter).

2.5.4 ISO mapping

Although ISO messages can be used for message exchanges between the sender and receiver of a message both between and within financial institutions, it may be that a mapping from ISO to other message formats or to an internal data store is required at some point.

The process for the data mapping exercise maps the source (i.e. ISO 20022 XML) data elements to the target. The high-level steps²⁹ in the data mapping procedure are:

- data mediation between two sources (ISO message and the transactional system data model), either directly, or indirectly using a mediating data model; and
- data analysis to identify possible relationships.

Data mediation

The first step for the data mapping process is the data mediation stage. This involves mapping from internal data sources in transactional systems to ISO messages. When the data mapping is indirect using a mediating data model (e.g. InfoSphere Data Architect), the process is also called data mediation. During the mediation stage, major data sources must be identified. Input data is referred to as *data sources*. The aim is to map the data to the appropriate ISO XML message elements.

If there is an existing data warehouse, that would suggest that the sources are known and the mediation process may not need anything beyond that. However, there may exist cases where the sources are not known and need to be identified. There may also exist scenarios where the data model needs revision. In the latter case, if changing the data model is not possible, a data wrapping layer could be considered as an option where the data sources are aggregated into a single layer.

The following figure illustrates the data mediation process between two entities, where the mediation data model that will facilitate the data mapping between the ISO messages and the transactional system has been identified and modelled.

Figure 2.4: Data mediation



Source: IBM (2013) "Implement ISO 20022 payment initiation messages in a payment processing solution".

In this example, the data destination is the "Payment Instruction" entity, where all key data attributes are defined. A relationship between two entities demonstrates a flow during the data mediation step. Each data set is represented as a single data entity. The "ISO Message Document" entity contains the XML message header "Payment Group Message ID" and the "XML document payload". The "Payment Instruction" data entity contains data attributes defined in the transactional system that is used for payment processes.

²⁹ See IBM (2013) "Implement ISO 20022 payment initiation messages in a payment processing solution".

The incoming XML message may contain multiple transactions within the XML payload. Therefore there can exist a "0 or 1 to many" relationship with the "Payment Instruction" entity. The '0' covers a case when the message validation failed and resulted in no Payment Instruction defined in the incoming XML message. In such cases, manual intervention may be required as a decision needs to be made on which fields should be stored as a single attribute (e.g. "Message Identifier", "Number of Transactions", and the group message header "Payment Group Message ID" in the figure above).

Data relationships

The purpose of this task is to identify the relationships between the mediation data model and the ISO messages, thus establishing the foundation from which data mapping will progress. There may exist variations in the type or structure of the data entities (i.e. structural variations). Different types typically have common but also different additional attributes. During this stage, the following steps are required:

- identification of data types, including data transformation;
- identification of variations in structure;
- identification of commonality across structural variations; and
- identification of meta-model based on variations in structure.

If the source and destination data types do not match, transformation logic needs to be implemented. This should also include validation rules based on the ISO message schema. Examples could be different string length, pre-defined string values etc.

2.5.5 Other uses of ISO 20022 XML

Apart from payments, the ISO 20022 XML standard may also be used by:

- investment funds;
- securities clearing/settlement and corporate actions; and
- trading.

Below, these are presented in more detail.³⁰

Investment Funds

ISO 20022 XML messages may also be used by investment for:

- orders;
- transfers;
- reconciliation;
- price reporting; and
- fund cash forecast reports.

Messages are also available for hedge funds and fund processing passport (FPP) information. The main driver for using ISO 20022 XML, or similar messaging standards, in this business area is the desire to eliminate fax or e-mail communication and manual processes, thus facilitating STP.

Securities clearing/settlement and corporate actions

Over recent years both new and existing global/regional market infrastructures (MIs) have chosen ISO 20022 XML to facilitate the clearing and settlement of securities and other instruments.³¹ As a result, many

³⁰ See ISO (2004) "ISO 20022 for dummies".

players affected by these changes are planning to implement, or have already implemented, the ISO 20022 XML standard before the scheduled live dates of the MIs, to ensure that they are ready.

Another important factor in the adoption of ISO 20022 XML in the securities industry is the Giovannini Protocol, which aims to harmonise the clearing and settlement of securities in Europe.³² This is achieved by eliminating several barriers to cross-border processing. One of these barriers is the different standards and communication protocols used for accessing Central Securities Depositories (CSD). The industry has specified that CSDs should support the use of ISO messages (ISO I5022 and ISO 20022) in an interoperable way) for the clearing and settlement of European cross-border securities transactions.

Similarly, the asset servicing business is currently seeking to automate the generation of corporate action information. The basic functionality will be covered by both standards (i.e. ISO 15022 and ISO 20022 XML), while additional functionality (e.g. proxy voting) is only available in ISO 20022 XML.

Trading

In the trading space, there are currently 50 ISO 20022 XML messages used by financial institutions to communicate with the Trade Services Utility (TSU). The TSU is a collaborative centralised matching utility designed to help banks to provide enhanced financing services for open account settlement.³³ The service is available between banks and is designed to allow a more effective integration with corporate customers and technology providers.

2.6 Potential future developments

As part of the SEPA Regulation, global and regional banks operating in euro have already invested in ISO 20022 XML to support their activities. However, beyond the SEPA-induced adoption effects, there is a broader momentum towards ISO 20022 XML from current messaging standards. More specifically:

- TARGET2 and T2S mandate the move to ISO 20022 XML by 2017 for high value payments and securities settlement.³⁴
- As part of EMIR,³⁵ trade repositories (TRs) will need to implement ISO 20022 XML message formats when providing data to European national competent authorities (NCAs), the European Securities and Markets Authority (ESMA) and the Agency for Cooperation of Energy Regulators.³⁶
- Considering the EMIR mandate to report to NCAs in ISO 20022 XML form, within the context of MiFID II/MiFIR,³⁷ ISO 20022 XML is also expected to be applied to:³⁸
 - reference data for all financial instruments traded or admitted to trading on trading venues;
 - transparency data information for equities and non-equity instruments;
 - transaction data, in the scope of the regulation;

³² See<u>http://ec.europa.eu/internal_market/financial-markets/docs/cesame/giovannini/swift_protocol_en.pdf</u>

³¹ TARGET2-Securities, the Japanese central securities depository, Clearstream, Euroclear and Depository Trust and Clearing Corporation (DTCC) have either already adopted or are expected to adopt the ISO 20022 standard.

³³ See <u>http://www.gtreview.com/news/global/trade-services-the-trade-services-utility-tsu/</u>

³⁴ See <u>https://www.ecb.europa.eu/paym/t2/shared/pdf/professionals/ISO_20022_strategy.pdf?5bf114e926af16c560b002a2a010cd70</u>

³⁵ EMIR is the European Market Infrastructure Regulation which aims to ensure more stability, transparency and efficiency in derivatives markets.

³⁶ See ESMA (2016) "Draft technical standards on access to data and aggregation and comparison of data across TR Article 81 of EMIR".

³⁷ MiFID II (the Directive on Markets in Financial Instruments repealing Directive) is a revised version of the original MiFID directive, which aims to improve the competitiveness of EU financial markets and ensure a high degree of investor protection. Part of the MiFID II is the newly developed Regulation on Markets in Financial Instruments (MiFIR).

³⁸ See ESMA (2015) "Draft Regulatory and Implementing Technical Standards MiFID II/MiFIR".

- weekly reporting of positions in commodity derivatives;
- data on volumes of trading of equity instruments for the purpose of the volume cap mechanism; and
- derivatives transactions data stored by the trade repositories.
- Regarding SFTR adoption,³⁹ both the European Central Bank (ECB Money Market Statistical Reporting Regulation (MMSR)) and the Bank of England (Sterling money market data collection) have committed to the use of the ISO 20022 XML syntax for reporting requirements.⁴⁰

The above suggest the existence of an ISO 20022 XML adoption trend starting with TRs and NCAs for EMIR, and eventually impacting reporting counterparties under MiFIR and SFTR. Whilst the journey of ISO 20022 XML only begun in 2003, there has been notable progress in terms of harmonisation, coverage and adoption. In the UK as well, the adoption of ISO 20022 XML for all transactions has also been supported by the Payments Strategy Forum. Overall, such outcomes indicate a drive towards a single payment standard used globally by any corporate, irrespective of currency, size, sector or servicing bank.

³⁹ SFTR is the Securities Financing Transactions Regulation which is being adopted in the EU to increase the transparency of securities financing transactions (SFTs), e.g. repos, and their reuse.

⁴⁰ See ESMA (2016) "Draft RTS and ITS under SFTR".

3 Migration costs

The costs of migration to ISO 20022 in SEPA are considered in two main streams. The direct costs incurred in undertaking the migration process itself, and the indirect costs that may arise as a result of the migration, either during the migration process itself or following migration. This section focuses on the direct costs of migration.

The migration process encompasses a number of different stages, as well as a number of different market participants at each of the stages along the migration process. The direct costs are considered in terms of the chronology of the migration process, drawing out the impacted parties at each stage. Where relevant, this section indicates where the costs described relate specifically to the migration to ISO 20022 and where the costs relate to SEPA regulation more broadly.

3.1 Costs of industry migration planning, communication and monitoring

The first phase of the migration process is the planning phase. This can be a significant cost, both in terms of time and resources required, drawing on economic, legal, technical and operational resources. The implementation process and the role of coordinating bodies in that process is considered in more detail in Section 6. Here we focus on drawing out the costs associated with this.

3.1.1 Development and implementation of national migration plans

The planning phase required close communication between the coordinating bodies and key industry stakeholders, including central infrastructure providers, scheme operators, and major PSPs. This typically involved the coordinating body establishing a steering committee/forum, often supported by a number of working groups focused on specific aspects of the migration, and with the coordinating body providing secretariat services.

Decisions made at this stage would include the type of migration model to adopt, such as, a phased migration model or a big bang approach, as well as the use of any transitional arrangements during the migration process, and the relevant timeframes and key milestones for the migration process. Decisions would also need to be made on how to map the existing legacy standards onto the new ISO 20022 XML standard. This would require the development of various ISO 20022 XML messages that are able to replicate what is offered by the current legacy standards.

Once a migration plan was agreed upon, the coordinating body/steering committee published a national migration plan. In addition to this, coordinating bodies were also likely to produce and circulate harmonised and consistent implementation guidelines for various types of market participants. This included both technical/legal documentation and supporting guidance to ensure that all affected parties were aware of the legal requirements they faced and the specific practical implications for their business. The coordinating bodies also developed documentation about the new messaging standard and how it is mapped from the legacy standards, as well as the accompanying business rules to ensure consistent interpretations of that standard. This documentation was made freely and publicly available to ensure a smooth and consistent implementation process.

The details of the migration plan that were determined at this phase could obviously have had important implications for the costs incurred in the migration process, both direct and indirect. For example, the length of period for adoption could have had important implications for the availability of relevant

resources (e.g. due to the possibility of resource bottlenecks) and for the likelihood of system instability in the transitional period. The rest of this section will draw out, where relevant, how the specifics of the migration plan may have affected the incidence and/or materiality of certain direct and indirect costs of the migration process.

3.1.2 Communication to relevant stakeholders

Communication of the requirements of the SEPA Regulation, and the national migration plans developed to incorporate these requirements, was the responsibility of the national coordinating bodies and the associated steering committee. In some cases, a specific working group was developed to oversee the communication process, such as in France, where a working group was given the responsibility of organising a series of national communication initiatives. This included a series of scheduled information sessions across different areas of France, particularly targeted at SMEs, to promote understanding of the legal obligations of the SEPA Regulation and practical advice on how affected stakeholders should comply with them. In order to ensure consistent messages, these scheduled information sessions were underpinned by a common set of documentation developed by the coordinating body.

Interview evidence suggested that, of the affected stakeholder groups, SMEs were typically the most difficult stakeholders to reach out to and incentivise to make the necessary changes to become SEPA compliant, especially given their resource constraints and the perceived low priority of SEPA adoption. In some cases, it may have even been quite difficult to identify all the SMEs to reach out to in the first place. Therefore, as well as through more general communication on their website and scheduled information sessions, coordinating bodies needed to reach out to relevant trade associations and technology suppliers to target the SMEs affected by the regulation, which were difficult to contact directly. The process of reaching out to SMEs and encouraging their participation was therefore seen as a particularly resource intensive part of the communication strategy.⁴¹

3.1.3 Monitoring

Progress on the migration was regularly monitored by coordinating bodies and, in particular, the associated steering committees. The extent of these monitoring costs would have been dependent on the frequency, granularity and form of monitoring undertaken.

This monitoring was in some cases undertaken with the use of a periodic harmonised survey of relevant associations which collectively represent a large number of domestic corporates, to ascertain the degree of private sector readiness and collect data on the adoption of SEPA Credit Transfer and SEPA Direct Debit. Sometimes trade associations conducted their own surveys, but these were not always comparable with those of other trade associations, which made reconciliation of the findings difficult.

The coordinating bodies also produced updated versions of the migration plan during the migration process. France, for example, released its first migration plan in 2006, its second migration plan the following year (2007) and its third migration plan in 2012. In this example, the first version contained details on the range of SEPA payment instruments and details of the migration plan; the second version contained updated elements, details of payment instruments not covered by the EPC work and an updated migration timetable; and the third version sets out the instruments that will need to be replaced by SEPA payment instruments and the initiatives put in place to ensure the success of the migration.

The updated SEPA migration plans also included the latest migration figures for both SEPA Credit Transfer and SEPA Direct Debit, in terms of the uptake of SEPA as a percentage of total credit transfers and direct debits respectively. This information had to be reported to the European Central Bank on a regular basis.

⁴¹ See e.g. <u>http://www.europeanpaymentscouncil.eu/index.cfm/newsletter/article/?articles_uuid=ABA6EE62-5056-B741-DB85DFDC569B6CF6</u>.

3.2 Organisation-specific migration costs

In this section, we consider the migration costs faced by individual organisations, both PSPs and PSUs. This includes both the one-off migration costs and the ongoing costs associated with the migration. With regard to the ongoing costs, the key issue is whether these ongoing costs are materially different to what the business-as-usual ongoing costs would have been.

The analysis of organisation-specific migration costs is broken down into the following areas:

- Systems analysis costs this includes both internal, and external (consultancy) costs (e.g. IT specialists and systems analysts), of developing, implementing and executing the migration process.
- Systems costs this includes the cost of purchasing and implementing new, or upgrading existing, payment systems, communication interfaces and storage systems.
- Internal change costs this includes planning, reorganising internal structures, training, regulatory compliance and administrative costs.
- External costs this includes the time spent on technical interface alignments, testing and commercial negotiations with external partners.
- Broader SEPA related costs this include the costs associated with the adoption of IBAN and BIC, as well as the costs of the SDD mandate requirements.

Each of these cost categories are considered in turn, after first setting out two key types of approach to migration. After presenting these costs qualitatively, we conclude by presenting the quantitative costs across all these categories, on both a one-off and ongoing basis, and draw conclusions on the cost drivers.

3.2.1 Migration strategies

The costs incurred by organisations in adopting the ISO 20022 XML messaging standard are to a considerable extent dependent upon the precise migration strategy adopted. Broadly this divides into two possible strategies:

- use of conversion services; or
- update of internal systems.

The reason that these different approaches can be adopted is that, while the SEPA Regulation states that the ISO 20022 XML standard is to be used for message formats in the interbank space and for PSUs sending or receiving bundled payments, it does not specify how this requirement should be met and neither does it specify an end-to-end use of the standard *inside* the technical infrastructure of each organisation. Therefore, one option would be for an organisation to become ISO 20022 XML compliant, by making its own internal systems ISO 20022 XML compliant and, as result, any payment messages that are exchanged between it and other PSPs or PSUs ISO 20022 XML compliant also. An alternative, and equally acceptable, approach as far as the regulation is concerned, is for the organisation to make use of conversion (translation) services to map its existing message formats into the ISO 20022 XML format, while the technical infrastructure continues to operate on the legacy message formats. These conversion services can be used both to translate incoming ISO 20022 XML into legacy formats and translate outgoing messages into the ISO 20022 XML messaging standard.

These two possible strategies – use of conversion services or update of internal systems – are of course not mutually exclusive. An organisation may, for example, have chosen to use conversion services on a temporary basis and then update internal systems at a later stage. Indeed, interview evidence suggested that conversion services were often used by corporates who needed to be compliant in time for the regulation deadline, and did not have time for a more fundamental update of internal systems. The interview evidence went on to suggest that, once compliant with the regulation, the corporates could then, in their own time, consider the business case for (and, if justified, implement) the update of their internal systems.

Table 3.1 below shows the percentage of respondents who adopted these core implementation methods, i.e. updating internal systems and use of conversion services. For both SDD and SCT, around 75 per cent of responses indicated updates to internal systems, while less than one-fifth indicated the use of conversion services. The survey data also shows that those who made use of conversion services for one payment type, i.e. SDD or SCT, did not necessarily make use of conversion services for the other payment type. The same pattern persists when decomposing responses across schemes into those provided by PSPs and PSUs. Noticeably, all of the PSUs surveyed, who were primarily large PSUs, indicated updates to internal systems for both SDD and SCT. These figures should not, however, be seen as reflective of the overall population of PSUs, as it was apparent from interviews with PSPs that many of their smaller PSU customers made intensive use of conversion services (as discussed later in this section). This dichotomy between the PSU survey responses and PSP interview responses can be attributed to the under-representation of smaller PSUs in the survey sample.

Implementation method	SDD % all responses	SDD % PSP responses	SDD % PSU responses	SCT % all responses	SCT % PSP responses	SCT %PSU responses
Updating internal systems	75%	67%	91%	77%	68%	92%
Use of conversion services	13%	14%	9%	14%	18%	8%
Other	13%	19%	0%	9 %	14%	0%

Table 3.1: Implementation methods adopted

Source: Europe Economics' analysis based on 24 respondents.

For those who specified 'other', this was not reflective of the fact that they had neither updated internal systems nor made use of conversion services, but rather that they had done something else *in addition to* either updating internal systems or making use of conversion services. One additional method that was mentioned in this regard was the use of systems integration services. This describes a broader package of services offered to clients to help manage the entire process of adapting to complex system integration challenges, including requirements planning, architecture design, programme management, deployment and testing, and as such represents a more comprehensive migration package comprising all key cost categories (namely systems analysis costs, systems costs, internal change costs and external costs).

We consider each of these two main strategies in more detail below.

Use of conversion services

Data manipulation via conversion services ensures technical interoperability between legacy formats and the ISO 20022 XML format. Conversion services simply perform the function of translating one message format, say SWIFT MT 103, into another, say ISO 20022 XML. The use of conversion services therefore allows organisations to continue using non-XML formats in-house or, more in general, non-ISO 20022 messaging standards. As mentioned above, such conversion services were sometimes used by organisations on a one-off transitional basis (prior to updating internal systems), or in other cases on a more permanent basis.

Table 3.2 below shows that of those respondents who made use of conversion services, a considerable majority (two-thirds) continue to do so.

Table 3.2: Use of conversion services

Use of conversion services	Percentage of respondents
Yes – temporary	33%
Yes – currently ongoing	67%

Source: Europe Economics' analysis based on 9 respondents who made use of conversion services.

The first stage of this process involved the mapping of legacy standards to the ISO 20022 XML messaging format. This involved engagement of central co-ordination bodies with PSPs and payments aggregators to ensure that the mapping was done consistently. Once this mapping had been determined, conversion services were developed to translate from the legacy standard to the ISO 20022 XML standard.

Importantly, conversion services can allow for a period of co-existence between the new ISO 20022 XML messaging standard and legacy standards, which helps to ensure that all PSPs and PSUs can continue to send and receive payments while the complex migration process takes place.

In some cases, organisations opted for the use of conversion services over making their own internal systems ISO 20022 XML compliant, as the business case for the former was stronger. Survey evidence suggests that conversion services were used in this way by both PSPs and PSUs. In other cases, PSUs were isolated from these changes where they made use of payment aggregators, who process payment transactions on their behalf.

When asked whether the use of middleware helped to mitigate the migration costs, two-thirds of respondents who made/are making use of conversion services said that it had done, while less than quarter per cent said that it had increased costs (see Table 3.3 below).⁴² Views were largely comparable across PSPs and PSUs. Interview evidence emphasised the use of middleware as a means of meeting PSPs and PSUs' desire to insulate themselves from more fundamental changes to their internal systems, and thus significantly reduce their migration costs. This was a common theme emerging from interviews with all different stakeholder types, with some PSPs stating that the use of middleware has been of significant benefit to their smaller business and corporate banking customers.

Table 3.3: Ability of conversion services to mitigate migration costs

Impact of conversion services on migration costs	Percentage of respondents
Significantly mitigates migration costs	33%
Slightly mitigates migration costs	33%
No effect	11%
Increases migration costs	22%

Source: Europe Economics' analysis based on 9 respondents who made use of conversion services.

Those who preferred using conversion services rather than updating their own internal systems cited a number of reasons for doing so:

- Updates to internal systems would have imposed significant one-off costs, particularly where existing internal systems are highly integrated with other back-office systems within the organisation.
- Updates to internal systems were considered disproportionately burdensome for those with limited volumes of euro-denominated direct debits and credit transfers, as they would not have exhibited sufficient economies of scale to justify the one-off fixed costs. This would have likely included Eurozone SMEs, and PSUs more broadly in non-Eurozone SEPA countries.
- Updates to internal systems would have required writing-off certain sunk (tangible and intangible) investments in current systems which had not yet been fully depreciated and amortised, and thus would have exacerbated the one-off migration costs.
- Updates to internal systems were considered to create significant risks in the transitional phase, which may have led to payment delays and customer dissatisfaction.

Other benefits of conversion services cited are:

• The use of conversion services allows for a uniform adoption among parties who would otherwise have significantly different speeds of implementation, thus enabling all parties to meet regulatory end dates.

⁴² As discussed later in this section, the survey evidence suggests that where the use of conversion services was only on a temporary basis, these costs were less than 25 per cent of the total SEPA migration costs.

• The use of conversion services allows organisations to operate business as usual while testing the implementation of any updated internal systems, thus avoiding down-time for end-users.

Therefore, for the reasons provided above, many organisations found it financially favourable to make use of conversion services. While this is not reflected by the percentage of respondents who made use of conversion services in Table 3.1 above (which were 13 per cent and 14 per cent for SDD and SCT respectively), this was nevertheless apparent from the interviews with PSPs, who suggested that many of their corporate clients had made use of such services. The likely reason for this apparent disconnect is that those corporates who responded to the survey were typically larger, more international corporates who are likely to have had a stronger preference for updating internal systems. As the interviews suggested, conversion services were typically favoured by smaller corporates (and PSPs). These services were attainable from banks or specialist third party vendors or, in other cases, developed in-house.⁴³

While some organisations opted to make use of conversion services on an ongoing basis, others chose to make use of the conversion services for a limited period. Interview evidence suggested that in some cases this was to delay updates to internal systems until existing internal systems were in need of renewal, or until a feasible plan for updating their internal systems had been developed (post the regulation deadline). Our survey evidence suggests that where the use of conversion services was only on a temporary basis, these costs were less than 25 per cent of the total SEPA migration costs.

However, while the use of conversion services may have been financially attractive, some earlier commentary had suggested that the use of conversion services may also have imposed risks and limited the potential benefits of using the ISO 20022 XML messaging standard. This is discussed in more detail in section 4.3, when considering the indirect costs of migration.

Update of internal systems

This would involve organisations updating their core internal systems for payments such that they are capable of sending and receiving messages in the ISO 20022 XML format, which is a richer format than most legacy formats.

Although acting as a trigger, some interview evidence suggested that updates to internal systems may not purely have reflected the need to become SEPA compliant but also the need to future proof payment systems, given long system lifecycles, against expected payment industry developments.

The attractiveness of updating internal systems, as opposed to using conversion services, appears to have varied across different types of stakeholders. Interview evidence suggests that, in the case of PSPs and corporates with multinational operations, updates to internal systems may have been more attractive as it provided them with the opportunity to centralise their payments infrastructure and rationalise their payment accounts in one location within SEPA. For these organisations, the migration costs do not purely reflect a cost of complying with the SEPA Regulation (as this could have been achieved by updating systems at each existing location), but rather a conscious decision to incur additional upfront costs in order to make their payments infrastructure more efficient in the long-run (see Section 5.2.2 for more details). Before the SEPA Regulation came in such consolidation and rationalisation would not have been possible, as there was no tool for cross-border direct debit or credit transfer.⁴⁴

In terms of the choice of how to update internal systems, there are broadly three key approaches that an organisation could have adopted to become ISO 20022 XML compliant:

• Upgrading existing payment application using proprietary software.

⁴³ In Nordic countries, banks did not see data conversion as their main business and, therefore, instead engaged in a programme of educating third party middleware software providers, who then sold their middleware services to corporates. This meant that the banks could then receive messages from their corporates in the ISO 20022 XML form and, therefore, did not need to significantly engage in data conversion themselves.

⁴⁴ Please see Section 5.1 for a discussion of what was done prior to cross-border CT and DD were possible.

- Upgrading existing payment application using an external package.
- Buying and implementing a fully new processing package adapted to SEPA and ISO 20022.

Table 3.4 below shows survey responses on the frequency of use of different methods for updating internal systems. The data shows that the most common method for updating internal systems was to upgrade an existing application using proprietary software. The next most frequent solution was to buy and implement a fully new processing solution that was already SEPA and ISO 20022 compliant, although the results show this to be significantly more common across PSPs. The same pattern persists within PSPs. Noticeably, for PSUs, the second most common method was to upgrade an existing application using an external package.

Implementation	SDD	SDD	SDD	SCT	SCT	SCT
method	% all	% PSP	% PSU	% all	% PSP	%PSU
	responses	responses	responses	responses	responses	responses
Upgrade existing application – proprietary software	58%	50%	70%	56%	53%	58%
Upgrade existing application – external package	17%	14%	20%	15%	7%	25%
Buy and implement fully new processing package adapted to SEPA and ISO 20022	25%	36%	10%	30%	40%	17%

Table 3.4: Metho	d of updating	internal s	ystems
------------------	---------------	------------	--------

Source: Europe Economics' analysis based on 23 respondents.

Interview evidence suggested that the choice depended on a number of factors, including: the availability of in-house expertise; the age of legacy systems; and the bespoke nature of existing systems. For example, the decision to upgrade, over buying and implementing a new package, may have been more attractive to those who have only recently upgraded their payment applications and, therefore, do not want to replace this with an entirely new package and by doing so write-off the recent investments made in the existing payment application. As another example, the choice between using proprietary software and using an external package may have, in part, been dependent on whether the organisation had sufficient in-house expertise to develop proprietary software and/or whether existing systems were too bespoke to be compatible with a pre-developed external package.

We have set out above the two primary migration strategies in detail, as these are key drivers of the different cost categories discussed in sections 3.2.2 to 3.2.5 below. Therefore, in discussing the types of costs incurred in the migration process, sections 3.2.2 to 3.2.5 will regularly refer back to these two types of migration strategies.

3.2.2 Systems analysis costs

Systems analysis costs are primarily the human resourcing costs associated with developing, implementing and executing the migration process. Depending on the organisation in question, this may draw on a combination of both internal and external human resources.

When asked to rate the significance of systems analysis costs on a scale of 1 to 5, where 1 is 'highly insignificant' and 5 is 'highly significant', the average rating provided by respondents was 3.71. This indicates that systems analysis costs were a significant cost driver.

Systems analysis required individuals with relevant IT expertise, including experience in the ISO 20022 XML messaging standard, or at least the XML format. However, it is unlikely that PSUs, particularly SMEs and government bodies, would have had any existing expertise in place. Where relevant expertise was not

available in-house, the need to draw on external resources, specifically IT consultancy services, would likely have been greater. This need to draw on external resources would have inflated systems analysis costs for organisations.

One of the key drivers of systems analysis costs is the choice of migration strategy, which were set out in detail in section 3.2.1. If an organisation opted for the use of conversion services, then systems analysis costs would depend on whether the organisation purchased relevant middleware from a bank or third-party vendor, or chose to develop it in-house – either from scratch or by adapting an existing system.

The systems analysis costs, in terms of staff resourcing would have been greater in the case of developing middleware in-house, but in exchange for lower systems costs (discussed in Section 3.2.3). This would have first involved developing a mapping for the legacy messaging standard to the new ISO 20022 XML messaging standard and then building software capable of running this mapping in order to convert incoming ISO 20022 XML messages into the legacy format that the organisation's back office systems still run on. This would have involved individuals with coding expertise developing software capable of making such a conversion.

In the case of purchasing middleware from a bank or third party vendor, systems analysis costs would have been more limited, but at the expense of higher systems costs (perhaps both one-off and on an ongoing basis). Under such circumstances, the coding would have been undertaken by the bank or third party vendor, and so the resourcing costs to the organisation itself would be limited to staff with more general IT experience, capable of installing the pre-developed middleware software on the organisation's systems. Interview evidence said that these resource costs could be inflated if the conversion services being offered by banks and third-party vendors were not compatible with the systems currently in place at the organisation, as this then required the organisation to move back to an older version of their system for which conversion services had been pre-developed.

If organisations instead chose to update internal systems, the systems analysis costs would have been much more significant. Again the split between systems analysis and systems costs would be dependent on the extent to which systems were developed in-house or bought in from third-party vendors.

As well as coding core payment systems to be capable of sending and receiving payments in the ISO 20022 XML messaging standard, organisations would also have to ensure that the information received in this message could be mapped, as appropriate, for use in other back office systems. This would involve staff resourcing, with coding expertise, in order to adapt existing systems interfaces to cope with receiving messages in the new ISO 20022 XML format. Each of the different back office systems is likely to require different information included in the ISO 20022 XML message and, therefore, the interfaces have to be recoded to ensure that the same information is being drawn out from this message, as was the case under the old payment messaging standard. Affected back office systems are likely to include:

- bank account management systems and reporting applications these systems allow organisations to manage and control their bank accounts and bank relations, typically including electronic opening, closing and maintenance of management accounts and generation of audit reports.
- enterprise resource planning (ERP), accountancy systems and treasury management applications ERP is a business process management software that allows organisations to collect, store, manage and interpret data across a range of business activities – planning, development, manufacturing, sales, marketing etc. – through a system of integrated applications, including things like accountancy systems and treasury management applications, the latter of which helps manage a company's cash flow.

The magnitude of systems analysis costs would, therefore, be dependent on the number of other backoffice systems interlinked with the core payment system. This is not the case with conversion services, as all other back office systems can continue running on the legacy standards (as the incoming ISO 20022 XML messaging is immediately converted into the legacy messaging standard).
As discussed in section 3.2.1, survey evidence has shown that some organisations have used, or plan to use, the introduction of the SEPA Regulation as an opportunity to consolidate their core payment systems, i.e. develop a 'payment factory' solution. This is true of both PSPs and PSUs, particularly those with more international reach and, hence, with payments infrastructure and/or bank accounts in a number of different SEPA countries. This is consistent with much of the pre-implementation commentary which suggested that SEPA provided organisations with the strategic opportunity to execute a centralisation project.⁴⁵ Interview evidence suggested that the process of consolidating systems would significantly inflate the one-off migration costs, including systems analysis costs. However, respondents who took such an approach were unable to provide an estimate of the migration costs they would have faced had they chosen to update their internal systems in each country separately as a means of comparison. Instead, respondents stressed that there business case for centralising was much stronger, given the potential for significant ongoing operational cost savings (see section 5.2.2), although they were unable to quantify these benefits.

3.2.3 Systems costs

Systems costs comprise the costs of an organisation's SEPA- and ISO 20022 XML-compliant payment systems, in terms of the IT software and hardware costs involved. Staff resourcing costs associated with developing and implementing this IT infrastructure are already captured in the systems analysis costs.

When asked to rate the significance of systems costs, again where I is 'highly insignificant' and 5 is 'highly significant', the average rating provided by respondents was 3.78. This indicates that systems costs were the most significant cost component of the migration process.

Systems costs were primarily the costs of software required to make the organisation capable of receiving and sending ISO 20022 XML payment messages. This included any one-off costs of purchase and installation (if not built and implemented by staff in-house), as well as any ongoing licensing fees and maintenance costs. Interview evidence suggested that the magnitude of software costs would depend to some extent on the following:

- The legacy systems in place costs were inflated if the organisation's existing software was significantly outdated such that it was not compatible with the new ISO 20022 XML-compliant software being offered by banks or third-party vendors. This, in turn, meant that the organisation first had to update its existing software (and hardware) to a sufficiently recent version before purchasing the relevant software for ISO 20022 XML.
- The degree to which internal systems are already centralised where payment systems were already centralised it would have been less costly for an organisation as they would only have to upgrade this central system, rather than several separate payment systems.⁴⁶
- The degree of integration of payment systems with other back-office systems where organisations' processes were more integrated and automated, upgrade of their payment applications would have had knock-on effects for other back-office systems, including: bank account management systems; enterprise resource planning (ERP), accountancy systems and treasury management applications; bank account reporting applications; and external communication channel systems. This would have inflated systems costs, through the purchase of relevant software (upgrades) to ensure the new ISO 20022 XML-based payment system is correctly interfaced with other systems. Table 3.5 below summarises the most affected internal systems. It shows the most affected systems across all parties were the payment processing systems and external communication systems. It is also worth noting the significant

⁴⁵ See, for example, page 30 in: Deutsche Bank (2013), "The Ultimate Guide to SEPA Migration".

⁴⁶ Indeed, by this same logic and as we shall come on to discuss in section 5.2.2, the migration to ISO 20022 XML may have acted as a trigger for organisations to consolidate their existing systems and rationalise their existing accounts in one SEPA country.

proportion of PSUs (approximately three-quarters) whose ERP, accountancy or treasury management systems were impacted.

System impacted	Percentage of all affected parties	Percentage of affected PSPs	Percentage of affected PSUs
Bank account management systems	41%	45%	45%
ERP / accountancy systems / treasury management applications	44%	35%	73%
Payment processing / bank account reporting applications	65%	65%	82%
External communication channel systems	50%	50%	64%
Internal middleware	38%	55%	18%
Other	18%	25%	9%

Source: Europe Economics' analysis based on 26 respondents.

Systems costs were also inflated where the organisation needed to upgrade relevant hardware, in addition to the required software upgrades. This is due to the fact that ISO 20022 XML is a richer format than most legacy formats and, therefore, given the tens of thousands of payment transactions which may be occurring every day for a given organisation, this can have significant implications for bandwidth, processing capacity and storage. The decision of whether to replace existing hardware in the payment processing chain was dependent on whether each piece of existing hardware had the capacity to absorb the richer data format. The interview evidence suggested that hardware costs – including additional data storage costs – were, on the whole, fairly limited. That said, respondents were of the view that organisations with older legacy systems (which, in some cases, may have in place for decades) may have had to look into upgrading their hardware to cope with the demands of the new ISO 20022 XML format. This may have involved purchasing additional hardware capacity on-site or leasing additional external servers, which may in turn have presented other operational difficulties and inefficiencies.

One of the key determining factors of systems costs is the choice between using conversion services and updating internal systems. Systems costs in the latter case were expectedly higher on an upfront-basis. Of course the magnitude of systems costs, depends on the relative split between developing solutions in house (resulting in high systems analysis costs) and purchasing solutions developed externally (resulting in high systems costs). Differences in the ongoing systems costs of the two core migration strategies are less clear-cut, in terms of maintenance and relevant licensing costs.

As discussed in section 3.2.1, the business case for updating internal systems was in part dependent on the extent to which sunk investment costs in existing systems (including software, hardware and employee know-how) would need to be written-off. If these previous investment costs were not fully depreciated and amortised then this needed to be factored into the total upgrade costs, as the organisation would not have benefited from the full life-cycle of services that can be provided by the existing system. Therefore, the migration costs, adjusted for sunk costs, were less where the migration coincided with an organisation's next large-scale system renewal, as the organisation would have needed to update their systems even in the absence of the SEPA Regulation.

This provides organisations with the incentive to use conversion services on a temporary basis and thus delaying internal updates until these systems have reached the end of their current lifecycle. By delaying in this way, organisations could avoid the (potentially significant) costs of writing-off sunk investments. As a

result, the business case for adapting internal systems naturally becomes more attractive towards the end of an existing infrastructure cycle.⁴⁷

Table 3.6 and Table 3.7 below show the key drivers of systems costs for SCT and SDD respectively. The cost drivers are seen to be largely similar across SCT and SDD, with payment applications, expectedly, the most significant cost driver and middleware the least significant cost driver. The majority of respondents in both cases regarded communication interfaces as at least a moderate cost driver.

Payment applications	Communications interfaces	Middleware	Storage systems
88%	21%	5%	5%
4%	50%	18%	23%
8%	25%	50%	55%
0%	4%	27%	18%
	Payment applications 88% 4% 8% 0%	Payment applicationsCommunications interfaces88%21%4%50%8%25%0%4%	Payment applicationsCommunications interfacesMiddleware88%21%5%4%50%18%8%25%50%0%4%27%

Table 3.6: Cost drivers of SCT systems costs

Source: Europe Economics' analysis based on 24 respondents.

Table 3.7 shows a similar pattern, but for SDD systems costs. One of the notable differences is the higher storage costs relative to SCT, which may reflect the costs associated with storing the SDD mandates.

Table 3.7: Cost drivers of SDD systems costs

	Payment applications	Communications interfaces	Middleware	Storage systems
Main cost driver	70%	17%	5%	17%
Moderate cost driver	13%	39%	38%	22%
Limited cost driver	9%	30%	19%	26%
No cost	9%	13%	38%	35%

Source: Europe Economics' analysis based on 24 respondents.

In terms of ongoing systems costs, interview evidence suggested that these were significantly less material than the upfront one-off costs. These are costs associated with system maintenance, storage costs, security costs and ongoing licensing of relevant software, such as conversion service software, but these were, in the most part, not seen to be particularly significant. PSPs and PSUs may also face the costs of parallel running of legacy systems and the new ISO 20022 XML-based system, to ensure a smooth transition period and minimise the likelihood of risks materialising in case of any problems with the new system. With regard to the licensing of conversion services, a rationale for the use of conversion services over updating internal systems is that organisations were able to forego high one-off migration costs (and some of the associated transition risks discussed in Section 4.2) in exchange for low ongoing annual licensing costs for conversion services.⁴⁸ This may be particularly pertinent, given that some interview respondents spoke of business cases being assessed on a five-year time horizon, which is too short a timeframe, in the case of many PSUs and PSPs, to justify the significant upfront costs required.

⁴⁷ If the total allowed transition period was reflective of the timescale over which stakeholders upgrade their internal systems, then stakeholders would not need to write-off any investments in existing systems, as becoming SEPA and ISO 20022 XML compliant could have been achieved as part of their wider infrastructure replacement cycle. This will be discussed in more detail later.

⁴⁸ Note that where conversion services were developed in-house, stakeholders would incur the one-off costs of staff time involved in developing these services and ongoing maintenance costs, but not the ongoing software licensing fees.

3.2.4 Internal change costs

The internal change costs comprise the costs of regulatory compliance and planning, reorganising internal structures, project management, training and other administrative costs. Internal change costs received an average rating from survey respondents of 3.38, with I representing 'highly insignificant' and 5 representing 'highly significant'. They were, therefore, judged to have some significance, but were not considered as material as the systems (3.78) and systems analysis (3.71) costs faced by stakeholders.

Once a migration plan has been determined at the national level, organisations first faced the costs of understanding this national migration plan and the implications for their business, in terms of the relevant changes they are affected by and the relevant timeframes within which they must comply. This typically involved stakeholders developing their own project map of the implementation process, detailing: the necessary upgrades that will need to be made; the expected resource requirements the migration process will impose on their business; and the key milestones that will need to be met. In this regard, central infrastructure providers had to develop a migration plan that incorporated a redesign of their entire architecture to become compliant with the new rules and technology. For second order stakeholders, i.e. the PSPs and PSUs, these project maps were expected to be similar, but not of the same magnitude as those of the central infrastructure providers. These project maps would typically involve stakeholders setting out a full inventory of existing internal systems and databases, such that they could consider the implications of the migration for each of these systems in turn.

This project planning phase would have required internal discussions between employees from a range of relevant departments, including IT, compliance, legal and treasury teams. The compliance and legal team(s) would set out what was legally required by the regulation, while the IT team would set out the technical options for meeting this regulation (e.g. conversion services v updating internal systems), and the treasury team would consider the business case for each of these options and agree on the funding required to deliver the project. Procurement personnel may also be involved in determining at what cost necessary software, hardware, consultancy and other external systems/services can be acquired. One or more project managers also needed to be in place to oversee the planning and delivery of the proposed solution.

Interview evidence suggested that these planning costs were exacerbated when there was no specified end date for regulatory compliance, as this proliferated the length of talks and thus hindered real progress being made, while eating up valuable staff resources. Indeed, many sources talk about how adoption of the SEPA Regulation only gained significant traction with the adoption of the SEPA Migration End Date Regulation in 2012, which demanded an end date of February 2014 for Eurozone economies (later extended to August 2014).⁴⁹

Interview evidence also suggested that discussions at this planning stage were not only around the SEPA Regulation in isolation, as organisations needed to consider other known, or expected, regulatory changes, as well as wider industry trends, both demand (consumer) driven and supply (technology) driven. This is likely to have required engaging with other teams within the organisation to understand potential upcoming developments and how they may affect the feasibility and/or commercial viability of the proposed solutions. For PSPs, given payments is their core business and given the high upfront costs involved in developing new payment systems, interview respondents spoke of the need to future-proof investments.

In terms of the transitional process, desk research has suggested that some organisations developed additional disaster recovery plans due to the increased risks during the transition period. Other transitional requirements related to testing and communication to clients are covered in section 3.2.5.

⁴⁹ See, for example, Comité National SEPA (2012) "The French migration plan to SEPA: Version 3". Figures 2.4 and 2.5 in this migration plan show the slow rate of uptake SCT and, in particular, SDD, prior to the SEPA End Date Regulation coming into effect. As of May 2012, the uptake rates stood at 26.6 per cent and 0.076 per cent for SCT and SDD respectively.

Internal change costs also comprised the cost of training relevant staff about the SEPA Regulation and the requirements it imposes on their organisation. Interview evidence suggested that, for PSPs, this would include the cost of training bank branch staff about the new products they are now able to offer to their customers as a result of the migration, e.g. cross-border direct debits and credit transfers.

3.2.5 External costs

External costs include the costs of time spent on technical interface alignments, testing and commercial negotiations with external partners.

Interview evidence stressed the importance of rigorous testing before taking the new systems live. PSPs spoke of testing their systems with every possible eventuality to ensure they were working as desired. It was said that when bringing any new payment innovation to market no degree of inaccuracy or unreliability is deemed acceptable, as these are the fundamental concerns of PSUs and their customers and, therefore, failures can have catastrophic effects on the integrity of the PSP, and customer confidence and loyalty. As such, the interview evidence suggested that there was no scope for cutting corners on testing and that it was a very time-consuming and resource intensive process.

The testing process involved organisations trying out a whole range of potential eventualities to ensure that the systems and software were working in the desired way. Testing needed to be undertaken both in the case of using conversion services and in the case of updating internal systems, but evidence suggests it was more material in the case of the latter. The testing was in part carried out by third party suppliers of the related software but also carried out by technical experts in-house. For PSUs, testing was also supported by their banks.

The process started with testing of internal systems. For those organisations who had to adopt other back office systems (i.e. those not using conversion services), this included the costs of testing that systems interfaces were receiving the correct information from the ISO 20022 XML message for inclusion in other back-office processes. The next stage of testing was then to start exchanging the new ISO 20022 XML messages with participants outside the organisation and, ideally, with as many external participants as possible, as it is often the case that one organisation's interpretation of the new standard is not exactly the same as another organisation's interpretation.⁵⁰

Organisations also faced the costs of external negotiations with suppliers of software and other services, in order to find the best deal for their business. Interview evidence said that, given that the SEPA Regulation imposed the same messaging standard across all SEPA countries, third party vendors were relatively quick to develop ISO 20022 XML-compliant software solutions for PSPs and PSUs, as it provided these vendors with a huge market place in which to sell their products (rather than the old model of having to develop country specific solutions). This meant that the later adopters had significant number of providers to choose between, which may have increased search and negotiation costs. However, this may have driven down end prices due to increased competition. That said, interview evidence suggested that excess demand in the period running up to the compliance deadline had led to artificially high prices being charged by third party vendors for their products and services.

As well as the costs of engaging with external suppliers, PSPs were also expected to consider how the migration would impact on the PSUs they provide payment services for and, therefore, communicate to these PSUs how the changes would affect them and what they needed to do about it. This involved one-off costs of developing and publishing written guidelines for their PSUs (some of which can be found publicly available on the Internet), in order to educate them about the migration process and the changes this will require them to make. This includes more specific guidance for those PSUs engaged in specific types of

⁵⁰ The role of the national body in charge of monitoring is particularly important in this regard, to ensure consistency in interpretation. This is discussed in more detail in Section 5.

activity, e.g. PSUs with large direct debit volumes like utilities companies, and more tailored guidelines for SMEs. In some cases, PSPs also provided advice to their PSUs on how they could best take advantage of the SEPA-wide migration to ISO 20022 XML, for example through the ability to rationalise their bank account structure in one SEPA country. It also involved ongoing costs in providing various support services to their customers during the transitional period.

3.2.6 Broader SEPA-related costs

Sections 3.2.2 to 3.2.5 above focus on the costs incurred by organisations in migrating to the ISO 20022 XML messaging standard. These costs are of course difficult to disentangle from the wider costs of the SEPA Regulation. Indeed, several interview respondents indicated that for them the process was viewed as 'becoming SEPA compliant' rather than 'becoming ISO 20022 XML compliant', and as such it was difficult for them to break down the costs between ISO 20022 XML and the other aspects of the SEPA Regulation. The internal change costs, discussed in section 3.2.4, are likely to be the most difficult to disentangle in this respect, because, from a project planning and management viewpoint, compliance with the SEPA Regulation is likely to be considered as one project, rather than two separate projects – namely, the migration to ISO 20022 XML and the migration to the other features of the SEPA Regulation.

With that in mind, we set out in this section the costs incurred by stakeholders that are specific to the broader aspects of the SEPA Regulation and not the ISO 20022 XML messaging standard.

The three core aspects in this regard are as follows:

- IBAN conversion.
- BIC search and update.
- SDD mandates.

We discuss the costs imposed by each in turn.

IBAN conversion

The SEPA Regulation mandates the use of the IBAN when making SEPA-compliant credit transfers and direct debits. The IBAN is an international standard designed to facilitate storage of bank account data from multiple countries. However, it is not a fool-proof system.

More specifically, IBANs may be mis-transcribed, truncated or wrongly entered.⁵¹ As a result, there is an international structure that all countries must adopt, which includes an integrity check.⁵² This helps address the aforementioned issues, but it cannot identify format, integrity or content errors within the domestic accounts to which they correspond. In this regard, conversion to the IBAN format without validation of the original bank account data is likely to perpetuate these errors.

In light of the above, migrating existing customer records to the IBAN standard could have been a considerable challenge involving significant human resource and IT costs. Evidently, this is of particular concern to large creditors given the sheer scale of records which will need to be updated.

BIC search and update

In addition to the IBAN requirement, the SEPA Regulation imposed a temporary BIC requirement for credit transfers and direct debits. These requirements have now been phased out: with domestic transactions not having to indicate BIC after 1st February 2014, unless a country has opted out of this; and with cross-border payments not having to indicate BIC after 1st February 2016.

⁵¹ Evidence suggests that one in eight records already contain one or more errors. See Experian (2012) "Counting the hidden costs of SEPA migration".

⁵² See <u>https://www.iban.com/</u>.

The absence of the BIC of debtor and creditor agent in the payment initiation message is only valid for PSUs. In the interbank context, BICs are still mandatory, as they are the only common reference of financial institutions across SEPA. Since Ist February 2016, PSUs may send only IBAN to their PSPs, while not having to match with the appropriate BIC. However, the first PSP in the processing chain, receiving the payment message from the PSU, must be able to associate the correct BIC with the IBAN supplied, in order to be able to send the SEPA payment further to a central infrastructure provider.

Therefore, while the BIC requirement is no longer a mandatory one for PSUs, early adopters of the regulation were exposed to the HR and IT costs associated with:

- Updating the figures BICs change over time (e.g. mergers, reorganisations, structural changes), but keeping this up-to-date posed a challenge and in many cases they were not updated in supplier or customer records.
- Cross-validating BICs correct BICs for the same bank may vary on a country-by-country basis.53

These two requirements are nevertheless still in force for PSPs.

SDD mandates

The SDD scheme allows a creditor to collect funds from a debtor's account, provided that a signed mandate has been granted by the payer to the creditor.⁵⁴ Mandate forms to be completed by debtors (customers purchasing goods or services) are usually provided by creditors (retailers or service providers) themselves.

Evidently, issuing SDD mandates could be a big obligation for some corporates (e.g. utilities companies who have a high volume of direct debits), thus exposing them to the costs (i.e. contracting costs, legal fees, human resources) entailed in producing these documents and providing them to their clients.

An innovation aimed at addressing such issues is e-mandates. The e-mandate solution allows fully automated end-to-end processing of mandates including issuing, amendment and cancellation of such mandates while eliminating the need to deal with a multitude of local technical or organisational barriers.⁵⁵

However, while the paper mandate is based on a 2-corner model (i.e. no banks are involved in the mandate issuing and accepting process), the e-mandate solution is based on a 4-corner model (i.e. the debtor bank and the creditor bank must participate in the same e-mandate scheme). This exposes PSPs to considerable costs. In practice, the involved debtor and creditor banks outsource the operations of such a 4-corner model to third party service providers (e.g. IT service providers, operators of the technical platform used for intra-bank communication, and electronic signature service providers).⁵⁶

In addition, many PSUs that happen to be big billers, facing the new obligation to collect and store SEPA direct debit mandates, have chosen to use a third way of collecting signed mandates. Although only paper based or the above described e-mandates are fully legally and contractually compliant, other less strong digital signatures are in use. These include acquiring the consent of the consumer on the SEPA mandate by a text message (i.e. SMS) confirmation, a recorded phone conversation, or any other less robust form of dematerialized signature. Until now, no major court case in relation to these types of mandates has occurred.

⁵³ For instance, for ABN Amro customers in the Netherlands, BICs did not make it to corporate databases. See Experian (2012) "How does migration to IBAN format impact payments integrity?".

⁵⁴ See e.g. <u>http://www.europeanpaymentscouncil.eu/index.cfm/sepa-direct-debit/the-sdd-mandate/</u>.

⁵⁵ See e.g. <u>http://www.europeanpaymentscouncil.eu/pdf/EPC_Article_17.pdf</u>.

⁵⁶ See ECB (2014) "Issues and way forward with electronic mandates for SEPA Direct Debit".

3.2.7 Comparison of migration costs

In this section we summarise the quantitative evidence on the costs of migration estimated by PSPs and PSUs in our survey.

High-level costs

Table 3.8 below shows the one-off costs as a percentage of annual payment processing costs. Although several respondents were unable to provide an estimate of the one-off costs, those who were able to provide an estimate presented a mixed picture. More than half of respondents said that migration costs were less than 30 per cent of annual payment processing costs, while 35 per cent said that migration costs exceeded 70 per cent. Of those who rated migration costs in excess of 70 per cent, the majority were PSPs, with one respondent estimating migration costs at around twice the level of their annual payment processing costs. There is a clear difference in the costs faced by PSPs and PSUs. For the majority of PSPs migration costs exceeded 70 per cent of annual payment processing costs, whereas the majority of PSUs suggested that migration costs would be less than 10 per cent.

We note here briefly that the majority of respondents also indicated a decrease in ongoing costs as a result of the migration to ISO 20022 XML. This is discussed in detail in Section 5.2.2.

One-off costs	Percentage of all affected parties	Percentage of affected PSPs	Percentage of affected PSUs
Less than 10 per cent	35%	11%	63%
II-30 per cent	18%	22%	13%
31-50 per cent	0%	0%	0%
51-70 per cent	12%	11%	13%
Greater than 70 per cent	35%	56%	13%

Table 3.0. One-on inigration costs as a proportion of annual payment processing costs	Table 3.8: One-of	f migration c	osts as a pro	portion of annua	al payment	processing costs
---	-------------------	---------------	---------------	------------------	------------	------------------

Source: Europe Economics' analysis based on 17 respondents.

The key reasons cited in interviews for the differences in cost faced by PSPs and PSUs were:

- PSPs were typically dealing with higher volumes of transactions than PSUs;
- PSPs typically needed to migrate both to SCT and SDD, whereas most PSUs use only SCT;
- PSPs needed to implement both downstream and upstream interfaces, i.e. the interface to connect with the PSU and the interface to connect with central infrastructure providers (or another PSP);
- PSPs, in some cases, needed to connect to multiple central infrastructure providers (typically one SEPA domestic and one SEPA cross-border) and, although the message standard is the same, connectivity and further wrapping or bundling techniques can vary from one central infrastructure provider to another;
- PSPs have the obligation to setup BIC search and validation engines after entry in force of "IBAN Only" requirement for PSUs; and
- PSPs often manage and offer to customers several electronic communication channels (e-banking, SWIFT, APIs, and local solutions like EBICS and ISABEL), while a PSU typically makes a single choice of electronic communication channel.

The cost estimates provided by PSPs and PSUs, along with the cost estimates provided by technology providers, have been used to estimate the order of magnitudes of typical one-off costs faced by PSUs and PSPs of different sizes:

• For small and medium-sized PSPs (with transaction volumes of less than 50 million) between £100,000 and £1,000,000;

- For large PSPs (with transaction volumes in excess of 50 million) between £1,000,000 to in excess of £10,000,000;
- For very large PSPs (with transaction volumes in excess of 100 million) between £10,000,000 to in excess of £100,000,000;
- For small and medium-sized PSUs (with transaction volumes less than 10 million) between negligible and £100,000; and
- For large PSUs (with transaction volumes in excess of 10 million) between £100,000 and £1,000,000.

Considering that the financial life of payment assets is typically 5-7 years, the one off costs quoted above should be evaluated over a 5-7 year time horizon. The wide ranges quoted are likely to be reflective of the number of factors at play in determining the cost faced by market participants, including: the payment methods used (i.e. SCT, SDD or both); the quality and number of legacy formats and data requiring conversion; the number of systems outputting legacy formats; and the number of countries in which the participant, and their clients, are based.

While it is not evident from the one off organisation cost estimates quoted above, it should be noted that there are economies of scale in the costs of migration. This is because, for a given solution to the SEPA Regulation, many of the cost elements (discussed in Section 3.2) are fixed costs and, therefore, the costs per transaction would be lower for firms with a higher volume of transactions. The reason that this is not readily borne out in the indicative cost estimates provided above is that, firms of different size do not typically go for the same type of solution when addressing the SEPA Regulation, such that it is difficult to demonstrate, through the data at least, that such economies of scale exist. This is in part, for example, because, for both larger PSPs and PSUs, the SEPA Regulation provided the opportunity to consolidate payment services and other back-office systems and infrastructure. As a result, these firms typically incurred higher one-off transition costs, with a view to making ongoing operational cost savings in the future (see Section 5.2.2 for more details).

It is also of interest to consider how one-off migration costs differed between Eurozone and non-Eurozone institutions. In Table 3.9 we compare estimated one-off migration costs for large Eurozone and non-Eurozone PSPs. We can see that non-Eurozone PSPs report higher one-off costs relative to their annual payment processing costs. This is as one would expect, given that the fixed costs of migration are spread over fewer euro transactions for non-Eurozone firms.

One-off costs	Percentage of large Eurozone PSPs	Percentage of large non-Eurozone PSPs
Less than 10 per cent	0%	20%
II-30 per cent	50%	0%
31-50 per cent	0%	0%
51-70 per cent	25%	0%
Greater than 70 per cent	25%	80%

Table 3.9: One-off migration costs	as a proportion of annua	I payment processing costs
------------------------------------	--------------------------	----------------------------

Source: Europe Economics' analysis based on 9 responses.

The range provided by technology providers broadly matched the responses received from PSPs and PSUs, although some large PSPs incurred costs notably higher than the estimates provided by technology providers. This may in some cases relate to the PSP's decision to adopt a global solution and use the SEPA Regulation and ISO 20022 XML as an opportunity to consolidate all payment systems in the SEPA region. Indeed, one technology provider said that the move to ISO 20022 had been the catalyst for significant payment renovation and, therefore, the costs also reflect this renovation rather than simply the transition to a new messaging format. In such cases, the one-off costs related to system consolidation will have amplified the total cost of ISO 20022 XML adoption. However, these costs should not be seen strictly as

compliance costs, insofar as consolidation was not required to become compliant with the regulation, rather it was a commercial decision of the firm in question.

ISO 20022 XML cost drivers

Table 3.10 shows the relative significance of the different cost drivers discussed in sections 3.2.2 to 3.2.4, as well as their significance in comparison to the indirect costs discussed in section 4 below. As also discussed earlier, the most important cost drivers were systems costs and systems analysis costs across all respondents, followed by internal change and indirect costs.

Cost type	Average rating all affected parties	Average rating affected PSPs	Average rating affected PSUs
Systems analysis	3.72	3.94	3.50
Systems costs	3.82	4.06	3.44
Internal change costs	3.46	4.00	2.67
Indirect costs	2.72	2.88	2.20

Table 3.10: Significance of cost drivers

Source: Europe Economics' analysis based on 29 respondents. (I = highly insignificant; 5 = highly significant)

Table 3.11 to Table 3.18 below provide cost estimates for the migration process broken down along the following lines:

- SCT and SDD;
- cost drivers (i.e. systems analysis, systems, internal change and external);
- SEPA wide costs (i.e. ISO 20022 XML, IBAN conversion, BIC search and update, and mandates);
- one-off and ongoing; and
- PSPs and PSUs.

The cost estimates provided in these tables are presented as a proportion of total transaction volumes.⁵⁷ This approach allows for cost comparisons to be made across organisations with significantly different transaction volumes. Costs are presented as pence per annual transaction. It should be noted that the ongoing costs represent the ongoing costs associated with running the new SEPA compliant systems. Therefore, given that, even absent the ISO 20022 XML and SEPA compliant systems, stakeholders would still incur ongoing costs in operating their old systems, the ongoing cost estimates provided in the table below should be seen as upper-bound cost estimates. In other words, the *incremental* ongoing costs associated with SEPA and ISO 20022 XML are likely to be lower than those quoted in the tables which follow.

Table 3.11 shows the costs incurred on average by PSPs in relation to implementing ISO 20022 XML as part of the SCT scheme. It shows that one-off costs were I3p per annual transaction, while ongoing costs were in the region of 2p per annual transaction. The key cost driver for PSPs in this regard were internal change costs. The major ongoing cost related to systems costs.

⁵⁷ Cost estimates for PSPs and PSUs are calculated by dividing the total cost across affected parties (either PSP or PSU) by the total euro transaction volumes of those parties, for each of the four different cost types (systems analysis, systems, internal change and external). All costs were first converted into pound sterling using the average exchange rate for the years 2013 and 2014 (which were £1 equivalent to €1.21 and \$1.60). Costs are presented in pence per transaction for PSPs, and 1/100 pence per transaction for PSUs (given their lower magnitude). One-off costs and ongoing costs are reported separately, as this is how they were reported by survey respondents. Total costs reflect the sum of the four different cost types.

Cost type	One-off	Ongoing
Systems analysis	2.34	0.41
Systems costs	3.32	0.60
Internal change costs	4.76	0.35
External costs	2.99	0.50
Total costs	13.41	1.86

Table 3.11: SCT - ISO 20022 XML cost breakdown for PSPs

Units: pence per annual transaction; Source: Europe Economics' analysis based on 6 respondents.

Table 3.12 shows the costs incurred on average by PSUs. It shows that one-off costs per transaction were in the order of 20 times lower for PSUs than PSPs, with ongoing costs in the order of 50 times lower for PSUs. For PSUs, the systems costs were the key cost driver on both a one-off and ongoing basis and a higher proportion of total costs for PSUs than for PSPs. This may partly reflect the fact that PSUs preferred purchasing solutions from external third parties rather than developing solutions in house (perhaps, to some extent due to a lack of relevant expertise in-house). Systems analysis costs were also quite significant on a one-off basis, while internal change and external costs were relatively minor.

Table 3.12: SCT – ISO 20022 XML cost br	eakdown for	PSUs
---	-------------	------

Cost type	One-off	Ongoing
Systems analysis	0.22	0.00
Systems costs	0.49	0.03
Internal change costs	0.03	0.00
External costs	0.03	0.00
Total costs	0.77	0.03

Units: pence per annual transaction; Source: Europe Economics' analysis based on 4 respondents.

Table 3.13 and Table 3.14 show the equivalent figures for migration to the SDD scheme. It shows that both PSPs and PSUs faced higher costs for ISO 20022 XML related to SDD than they did for SCT. This is also in line with the findings of the literature and the interview evidence, which suggests higher costs for SDD due to the complexity of SDD rulebooks, with SDD rulebooks containing significantly more business and operational rules than SCT, with several key dates (D-5, D-2, D+2 etc.) and complex exception handling.

Comparing Table 3.11 and Table 3.13 shows that, for PSPs, ISO 20022 XML costs related to SDD are of the order of 70 per cent higher than for SCT. Systems costs were found to be the most significant cost driver, accounting for approximately two-fifths of total one-off costs and almost 50 per cent of ongoing costs. The next most material costs were systems analysis costs.

Table 3.13: SDD – ISO 20022 XML cost breakdown for PS	Ps
---	----

Cost type	One-off	Ongoing
Systems analysis	6.09	0.23
Systems costs	8.39	0.77
Internal change costs	4.95	0.21
External costs	3.15	0.41
Total costs	22.57	1.62

Units: pence per annual transaction; Source: Europe Economics' analysis based on 6 respondents.

Similarly, comparing Table 3.12 and Table 3.14 shows that, for PSUs, ISO 20022 XML costs related to SDD were in the order of 300 per cent higher than the one-off costs of ISO 20022 XML in relation to SCT. One-off costs equate to just over 2p per transaction, with the bulk of these costs related to systems costs. It can be seen that ongoing costs are significantly lower for PSUs than PSPs.

Cost type	One-off	Ongoing
Systems analysis	0.17	0.00
Systems costs	1.58	0.01
Internal change costs	0.47	0.00
External costs	0.07	0.00
Total costs	2.29	0.01

Table 3.14: SDD - ISO 20022 XML cost breakdown for PSUs

Units: pence per annual transaction; Source: Europe Economics' analysis based on 4 respondents.

Costs of ISO 20022 XML in context of wider SEPA costs

Having estimated the ISO 20022 XML-specific costs and the key cost drivers behind this, the next four tables consider the ISO 20022 XML costs in the context of the wider SEPA-related costs.⁵⁸ With regard to SCT this includes the costs of IBAN conversion and BIC search and update, while in the case of SDD this includes the costs of IBAN conversion, BIC search and update, and SDD mandates.

Table 3.15 shows the broader costs of SCT for PSPs. It shows that the total cost per annual transaction is 16p on a one-off basis and 2p on an ongoing basis, with around three-quarters of the costs attributable specifically to the migration to ISO 20022 XML. It shows IBAN conversion to be a more significant cost burden than BIC search and update, although both impose significantly less cost than ISO 20022 XML itself.

Table 3.15: Broader SCT cost breakdown for PSPs

Cost type	One-off	Ongoing
ISO-related costs	13.41	1.86
IBAN conversion	2.11	0.29
BIC search and update	0.84	0.12
Total costs	16.35	2.26

Units: pence per annual transaction; Source: Europe Economics' analysis based on 6 respondents.

Table 3.16 shows the same estimates but for PSUs. The one-off costs for PSUs are of the order of 15 times smaller than for PSPs, with the ongoing costs in the order of 40 times lower. Comparing Table 3.15 and Table 3.16, it can be seen that the percentage cost shares for IBAN conversion and BIC search and update are higher for PSUs than PSPs (collectively accounting for 36 per cent of the total migration costs, relative to 18 per cent in the case of PSPs).

⁵⁸ The wider SEPA costs were estimated based on the percentage cost breakdowns between the different elements of SDD and SCT provided by survey respondents. This involved scaling the monetary cost estimates for ISO 20022 XML in order to estimate the costs of the other aspects of SCT and SDD. As an example, if survey respondents indicated on average that ISO 20022 XML represented 50 per cent of the total costs of SCT, and that IBAN conversion and BIC search and update represented 25 per cent each, and assuming respondents reported total monetary cost of ISO 20022 XML of 10 pence per transaction, then the cost of IBAN conversion would be 5 pence per transaction ((25%/50%)*10) and likewise for BIC search and update.

Table 3.16: Broader SCT cost breakdown for PSUs

Cost type	One-off	Ongoing
ISO-related costs	0.77	0.03
IBAN conversion	0.25	0.01
BIC search and update	0.20	0.01
Total costs	1.21	0.05

Units: pence per annual transaction; Source: Europe Economics' analysis based on 4 respondents.

Table 3.17 and Table 3.18 show the equivalent estimates for SDD, for PSPs and PSUs respectively. The key difference here is the additional cost in terms of SDD mandates. The results below reinforce the earlier finding that the costs associated with SDD are greater than those associated with SCT.

For PSPs, as seen in Table 3.17, SDD mandates are in the order of one-fifth of the total costs associated with SDD migration (with three-fifths of total costs associated with ISO 20022 XML itself).

Table 3.17: Broader SDD cost breakdown for PSPs

Cost type	One-off	Ongoing
ISO-related costs	22.57	1.62
IBAN conversion	4.13	0.30
BIC search and update	2.54	0.18
SDD mandates	6.08	0.44
Total costs	35.32	2.54

Units: pence per annual transaction; Source: Europe Economics' analysis based on 6 respondents.

As seen in Table 3.18 below, the SDD mandate costs are of particular significance to PSUs, with the estimates showing that SDD mandates costs are of a similar magnitude to ISO 20022 XML-related costs.

Table 3.18: Broader SDD cost breakdown for PSUs

Cost type	One-off	Ongoing
ISO-related costs	2.29	0.01
IBAN conversion	0.85	0.00
BIC search and update	0.40	0.00
SDD mandates	2.02	0.01
Total costs	5.56	0.02

Units: pence per annual transaction; Source: Europe Economics' analysis based on 4 respondents.

Migration time

The survey evidence shows that the average migration time was 24 months. However, the survey evidence also shows that there was significant variation in that range, as illustrated in Table 3.19 below. 15 per cent of respondents said that their migration process took in excess of three years.

Table 3.19: Length of migration process

Length of migration	Percentage of respondents	
Less than 12 months	38%	
12-24 months	35%	
25-36 months	12%	
Over 36 months	15%	

Source: Europe Economics' analysis based on 26 respondents.

When asked whether a longer implementation period would have affected costs, the majority of survey respondents (67 per cent) said that they thought it would increase costs, as shown in Table 3.20. Only 7 per cent said that they expected a decrease in migration costs as a result of a longer implantation period, although no reasons were provided as to why they expected such a decrease.

Migration cost	Percentage of respondents
Increase significantly	26%
Increase slightly	41%
No impact	26%
Decrease	7%

Table 3.20: Impact of a longer implementation period on migration costs

Source: Europe Economics' analysis based on 27 respondents.

Several respondents explained that the higher costs associated with a longer implementation period would simply be the result of additional resourcing costs incurred over the longer period, including both internal and external staffing costs. Another rationale provided by survey respondents for a longer implementation period increasing costs is that it is expensive to keep running legacy and SEPA schemes at the same time, with PSPs and PSUs potentially needed to support multiple messaging standards and rulebooks simultaneously, thus adding to the complexity and cost of the migration. On a related note, another survey respondent said that a longer implementation period only delays uptake by some stakeholders even further, thus imposing additional costs on the early adopters for no material benefit.

For those who said there would be no impact, a commonly cited reason, both in interviews and questionnaires, was that stakeholders would simply delay the start of their migration process, so that the migration still lasted the same amount of time. Indeed, one interview respondent said that the migration start date would likely depend on when the funding was made available from an organisation's budgeting team. They expected that, were the migration end date to be delayed, the organisation's budgeting team would simply delay the allocation of this project until it became a regulatory priority.

Migration of other payments

Respondents were asked whether they thought that the migration of euro-based CTs and DDs would make it cheaper to migrate similar payments in other currencies. ⁵⁹ Table 3.21 shows that over 70 per cent of respondents believed that it would. For those respondents who said that it would generate cost savings for any similar migration projects in the future, the reasons given were:

- leveraging retained knowledge and expertise and learning curve effect;
- services in the process flow can be re-used for other payment types;
- existing knowledge of the technology and the XML format; and
- no need to acquire additional third party packages.

Of those survey respondents who said that there would be no impact, one was of the view that, despite having learnt from the experience of the previous migration, this would not necessarily allow for a less resource intensive migration or a shorter timeframe for migration. Another respondent stressed that every payment scheme is significantly different, each with their own unique complexities, so there are "no synergies" to be gained from a previous migration.

⁵⁹ It was clear from one interview respondent that, as well as reducing the costs of migration of other currencies, it would also reduce the costs of migration of other payment types. The upcoming adoption SEPA Instant Payments, for example, is making use of the same underlying message as SCT and it is therefore thought that it should not be so costly or difficult to implement as SCT itself.

Migration cost	Percentage of respondents
Significantly cheaper	46%
Slightly cheaper	25%
No impact	29%
More expensive	0%

 Table 3.21: Expected impact of euro payments migration on migration cost for other currencies

Source: Europe Economics' analysis based on 24 respondents.

3.2.8 The profile of affected and non-affected PSUs

It was clear from the survey that a considerable number of PSUs were not impacted by the SEPA Regulation and the adoption of ISO 20022 XML. The SEPA Regulation requires PSUs to comply with the ISO 20022 XML standard only for payment orders sent in batches, with all unitary payments (even within a file) out of scope. The interview evidence suggested that a number of PSUs, however, are submitting their payment orders one by one using a screen-based solution and are, therefore, not affected by the regulation. Interview evidence suggested that such screen-based solutions may have been in two key forms: firstly, among smaller PSUs, many make use of web banking tools (similar to those used by individual consumers); and, secondly, among more medium-sized PSUs, external packages or cloud (SaaS) solutions are often used, such that the PSU itself did not notice the SEPA-specific change as it was directly managed by the provider of the existing solution. The latter is especially true in the case of salary payments (i.e. credit transfers) which are very often outsourced to third parties.

Overall, therefore, it was found that, for those PSUs making use of screen-based payment submissions (rather than batch file payments), the impact of the SEPA Regulation was minimal. Indeed, many PSUs contacted by telephone said that their awareness of ISO 20022 XML itself was extremely limited, as their exposure to this was limited by their bank or a third-party technology provider.

From interview evidence it has been estimated that, in terms of the total population of PSUs, those making screen-based submissions are in the order of 65 per cent. However, as described above, those PSUs making screen-based submissions are typically small- or medium sized PSUs and, therefore, when considered in terms of the total volume of transactions, screen-based submissions only account for about 10 per cent of total payment transaction volume.

There were a number of survey respondents who said that they were not impacted by the migration to ISO 20022 XML and the wider SEPA Regulation, and the tables below demonstrate the impact of including these additional 'not impacted' PSUs in the analysis. Three approaches are adopted for including these additional results:

- Volume-weighted approach this weights the 'not impacted' results by 10 per cent (as they are estimated to account for 10 per cent of the total volume of transactions) and thus the existing/impacted results by 90 per cent.
- Number-weighted approach this weights the 'not impacted' results by 65 per cent (as they are estimated to account for 65 per cent of the total number of PSUs) and thus the existing/impacted results by 35 per cent.
- Median approach this orders all PSU responses to see how the 'middle' PSU in the ranking is affected.

In each table below, the results of the 'impacted PSUs only' (which appear in all other tables outside section 3.2.8 of the report) are compared against the results using all PSU responses (i.e. by including those additional PSUs who said that they were not in any way impacted by the SEPA Regulation and ISO 20022 XML). The results of 'not impacted' PSUs are taken into account using the three approaches set out above, namely: the volume-weighted approach; the number-weighted approach; and the median approach.

Table 3.22 below shows the adjusted results for the one-off migration costs as a proportion of annual payment processing costs. It demonstrates that, using the volume-weighted approach the results are largely comparable to those for impacted PSUs only, since the non-impacted PSUs represent only a small proportion (approximately 10 per cent) of the total volume of transactions. This is in contrast to the number-weighted approach which presents a significantly different picture to the impacted PSUs only. The reason for this is that the non-impacted PSUs, in terms of their sheer numbers, represent a significant proportion of the market (approximately 65 per cent).

Migration costs	Impacted PSUs only ⁶⁰	Volume weighted	Number weighted	Median PSU
Less than 10 per cent	63%	67%	89%	\checkmark
II-30 per cent	13%	11%	4%	
31-50 per cent	0%	0%	0%	
51-70 per cent	13%	11%	4%	
Above 70 per cent	13%	11%	4%	

 Table 3.22: One-off migration costs as a proportion of annual payment processing costs

Source: Europe Economics' analysis. 'Impacted only' based on 8 respondents; volume- and number-weighted based on 19 respondents.

Table 3.23 below shows a similar picture for the impact on ongoing processing costs. Again it can be seen that the volume-weighted figures are closely in line with the figures for impacted PSUs only, while the number-weighted figures differ significantly.

	Impacted PSUs only ⁶¹	Volume weighted	Number weighted	Median PSU
Over 25% less costly	11%	10%	3%	
10% to 25% less costly	33%	29%	10%	
Up to 10% less costly	33%	29%	10%	
No change in costs	22%	32%	76%	\checkmark
Up to 10% more costly	0%	0%	0%	
10% to 25% more costly	0%	0%	0%	
Over 25% more costly	0%	0%	0%	

 Table 3.23: Impact of ISO 20022 XML on ongoing processing costs

Source: Europe Economics' analysis. 'Impacted only' based on 9 respondents; volume- and number-weighted based on 20 respondents.

The different weighting bases will be more appropriate for different purposes. If the aim is to provide a sense of how the balance of activity in the market is affected, the volume-weighted basis is more relevant. If, by contrast, the aim is to provide a sense of how the "typical" or "average" PSU is affected, then the number-weighted approach or median PSU approach is likely to be more relevant. The results of the median PSU approach show that one-off costs would be less than 10 per cent of the firm's annual payment processing costs and that there would be no change in ongoing costs.

In addition to the above, another reason cited for there being limited impact on some PSUs is that, for those PSUs based in non-Eurozone economies, there are likely to be only a small volume of payments, if any, conducted in euros. Further, even where payments are conducted in euros, they may be more likely to be submitted on a one by one basis, rather than in batches, and so would again fall outside the scope of the regulation.

In terms of the profile of affected and non-affected PSUs there is a further key observation that should be made at this stage. The observation is that, although (as shown in Section 3.2.7) the SDD per transaction

⁶⁰ The figures in this column can also be found in the fourth column of Table 3.8.

⁶¹ The figures in this column can also be found in the fourth column of Table 5.7.

costs are higher than the SCT per transaction costs, the SDD costs will be concentrated on a much smaller number of PSUs than the SCT costs. This is because only a relatively small fraction of PSUs make direct debit payments, typically those with a large customer base who are subscribing to an ongoing service that the PSU provides, such as utilities and telecoms companies. This is in contrast to SCT where, although the per transaction costs are lower, the impacts will be felt across a significantly larger proportion of PSUs (as the vast majority of PSUs do make credit transfer payments).

3.2.9 Global SEPA cost estimates

By using the per transaction cost estimates in Section 3.2.7 and the total volumes of euro-based credit transfers and direct debits, the total costs of transitioning to the SEPA Regulation, and the ISO 20022 XML messaging standard within that, have been estimated. Total euro-based CT and DD transaction volumes have been proxied using the total volume of CTs and DDs for Eurozone countries.⁶² PSU cost estimates have then been scaled based on the finding that impacted PSUs represent 90 per cent of the total volume of transactions (see Section 3.2.8 above). By contrast, all transactions from the PSP perspective are affected and, therefore, no corresponding weighting is applied to PSP per transaction cost estimates.

Table 3.24 below shows the total cost estimates for transition to SEPA in respect of SCT. The results are broken down for PSPs and PSUs, and between ISO 20022 XML costs and wider SEPA costs. It can be seen from this that total SCT costs are in the order of \pounds 3bn across the SEPA area, the vast majority of which – approximately 95 per cent – is incurred by PSPs.

Table 3.24: Total cost estimates for transition to SEPA in respect of SCT

PSP	PSU
£2,400mn	£120mn
£520mn	£71mn
£2,900mn	£190mn
	PSP £2,400mn £520mn £2,900mn

Source: Europe Economics' analysis. Estimates reported to 2 significant figures.

Similarly, Table 3.25 below shows the total cost estimates for transition to SEPA in respect of SDD. It is again broken down for PSPs and PSUs, and for ISO 20022 XML costs and wider SEPA costs. Total SDD costs are found to be more than twice that of total SCT costs – approximately £7bn for SDD compared to £3bn for SCT. Furthermore, it can be seen that PSU costs constitute a higher proportion of total costs in the case of SDD, of the order of I2 per cent, than in the case of SCT, approximately 6 per cent.

Table 3.25: Total cost estimates for transition to SEPA in respect of SDD

	PSP	PSU
ISO 20022 XML costs	£4,000mn	£360mn
Wider SEPA costs	£2,200mn	£520mn
Total costs	£6,200mn	£880mn

Source: Europe Economics' analysis. Estimates reported to 2 significant figures.

Combining the cost estimates for SCT and SDD presented above gives a total cost estimate in the region of approximately £10bn, approximately nine-tenths of which is incurred by PSPs and the remaining one-tenth by PSUs. Furthermore, while it should be recognised that there are inherent difficulties in separating out ISO 20022 XML costs from the wider costs of the SEPA Regulation, it has been estimated that

⁶² This will be a slight underestimation of total euro-based CT and DD transactions, as a very small percentage of euro-based CTs and DDs takes place outside of Eurozone countries.

approximately two-thirds of the total costs are attributable to ISO 20022 XML, which equates to a cost of $\pounds 6.9$ bn.

3.3 Summary of migration costs

Table 3.26: Summary of migration cost findings

Issue	Findings	Nature of evidence	Evidence strength
Implementation method	The majority of affected firms updated internal systems.	Survey	Strong
	Of firms that used conversion services, most are doing so on an ongoing basis.		Strong
	Use of middleware helped mitigate migration costs.	Survey	Strong
Affected systems	Payment processing and external communication systems were the most frequently impacted. A significant proportion of PSUs' ERP/accountancy/treasury management systems were affected.	Survey	Strong
Timing	The migration took on average two years, although there is significant variation across parties. A longer implementation period is regarded as having been likely to increase costs, not decrease them.	Survey	Strong
Impact of having converted to ISO 20022 for euro-based transactions on costs of conversion for other currencies		Survey	Strong
Sources of one-off cost	Systems costs were typically the main firm-level cost drivers.	Survey	Moderate
Wider SEPA costs	ISO 20022 XML was the main cost component of the SEPA Regulation, although PSUs experienced high costs due to SDD mandates.	Survey	Strong
Ongoing impacts	Ongoing costs fell materially.	Survey	Strong
	ISO-related and SDD mandate costs are more material than IBAN conversion or BIC search and update costs, with SDD mandate costs particularly material for PSUs.		Strong
Costs of migration are significantly higher for PSPs, both for SDD and SCT. For both PSPs and PSUs, the costs of SDD are higher. Costs associated with SDD mandates represent a higher proportion of total costs for PSUs than PSPs.		Survey	Strong
Cost differencesReported one-off costs of migration were higher, as abetween the Eurozonepercentage of annual payment processing costs, in non-and non-EurozoneEurozone countries.		Survey	Moderate
Profile of affected and non-affected PSUs	A large proportion of PSUs are not materially impacted by the SEPA Regulation and ISO 20022 XML, but they only account for a small proportion of the transactions in the market. A 'typical' firm will face one-off costs of less than 10 per cent of annual payment processing costs and no change in on-going costs.	Survey	Strong
Global SEPA cost estimates	Total SCT costs of £3.1bn and total SDD costs of £7.1bn, giving a global SEPA cost estimate of £10.2bn. Approximately nine-tenths of this cost is estimated to have fallen on PSPs, and two-thirds of total costs are attributed to ISO 20022 XML.	Survey	Strong

4 Indirect costs

The indirect costs of migration can be thought of as the risks that have arisen, or may be expected to arise, as a result of the migration process, either during the migration process itself or following the migration process. As such, they are not costs directly incurred by stakeholders (in becoming compliant with the SEPA Regulation), but rather issues which have arisen, or may arise, and as a result cause harm to stakeholders and/or the wider payments industry.

These indirect costs are inherently more difficult to quantify, partly because they are often not specific products or services that a market price can be attributed to, and partly because their occurrence is uncertain and, as such, their expected cost depends on the likelihood of occurrence (which can also be practically difficult to estimate). Therefore, the indirect costs described below are largely considered in a qualitative nature.

When asked to rank the significance of different costs on a scale of 1 to 5, where 1 is 'highly insignificant' and 5 is 'highly significant', the average rating provided by respondents for 'indirect costs of migration' was 2.72. This was significantly lower than the average grading for the direct costs of 3.67, and for each of the sub-categories of direct costs, namely: systems analysis costs (3.72); systems costs (3.82) and internal change costs (3.46).

Survey respondents were also asked about the challenges they faced during the migration. Table 4.1 below summarises these challenges. It shows that none of the challenges were experienced by more than half of the respondents, with problems of internal resources being the least frequent challenge. Competition for external resources was a particularly frequent challenge among PSPs, with 60 per cent of PSPs reporting that it had been an issue for them.

Migration challenges	Percentage of responses
Lack of internal resources	41%
Competition for external resources	41%
Internal glitches	41%
Problems with external stakeholders	34%

Table 4.1: Main challenges faced during the migration

Source: Europe Economics' analysis based on 29 respondents.

4.1 Risk of competition for relevant resources

As shown in Table 4.1 above, competition for external resources was the joint most common challenge faced by stakeholders during the migration process.

On the one hand, the development of a common messaging standard may have incentivised vendors to invest significantly in ISO 20022 technology and functionality and thus improved the number of viable providers of these services. The incentives for vendors to do so were likely to have been quite strong, as it provided them with the opportunity to access a significant marketplace, with thousands of PSPs and PSUs requiring SEPA- and ISO 20022 XML-compliant solutions. Therefore, it has been suggested that many European vendors became ISO 20022 "native", insofar as they developed out-of-the-box ISO 20022 solutions, having not needed to develop bespoke solutions for each country in order to cater for legacy formats (i.e. they can make use of the same technology across all SEPA countries). This would suggest a significant increase in supply of relevant external resources.

That said, however, given the pressures created by a common end-date for all Eurozone SEPA economies, and similarly for all non-Eurozone SEPA economies, there was a risk of bottlenecks due to large peaks in demand for these services prior to the compliance dates, as was raised during the interview responses. This created the potential for PSPs and PSUs to miss the migration deadlines, and provided vendors with the opportunity to exploit the imminent need for PSPs and PSUs to comply with the regulation by charging high prices for their services.

Materiality if realised: Low

Likelihood of being realised: Moderate to high

4.2 Risks to system stability

Risks to system stability are a key concern of stakeholders in the migration process, particularly to PSPs for whom a core aspect of their businesses is the provision of payment systems which are continuously available, timely, reliable and accurate. Indeed, one respondent spoke of how, when implementing their SEPA-compliant solution, the priority for them was the minimisation of risk rather than the cost of migration itself. Interview evidence more broadly emphasised the importance of risk minimisation to stakeholders.

Much of the literature written prior to the migration emphasised the risks to system stability and resilience during the migration process, particularly given the materiality and non-routine nature of the change. It is thought that even the most well planned migrations can be subject to these risks. Further, interview discussions emphasised that the manifestation of these risks is particularly pertinent in a payment context, given their reciprocal nature, which must be built on continuously reliable services supporting the transmission and receipt of payment messages. Reliability of payments is such an important determinant of customer satisfaction that any significant instability during this process, however temporary, could have long-term detrimental impacts on the integrity of a given payment system or PSP.

The risks to system stability may be particularly pertinent if implementation timescales are considered too short, as this may, for example, allow insufficient time for testing of new services. Transitional risks may also be more material where a big-bang approach to migration is adopted, rather than a phased migration where there is a period during which the old and new systems run in parallel. Although this phased approach would incur additional costs associated with running the two systems in parallel, it should help to reduce the risk of instability and thus benefit long-term integrity of payment systems. Risks are also likely to have been higher where the migration took place at the same time as other material regulatory changes, as these other regulatory matters may have already imposed significant resource requirements on the business and thus lead to an unsatisfactory level of resources being available for the migration process.

The risks to system stability are, however, likely to have decreased over time due to progression along a learning curve in relation to ISO 20022 XML and SEPA adoption. Therefore, late adopters may benefit from the mistakes and lessons learnt by early adopters of the messaging standard and wider regulation. In that regard, it may be that the non-Eurozone economies who had an additional two years to become compliant with SEPA Regulation, were able to learn from the experience of the Eurozone economies who are already compliant.

If these transition risks were to have materialised, then the costs would have been potentially very significant. As mentioned above, risks materialising at the PSP level could be very damaging to the integrity of that PSP and could, ultimately, damage its competitiveness and customer base. Risks materialising at the level of the core payments infrastructure could cause significant disruption costs, as evidenced by the CHAPS outage in October 2014.⁶³ As a result of this CHAPS outage, 30 per cent of housing transactions

⁶³ Deloitte (2015), "Independent Review of RTGS Outage on 20 October 2014".

were not completed until the next day or later, according to a survey of its members by the Law Society of England and Wales. A similar outage in the context of retail credit transfers, could have serious implications for the timely payment of corporate and government salaries, and state benefit and pension payments.

However, despite many fears and warnings being raised during the transition period, there has been no major crash down to date. Single incidents arose here and there, most of them at PSP level, but without greater consequences, for each incident, than a one-day delay in the processing of payments.

Materiality if realised: High

Likelihood of being realised: Extremely low

4.3 Risks with the use of conversion services

Although, as discussed earlier, there can be strong business cases for using conversion services, it has been suggested that the use of conversion services can increase the risk of errors in payment transactions, if the information is not mapped correctly from the legacy standard to the new ISO 20022 XML standard. Indeed, one survey respondent suggested that the mapping of data from one messaging standard to another is a key challenge when using middleware services and one that can involve significant costs to ensure that the meaning of the message is not lost during payment processing. One of the specific data issues raised was the need to correctly translate the various payment error codes from one standard to another.

Another key risk raised in the survey responses was that there is a risk of truncating the extra information provided by the ISO 20022 XML messaging standard from one end of the payments chain to the other. Although this issue was raised in reference to the use of conversion services, it is not a risk of using conversion services per se, but rather the result of converting from a more capacious messaging standard, i.e. ISO 20022 XML, to typically less capacious legacy standards. Thus continued use of conversion services can increase the issue of data truncation. A survey respondent raised this concern, as the use of middleware means there is no consistent data model across the payment chain. In terms of evidence of these risks actually materialising, the views of respondents were mixed, with one reporting that the use of middleware services had resulted in a "loss of data" and "loss of granularity", and another explaining they had witnessed no evidence of data loss to date.

As a result of this data truncation, use of conversion services could mean that end-to-end payment messages are not as fully enriched as they could be in the absence of conversion services. While this additional functionality may not be of importance to the majority of corporates, for some corporates, who have been demanding the extra richness that ISO 20022 XML can provide, the use of conversion services by their PSP may not be desirable, encouraging them to look for alternative providers. While this increase in service differentials between PSPs may damage the competitiveness of some PSPs, that can be seen as a sign of the market functioning correctly, as it provides a trigger for those demanding additional functionality to search for other providers who can deliver such functionality.

Survey respondents also noted that if the risks of data loss do materialise, that would have knock-on implications for (automatic) reconciliation rates and the number of rejected transactions. An increase in the number of rejected transactions would be of particular concern if the error codes have not been mapped correctly between the standards. Logic would suggest that this could in turn create additional resource costs, as the transaction counterparties would have to follow-up with each other to understand what went wrong with the payments and, in some cases, send the additional information that was not included in the payment message by other means.

From the above arguments it is logical to conclude that the protracted use of conversion services could dilute, in certain ways, the intended benefits of the SEPA Regulation and the adoption of ISO 20022 XML, i.e. by reducing the amount of remittance information that the ISO 20022 XML standard can provide to

PSUs and by reducing reconciliation rates and increasing the number of rejected transactions. Such a protracted use of conversion services may arise as a result of stakeholder inertia. This is because many organisations adopted conversion services in the short-term in order to comply with the SEPA Regulation end-date, as they had insufficient time to implement more fundamental changes Therefore, provided these organisations experience no problems with their conversion services over time, they may not see it as a business priority to move away from this migration model in favour of a more fundamental update of their internal systems. This may be particularly true of PSUs (for whom their core business is not payments), as teams responsible for allocating funding between different initiatives may see this as low priority. Thus, it is possible that we see a protracted use of conversion services and, as a result, potential limits to some of the anticipated benefits that the ISO 20022 XML messaging standard is thought to provide.

A separate concern raised by one survey respondent was that by licensing a specific piece of middleware, the organisation is in effect "putting all of [their] eggs in one basket". This is because to ensure reliable payment flows, the "... service must remain up to date with all amendments and upgrades to the formats and schemas". The survey respondent went on to suggest that some PSUs had experienced problems as a result of this, due to their middleware service experience issues or imposing increased costs after the start date.

Our survey evidence, however, found no material evidence of any of the aforementioned risks materialising in the context of using conversion services. That said, other evidence suggests that risks were more likely to manifest where PSUs and PSPs sought to take advantage of the SEPA migration by expanding the use of ISO 20022 XML to non-SEPA payment transactions.

When initiating and processing payments that are not intended to remain in the SEPA context, stakeholders face more complexity due to the routing complexity associated with multiple country-specific legal requirements. In addition, since these messages are not intended to be kept in the ISO 20022 XML format end-to-end, they must at a certain point of the processing chain be mapped into another format, either to MT standards in a cross border correspondent banking scenario, or else to any domestic format still in use outside the SEPA context. Experience shows that analysis, implementation, testing and ongoing support is more demanding in these scenarios, both in terms of budget and workload. That said, PSUs, particularly large corporates, who chose to move to the ISO 20022 XML standard and away from domestic formats, (including not only the formats used for domestic payments, but also for initiating non-SEPA payments), have noted a positive leverage effect in the global maintenance of their payment processing applications.

As further explained in 5.3.2, it may also be that large PSPs offering worldwide payment factory services are now increasingly demanding to receive ISO 20022 XML messages from their clients, even for domestic non-SEPA schemes (e.g. Bacs in UK or Elixir in Poland). This can be explained by the fact that it is easier to setup centralised payment hubs based on one single standard to perform validation rules, syntax checks, and business assessment of the payment (e.g. credit line checks and anti-money laundering (AML) filtering), compared to having several parallel processing engines, i.e. one for each payment format.

Materiality if realised: Moderate

Likelihood of being realised: **Extremely low**

4.4 Risks of parallel running and delays

Given the risks associated with the migration process that have been described above, in many cases legacy systems were run in parallel with the new ISO 20022 XML-based system in case any problems were experienced with the new ISO-based system. However, the risk of a lengthy period with both systems running side-by-side is the potential for low adoption of the new ISO 20022 XML-based system, in the absence of a specified end date for adoption. Parallel running is also problematic as it creates the problem of data truncation, discussed in section 4.3 above. This is because the legacy system accepts fewer

characters than the new system and can, therefore, mean that a returning message cannot be effectively recognised which may in turn prevent desirable functionalities like automatic reconciliation (as discussed in more detail in section 5.3).

Low adoption may also be the result of a weak business case for adoption. By the very nature of the project, the business case may have often been difficult to develop, as the project may involve large upfront costs to PSPs and PSUs with benefits gained on a more long-term incremental basis. The business case may be particularly difficult to justify where organisations only look at the return on investment over a relatively short, say five-year, time horizon. Add to that the fact that the benefits, again by their nature, are more difficult to predict and quantify, especially given a number of other external factors which may affect the realisation of such benefits, and the business case may become even more difficult to justify and be seen as too risky. In addition, for PSUs, given that payments are not a revenue generating aspect of their business (unlike PSPs), and provided that the existing systems work as desired, there is likely to be little incentive to update systems. In their eyes, it may be a case of "it isn't broken, why fix it?"

Given the above, and the likely constraints on internal resources, the adoption of the SEPA Regulation may have taken low priority relative to other initiatives (until the mandatory adoption end date came into force). Thus delays were common and could be problematic where they led to different parties being out of sync with each other in the migration process. As payments are a network industry, early adopters of the Scheme will have gained only partial benefits, while incurring the additional expense of running two systems (their legacy system and the new ISO 20022 XML-based system) in parallel (albeit their legacy systems costs will have fallen). Furthermore, PSPs who are slow to adopt, and thus continue to make use of legacy systems (as volumes are increasingly migrated to the new system). Hence parallel running can increase costs for both early adopters and slow adopters, although the increased costs faced by the latter should incentivise more timely migration (i.e. it may create a tipping point, whereby the costs of inertia become so high that they induce the migration).

Materiality if realised: Low to moderate

Likelihood of being realised: Moderate

4.5 Risks of differing interpretations of the messaging standard

One of the issues that may limit the potential benefits of the SEPA Regulation moving forward is the different interpretations of the ISO 20022 XML messaging standard implemented in different countries, which may limit the potential gains of interoperability. This could have knock-on implications for, for example, the consistency of remittance information collected by corporates.

The less granular the rulebooks are, the more flexibility in interpretation there is. There was, for example, seen to be a lack of common documentation on bank account reporting standards, resulting in many different ways, often at a national level, of codifying the SEPA transactions. That said, it is recognised that harmonisation in this area is still in its early days and, therefore, with later updates to the rulebooks may come more consistency in interpretation for bank account reporting.

Another particularly problematic area was that related to 'R-messages' coding and documentation within the SDD schemes. R-messages are used by PSPs in reporting back to the initiator (the creditor) to indicate that an SDD transaction could not be processed (R-transaction) and what the underlying reason was for this. It was well documented that there was a significant disconnect between the previous practices and the new standard, and also a range of different interpretations across the different PSPs, i.e. PSPs were making use of different reason codes to indicate the same reason why a specific transaction was not successful. While some national variation is expected, the variations have in some cases been more significant, thus making it difficult for PSPs and PSUs in different SEPA countries to communicate to each other in the same ISO 20022 XML messaging standard. This is the result of the rules being interpreted by various (national-level) communities in different ways. It could ultimately impact on some of the desired benefits of the adoption of the SEPA Regulation and the ISO 20022 XML messaging standard, such as increased STP of payments and related remittance information, as well as jeopardising the native cross border nature of SEPA payments due to different country-level interpretations, notably in R-transactions.

Materiality if realised: Low to moderate

Likelihood of being realised: Moderate to high

4.6 Risk of technological lock-in

Academic literature suggests that the move to a common standard could in fact inhibit innovation, rather than promote it, by increasing the cost of migrating to new superior technologies in the future. In other words, standardisation could lock-in a sub-optimal outcome. This is because the users of the new standard become dependent on that standard and thus unable to use another standard without facing substantial switching costs.

Therefore, while the move to a common standard could reduce monopolistic (vendor) lock-in, whereby an organisation is locked-in to buying its services from a given vendor,⁶⁴ this may determine greater technology lock-in. Technology lock-in can be caused by the fact that users of the technology are locked-in collectively, and in part through one another, such that the move away from this technology (standard) is not individually rational, e.g. the continued use of the QWERTY style keyboard. In such circumstances, the move to a different technology (standard) would be likely to require a big-push of all stakeholders collectively, as such a move is not optimal for any individual stakeholder.

In the context of payment systems, therefore, the migration to a common international standard could be seen as detrimental to the extent that it could hinder the move to a technically superior standard in the future. This would be of particular concern if such a technically superior standard is expected to be available in the very near future. This of course should not be seen as a result of the specific standard being adopted – it applies equally to ISO 20022 XML, as it does to any legacy national standard if that standard were adopted internationally – what matters is that the adoption of any common standard could, in theory, make it more difficult to move to a functionally superior common standard in the future.

Materiality if realised: High

Likelihood of being realised: Unknown

4.7 Risks associated with wider changes to the payments industry

On a related note to the lock-in argument above, it is important to consider how the migration sits as part of the wider changes to the payments industry. It is important to consider how these expected developments may change the economics of payments infrastructure provision and, ultimately, the implications of this for the desirability of the migration itself. There are three main types of change that should be considered:

 User demand changes – changes in consumer and business preferences between different types of payment methods would affect payment scheme volumes and so potentially the business models of different central infrastructure providers.

⁶⁴ This is discussed in more detail in Section 5.2.1.

- Regulatory changes other regulatory changes may underpin further changes in user demand and thus have similar implications to those described above.
- Technological changes the emergence of other technologies may reduce demand for existing payment solutions, which may render large-scale migrations undesirable if more fundamental changes are just round the corner. This ties in closely with the lock-in argument developed above. Of particular note in the payments context is the emergence of distributed ledger based technology (e.g. Bitcoin), which may remove the need for trusted third parties in payment transactions and could have serious knock-on effects on the nature of and demand for central payments infrastructure.

As well as the potential for wider changes in user demand, regulation and technology to materially change the existing structure of the payments industry and hence the desirability of the migration, these wider market developments also impose a practical challenge on the migration to ISO 20022 XML and the SEPA Regulation. Given the finite amount of expertise, the regulation-driven move towards ISO 20022 XML and the SEPA rulebooks may have diverted resources away from other, perhaps more desirable, collaborative projects. Another way of looking at this is that, given available resources, there is a finite capacity for change at any one given time and, therefore, the migration to ISO 20022 XML and the SEPA Regulation may have locked up a significant amount of that change capacity. It may also be that if other major changes were being undertaken concurrently, then the quality of the migration to ISO 20022 XML may have been jeopardised, e.g. insufficient time for testing which could have had knock-on implications for system stability. Thus, whether PSPs and PSUs have sufficient time for adoption, given their other existing commitments, can be a key driver of costs. These risks are not specific to the adoption of ISO 20022 XML, but are rather risks that may materialise as a result of any major project in the payments industry.

Conversely, it may be added that, among other initiatives, an additional European payment scheme dedicated to "instant payments", comparable to UK Faster Payments, will be ready to launch in 2017. This new scheme will allow initiation of euro payments and end-to-end confirmation within 10 seconds of processing time, is fully based on ISO 20022 XML standard, and presents marginal variations compared to the current SEPA Credit Transfer scheme in terms of messaging standard.

Along these lines, it may be underlined that a harmonisation and centralisation project in the field of European security markets, namely Target2 Securities (T2S) is adopting ISO 20022 as its messaging standard. This fact has recently led to the decision of migrating also the existing payment RTGS Target2 (Real Time Gross Settlement in Euro) to the same standard. Up to present, this system was using the legacy MT standard. Upon completion of the project, there will be a full alignment of all major market infrastructures in Europe on ISO 20022 XML.

Materiality if realised: Moderate to high

Likelihood of being realised: Unknown

4.8 Summary of indirect costs

Table 4.2 below presents a summary of the indirect costs presented in this section in terms of their materiality and likelihood of arising.

Table 4.2: Summary of indirect costs

Risk	Materiality	Likelihood
Competition for relevant sources	Low	Moderate to high
System stability	High	Extremely low
Use of conversion services	Moderate	Extremely low
Parallel running and delays	Low to moderate	Moderate
Differing interpretations of the messaging standard	Low to moderate	Moderate to high
Technological lock-in	High	Unknown
Wider changes to the payments industry	Moderate to high	Unknown

5 Benefits

SEPA is a key EU regulatory initiative aimed at simplifying euro payments. More specifically, the SEPA Credit Transfer (SCT) and SEPA Direct Debit (SDD) payment schemes contain sets of rules on the use of agreed standards for the execution of euro-denominated credit transfer and direct debit transactions. These rulebooks can be regarded as instruction manuals on how to transfer funds between accounts held in different banks within SEPA.⁶⁵

In order to execute a payment, a key requirement of the SEPA Regulation is the use of the ISO 20022 XML messaging standard for all communications between the parties involved.⁶⁶ The use of a common messaging standard is thought to allow payment systems in different countries to "speak the same language" to the benefit of payment industry stakeholders and end users. This section looks into this issue in more detail, as well as other benefits associated with the SEPA Regulation and the ISO 20022 XML messaging standard.

There are three key strands to assessing the benefits associated with SEPA and ISO 20022 XML. The first strand relates to the benefits associated with the additional **core product offering** as a result of the SEPA Regulation. The second and third strands relate specifically to the ISO 20022 XML messaging standard: the second strand capturing the benefits of the move to a **common** interoperable messaging standard; and the third strand focussing on the benefits associated with a move to a functionally **superior** messaging standard. Accordingly, this section discusses the benefits, in terms of:

- core product offering;
- interoperability; and
- functionality.

Naturally, the distinction between interoperability and functionality is not as appropriate for some benefits, as these may accrue as a result of both of these factors, as well as potentially their interaction with other exogenous factors.⁶⁷ Moreover, the benefits associated with the move to a common messaging standard may also be influenced by the broader changes induced by the SEPA Regulation (e.g. the use of a single bank account identifier (the IBAN) in all SEPA transactions) and not solely the standard itself. Lastly, as the SEPA Regulation only recently came into full effect,⁶⁸ several of the associated benefits may be at an early stage of manifestation, or may not have emerged yet. We have therefore based our assessment on a multi-dimensional approach involving:

- theoretical considerations from literature;
- evidence from SEPA countries that have fully adopted the regulation, focusing on early adopters; and
- evidence from our stakeholder engagement.

http://www.europeanpaymentscouncil.eu/index.cfm/about-sepa/sepa-vision-and-goals/.

⁶⁵ The SCT and SDD schemes are based on global standards such as, for example, 'IBAN' (International Bank Account Number) and 'BIC '(Business Identifier Code) developed by the International Organization for Standardization (ISO).

⁶⁶ These include the payer, the payer's bank, the payee and the payee's bank, but only for payers and payees who are organisations submitting bundled CT or DD payments.

⁶⁷ For instance, an improvement in transaction speed may be the result of increased interoperability, functionality, a combination of the two, and/or their interaction with the incumbent's processing capacity (e.g. hardware, IT systems/architecture).

⁶⁸ The SEPA regulation defines I February 2014 as the deadline in the euro area for compliance with the core provisions of this Regulation, though this was later postponed to August 2014. In non-euro countries, the deadline was October 2016. See, for example:

This approach provides a framework for a systematic consideration of the types of benefits associated with the migration to the SDD and SCT schemes, focusing on ISO 20022 XML.

5.1 Core product benefits

The most direct benefit of the SEPA Regulation is the formation of a single pan-European payments system for euro-denominated transactions. In this respect, the migration to ISO 20022 XML can be regarded as facilitating, in combination with other aspects of the SEPA regulation, the manifestation of these broader SEPA benefits.

Prior to the rollout of the SEPA Regulation, users of payment systems could complete credit transfers within the euro area, but the process for cross-border payments often took a long time to be completed and payments were subject to considerable interbank fees.⁶⁹ Indeed, interview evidence suggested that, as a result of the SEPA Regulation, cross-border payment costs may have fallen in excess of 95 per cent, from greater than $\notin I$ per transaction to less than $\notin 0.05$ per transaction.

Furthermore, prior to the SEPA Regulation, a bank account was needed in each SEPA country in order to initiate direct debits within that country. In such an environment, companies with a substantial number of cross-border payments had to maintain bank accounts in many of the countries in which they were active in order to promptly and, to the greatest extent possible at the time, cost-effectively respond to their business engagements. This resulted in additional costs (e.g. the administrative costs entailed in holding multiple bank accounts), delays in the completion of transactions, and a general inefficiency in the euro payments landscape.⁷⁰

In contrast, the SEPA Regulation ensures that euro payments are completed within a guaranteed time and banks are not allowed to make any deductions of the amount transferred. In particular, the SEPA Regulation eliminates the differences in charges for cross-border and national payments in euro, including elimination of the \leq 50,000 ceiling previously set for the requirement of equal charges.⁷¹

The above can translate to significant efficiency gains for corporates and government bodies, as well as cost savings for individual consumers, as cross-border payments in euros are rendered as simple and inexpensive as domestic euro payments. Such an outcome can, therefore, significantly improve money management processes through greater efficiency, faster cash flows and lower transaction costs. SMEs not used to cross-border operations may yield significant benefit in this regard, as the facilitation of cross-border euro payments could enable them to more fully exploit the benefits of the Single Market.

Some reports have already attempted to estimate the macroeconomic benefits of the wider SEPA Regulation ex-ante. Capgemini, for example, estimated that, over a period of 6 years, SEPA could generate cumulative benefits of up to ≤ 123 bn.⁷² This is similar to the estimates produced in a PwC report, which found that SEPA could lead to an annual saving of ≤ 21.9 bn across all stakeholders.⁷³

⁶⁹ See e.g. SEPA (2014) "Economic analysis of SEPA: Benefits and opportunities ready to be unlocked by stakeholders".

⁷⁰ See e.g. <u>https://www.ecb.europa.eu/paym/retpaym/paymint/migration/html/index.en.html</u>

⁷¹ See ECB (2014) "The Single Euro Payments Area: migration key facts".

⁷² Capgemini. SEPA: potential benefits at stake – Researching the impact of SEPA on the payments market and its stakeholders. Available at: <u>http://ec.europa.eu/internal_market/payments/docs/sepa/sepa-capgemini_studyfinal_report_en.pdf</u>.

⁷³ PwC. (2014). Economic analysis of SEPA – Benefits and opportunities ready to be unlocked by stakeholders. Available at: <u>http://ec.europa.eu/finance/payments/docs/sepa/140116_study_en.pdf</u>.

5.2 Interoperability benefits

Within the payments context, interoperability refers to the ability of participants in the payment systems to work with a central infrastructure provider or several different providers. In this respect, the benefits of interoperability can be considered in terms of:

- the benefits related to the heightened extent of connectivity to the European Single Market; and
- the benefits purely related to the interoperable nature of the standard itself.

Below, these are presented in more detail.

5.2.1 The Single Market benefits of interoperability

Typically, an incumbent firm has an incentive to deny interoperability in order to benefit from network effects,⁷⁴ "lock in" customers to its products⁷⁵ and thus protect its market dominance. Therefore, the procompetitive argument underpinning the SEPA Regulation and ISO 20022 XML is that the presence of common rules and standards would 'level the playing field' for central infrastructure provision and thus open up incumbent providers to competition from alternative providers during procurement processes. This could be both in the form of increased rivalry between different existing national infrastructure providers in different SEPA countries (i.e. fiercer competition between the same firms, even if the set of competing firms does not expand), but also in the form of market entry by new infrastructure providers.

However, it would be important to recognise that the impact of interoperability on competition is not necessarily as straightforward as it may first appear.⁷⁶ Indeed, there are two plausible channels through which competition could be hindered:

- Firstly, the adoption of a common standard across SEPA countries expands the size of the market for payments infrastructure provision which may, in turn, hinder market entry if the minimum competitive scale (driven by economies of scale) becomes larger.⁷⁷ In this scenario, it would, in principle, be easier for a prospective central infrastructure provider to first gain foothold in a domestic market operating on a specific standard, before expanding its services to other countries (and standards). Therefore, insofar as adopting a common standard expands the size of the market and increases the minimum competitive scale, market entry may become more difficult.⁷⁸
- Secondly, even if competition between central infrastructure providers operating on the new standard does increase, once a new standard is adopted then switching to an alternative standard may become difficult. In this way, standardisation could reduce competition between technologies and ultimately lock in customers to the incumbent standard, despite the presence, or emergence in the future, of a superior standard.

The relative significance of these pro- and anti-competitive factors may differ on a case-by-case basis, depending on the standard in question and the market structure(s) in question. Survey evidence on the implementation of the SEPA Regulation suggests the prevalence of the pro-competitive argument, with one interview respondent describing the migration as a "field-levelling mechanism" for competition.

⁷⁴ The network effect is a phenomenon whereby a good or service becomes more valuable when more people use it.

⁷⁵ A lock-in effect may be described as a situation where an individual is "locked" to a particular product due to the significant costs that arise when considering alternatives as a result of their incompatibility with the current product (i.e. switching costs).

⁷⁶ See e.g. Gupta, K. (2015) "Technology Standards and Competition in the Mobile Wireless Industry" Geo. Mason L. Rev., Vol 22, p. 865-1021 and Dufey, G. (2013) "Patents and standardisation: Competition concerns in new technology markets" Global Antitrust Review 2013.

⁷⁷ The minimum competitive scale is the minimum size of production a company must achieve in order to be competitive in a given market.

⁷⁸ That said, even with low or no entry into the market, competition can still increase as a result of greater competitive pressure between existing providers.

The survey evidence illustrated in Table 5.1 below indicates that more than two-thirds of respondents have witnessed an increase in competition in the provision of payment services as a result of the migration to ISO 20022 XML, with 30 per cent witnessing a significant increase in competition. A similar pattern was found for both PSP and PSU responses.

Table 5.1: Impact on	competition	in the	provision	of payment	services

Impact on competition	Percentage of respondents
Significant increase	32%
Slight increase	39%
No change	29%
Decrease	0%

Source: Europe Economics' analysis based on 29 responses

When asked separately about the impact on competition at different levels of the value chain, Table 5.2 shows that in all cases the percentage of survey respondents indicating an increase in competition exceeded those indicating a decrease. The impact on competition amongst PSPs was seen to be the most beneficial, with three-quarters of respondents indicating an increase in competition and none indicating a decrease in competition. 46 per cent of respondents stated that there was a beneficial impact on competition at the central infrastructure level, while only 8 per cent of respondents, which were PSPs, indicated a decrease in competition.

Table	5.2:	Impact	on	competition	in	the	provision	of	payment	services	at	different	levels	of	the
payme	ents v	value cha	in												

Impact on competition	Central infrastructure provider	Payment Service Provider	Technology providers
Significant increase	23%	25%	9%
Small increase	23%	50%	27%
No real change	46%	25%	45%
Small decrease	0%	0%	9%
Significant decrease	8%	0%	9%

Source: Europe Economics' analysis based on 36 responses

In support of this survey evidence, the experience of SEPA in Eurozone countries provides an example of a competitive model for payment systems as in Belgium, the tendering of the country's low-value bulk system resulted in a new, SEPA-compliant, system replacing the incumbent one.⁷⁹ Some interview evidence has suggested that this is just part of a temporary increase in competition (or 'rivalry') as a result of national central infrastructure providers entering into the same market. In other words, the initial increase in competition caused by central infrastructure providers entering induced by the *change* in payment environment, rather than the *actual* payment environment. PSPs may have considered whether the SEPA Regulation and the adoption of ISO 20022 XML had any implications for their preferred infrastructure provider and, therefore, whether they wished to switch provider, thus leading to a temporary increase in switching and competitive pressure. However, this temporary increase may then fade once the new SEPA environment settles and, as such, there is no longer a significant trigger for switching infrastructure provider.

By expanding competitive pressures at the infrastructure level, theory would suggest that PSPs can reap the benefits of increased bargaining power when negotiating with prospective central infrastructure providers over transaction fees. This was verified during our stakeholder engagement process, where it was further suggested that PSPs with centralised systems can stand to benefit the most in this respect, due to the sheer volume of transactions they can offer to a potential provider. The respondent stressed that provision of

⁷⁹ See, for example, Lipis Advisors (2015) "Payment system ownership and access models: Comparative analysis of 13 countries".

central infrastructure for payments is a volume based business, as the price per transaction is extremely low and, therefore, the focus of central infrastructure providers is on attracting large volume clients.

Interview evidence on the effect on competition at the central infrastructure level was mixed. Some stakeholders suggest that competition has been becoming increasingly fierce since SEPA and that this has been driving efficiency gains at the central infrastructure level, as well as improvements in the pricing and quality of central infrastructure service offerings. One way in which this has been manifested is in the increase in the number of clearing cycles. While transactions were typically settled and cleared the next day, central infrastructure providers are increasingly adding more intraday clearing cycles in order to compete with one another, such that the service is increasingly resembling an instant payment service. In terms of increased price competition, one interview respondent suggested that transaction prices may have fallen to as little as one-tenth of the level they were at prior to the SEPA Regulation, although such observations were not shared by other interview respondents. It was acknowledged that any disaggregation of a price decrease between ISO 20022 XML and the wider SEPA Regulation was extremely difficult, but that what can be said is that ISO 20022 XML is the main tool, or enabler, around which a common scheme could be built.

The respondent went on to suggest that this increased competition could be used by banks to renegotiate their existing deals with central infrastructure providers, as the latter would not want to run the risk of losing PSP customers. This argument was based on the respondent's view that it was easy to switch infrastructure providers, due to the use of a common messaging standard and similar risk mitigation strategies.⁸⁰ However, other respondents suggested that while migration to the new messaging standard should improve competition in theory, in reality switching infrastructure providers is not so straightforward due to a number of other factors.⁸¹ In other words, while the use of a common messaging standard lowers barriers to switching to some extent, other barriers are thought to remain, including: ⁸²

- undertaking compliance assessments and establishing new contractual agreements;
- implementing a volume migration strategy with a period of parallel running at the old and new infrastructures;
- the implementation of new connections, gateways and interfaces;
- ensuring end-to-end testing of the new infrastructure; and
- identification and execution of other necessary operational process changes.

One central infrastructure provider said that ISO 20022 XML in isolation would not be sufficient to significantly increase competition or reduce the prices charged by CSMs, but that ISO 20022 XML was nevertheless part of the wider trend towards standardisation that would help to improve competitive pressures in the market and potentially lower infrastructure charges to PSPs over time. This central infrastructure provider did say, however, that infrastructure charges may reduce over time as a result of standardisation leading to increased economies of scale for central infrastructure providers and, thus, lower costs per unit being passed onto PSPs in lower charges. Of course the extent to which these cost savings at the central infrastructure level are passed onto PSPs in lower charges will itself, in part, depend on the degree of competition at the central infrastructure level.

⁸⁰ This was also seen to underpin the fact that PSPs were often now contracting two central infrastructure providers concurrently, which is beneficial for the resilience of the PSP's payment service. In such circumstances, if a technical problem is experienced with one infrastructure, then the PSP could switch volumes to the other infrastructure to compensate.

⁸¹ Another respondent said that there would be limited impact on competition because every market player must provide the new ISO 20022 XML-compliant service and, therefore, it should not give any one any competitive advantage.

⁸² See, for example, PSR (2016) "Consultation responses: Market review into the ownership and competitiveness of infrastructure provision – Interim Report".

Other interview evidence suggested that it would be difficult for a new central infrastructure provider to establish itself in the SEPA region, as infrastructure provision is an industry that requires a proven track record and sufficient amount of volumes to be viable. Incumbent PSPs' compliance requirements would typically include experience and volume criteria when considering switching to a new provider as, due to the network effects characterising the industry, there are limited benefits to being among the first movers to a new central infrastructure provider. On the contrary to seeing new market entry, one interview respondent suggested that the SEPA Regulation had led to market consolidation, with the market being increasingly dominated by a small number of large central infrastructure providers. The rationale provided was that downward pressure on revenues per transaction had led to an increasing push to secure volume, and as such has led to smaller central infrastructure providers exiting the market or diversifying to other services (with four exiting the market to date and, perhaps, more in the near future).

The evidence that SEPA has driven more competition is more straightforward regarding greenfield projects. One example of this is the SEPA Instant Credit Transfer ('SCT Inst'). In 2015, EBA Clearing launched a Request for Proposal for the pan-European instant payment infrastructure.⁸³ As mentioned in the Lipis report commissioned by the PSR, competitive tenders for payments central infrastructures are rare. Therefore, such competitive tenders are a sign that there could be more competition in the provision of central infrastructure in the SEPA area. SIA was selected as the preferred provider in this instance, although it should be noted that SIA was already the incumbent provider of EBA Clearing's SCT and SDD services at this time.⁸⁴ Evidence of cross-border collaborations has also been observed with respect to the new SCT Inst. In Italy, Istituto Centrale delle Banche Popolari Italiane (ICBPI) has partnered with the Danish infrastructure provider Nets to provide Italian Instant payments.⁸⁵

There is a consensus in the literature and survey evidence of the beneficial impacts on competition at the level of the PSPs, particularly as PSPs compete to win the business of larger corporates. Table 5.2 above showed that 75 per cent of survey respondents reported an increase in competition amongst PSPs, with no survey respondents indicating a detrimental impact on competition. Increased competition among PSPs for corporate business could be for two main reasons:

- Firstly, interoperability means that corporates can more easily look beyond national borders and consider PSPs across the SEPA region as potential service providers, thus the sheer number of competitor PSPs in the market should increase as the market expands beyond national boundaries to the entire SEPA area.
- Secondly, the additional information that is included in the richer ISO 20022 XML messaging standard (as is discussed in more detail in Section 5.3) is valuable to large corporates in improving their backoffice systems, e.g. by automating reconciliation processes. Therefore, irrespective of the number of PSPs in the market, there should be increased competition between PSPs to develop and provide additional services to PSUs.⁸⁶

With regard to the second bullet point, PSPs in several SEPA countries have already started to offer Additional Optional Services (AOS) in order to build differentiation and win market share.⁸⁷ While such innovations can also be attributed to the functional features of ISO 20022 XML (as discussed in Section

⁸³ Finextra (2015). EBA Clearing goes to tender for pan-European instant payments platform. [online] Available at: <u>https://www.finextra.com/news/fullstory.aspx?newsitemid=27939</u> [Accessed 25 Oct. 2016].

⁸⁴ Finextra (2016). SIA signs letter of intent for EBA Clearing instant payments platform. [online] Available at: <u>https://www.finextra.com/news/fullstory.aspx?newsitemid=28443</u> [Accessed 26 Oct. 2016].

⁸⁵ Finextra (2016). ICBPI partners Nets for Italian instant payments. [online] Available at:

https://www.finextra.com/newsarticle/28964/icbpi-partners-nets-for-italian-instant-payments [Accessed 26 Oct. 2016].
 One interview respondent noted that the ability to sell additional remittance information to corporates, enabled by ISO 20022 XML, helped provide banks with more of a business case for ISO 20022 XML (to help offset the upfront costs of investing in back-office systems). This respondent also noted an increase in corporate requests for proposal for banking services since the migration took place.

⁸⁷ See e.g. Accenture (2015) "How to gain competitive edge in payments in the Single Euro Payments Area (SEPA)".

5.3), they are also reflective of the increased efforts made by PSPs across SEPA to gain a competitive advantage and increase their market shares. An example of an AOS is CORI, which is offered by a number of banks to corporates operating in Austria, Germany and Spain who faced disruption to their business due to the longer clearing cycles entailed in SDD Core, relative to the legacy DD processes.⁸⁸ CORI has helped corporates to again achieve the benefits of the shorter DD submission deadline. Further examples of AOS are discussed in Section 5.3 on the functionality benefits.

With regard to these additional service offerings, Table 5.3 below shows what PSPs said when asked what the impact of the migration was on their ability to offer new services and products. 80 per cent of PSP respondents said there was an increase in their service offerings as a result of the migration.

Impact on product/service you can offer	% of PSP respondents
Significant increase	25%
Slight increase	55%
No change	15%
Decrease	5%

Table 5.3: Impact on product and services you can offer (PSP responses)

Source: Europe Economics' analysis based on 20 PSP respondents.

Table 5.4 below shows that one third of PSU respondents said that there was a positive change in the product or service offering they received, with 10 per cent reporting a significant increase. This potentially suggests that the new products and services being offered by PSPs are not offered across all PSU clients. Evidence from interviews and literature suggested that PSPs increased service offerings would primarily be of benefit to larger, more multinational corporates, who are likely to value the additional services that can be offered as a result of the migration, while the service offering to small- and medium-sized corporates is likely to remain largely unchanged. However, while those who reported an increase in service offering where all large multinational corporates, there were also large multinational corporates amongst those who reported no change in service offering, which may suggest that not all large PSUs value the additional services that can be provided under ISO 20022 XML.

Table 5.4: Im	pact on produc	t and services	you are offered ((PSU responses)
1 abic 3.4. 111	pace on produc	c and set vices	you are onered ((1 30 Tesponses)

Impact on product/services you are offered	% of PSU respondents
Significant increase	10%
Slight increase	20%
No change	70%
Decrease	0%

Source: Europe Economics' analysis based on 10 PSU respondents.

Overall, the ability of different payment systems across countries to "speak the same language" (i.e. a common messaging standard) seems to have contributed to an increase in competition, at a number of levels. Even in the case of central infrastructure provision, where the evidence of competition having increased is less straightforward than elsewhere, it appears that there has been some effect, if only through ISO 20022 XML being part of the wider move towards standardisation in the payments industry.

Such increases in competition have the potential to contribute to:

- lower prices for clearing services;⁸⁹
- more bespoke/tailored offers by PSPs in order to attract PSUs, especially large corporates; and

⁸⁸ See e.g. <u>http://www.europeanpaymentscouncil.eu/index.cfm/sepa-direct-debit/use-of-sdd-core-options/</u>.

⁸⁹ Lower prices for clearing services are also likely to be the result of increased standardisation leading to increased economies of scale in infrastructure provision, which feeds through as lower costs and, ultimately, as lower prices to PSPs.

• greater scope for the emergence of innovations in payments-related applications/services (e.g. mobile banking, e-invoicing).⁹⁰

5.2.2 Other benefits of interoperability

Apart from the interoperability-induced competition effects of ISO 20022 XML, the implementation of the new standard has led, and could further lead, to additional benefits not necessarily related to increased competition but, rather, to the interoperable nature of the standard itself.

Transaction processing times and costs

Firstly, as all SEPA countries use ISO 20022 XML, its application can reduce the time and costs required for translating messages from one payment messaging standard to another. As a result, it can improve the rate of Straight-Through-Processing (STP), which refers to transactions which are conducted electronically with minimum or no need for manual intervention. Survey respondents highlighted increases in STP as one of the most important interoperability benefits of the migration to ISO 20022 XML (as seen in Table 5.8 at the end of this section).

The implementation of the ISO 20022 XML has allowed some PSPs to rationalise their current use of different standards, both across back-office systems and across geographies, thus reducing the need to translate between different standards. It has been posited that the reduction of such translation requirements could result in decreased transaction processing costs and transaction processing times, particularly in the case of cross-border transfers.⁹¹ Table 5.5 and Table 5.6 below report the survey evidence with regard to transaction processing times and costs respectively.

Table 5.5 shows that about a quarter of respondents have observed an increase in transaction processing times as a result of the migration. Indeed, some interviewees suggested that this might be driven by the SEPA Regulation resulting in a switch to a "t+1" transaction basis for domestic transactions, when domestic transactions had previously typically completed on the same day.⁹² Therefore, while in theory, the move to a common messaging standard provides the opportunity to reduce transaction times, the rules of the SEPA Regulation may mean that such improvements have not been realised.⁹³ Among PSP survey respondents, 39 per cent indicated no change, 28 per cent an increase in transaction processing times and 33 per cent a decrease. For PSUs, the large majority (73 per cent) said that there had been no change in transaction processing times.

Impact on transaction time	Percentage of all affected parties	Percentage of affected PSPs	Percentage of affected PSUs
Increased significantly	19%	22%	9%
Increased slightly	6%	6%	9%
No change	50%	39%	73%
Lowered slightly	6%	11%	0%
Lowered significantly	19%	22%	9%

Table 5.5: Impact of ISO 20022 XML on transaction processing time

Source: Europe Economics' analysis based on 32 respondents.

Table 5.6 below shows that whilst the considerable majority of PSUs felt that their transaction costs had either fallen or been unaffected (82 per cent), most PSPs (53 per cent) said that there had been an increase in transaction processing costs. This suggests that the considerably higher convenience and lower cost to

⁹⁰ Note that innovations may also be the result of potentially superior functional features of the ISO 20022 XML messaging standard (see section 5.3 below).

⁹¹ The reductions in transaction costs were also among the most important interoperability benefits of the migration to ISO 20022 XML, according to our surveyed stakeholders.

⁹² The times for cross-border transactions, on the other hand, decreased significantly.

⁹³ In particular, the SCT rules state that for transactions after 10.30am CET, settlement is next day (i.e. T+1).

PSUs of carrying out cross-border SCTs and SDDs far outweighs any additional processing complexities associated with the more complex ISO 20022 XML standard relative to the previous domestic standard. By contrast, one interpretation would be that a material proportion of PSPs find that the costs of bearing the main burden of adjusting away from domestic standards that were more parsimonious and targeted at their specific requirements, to a standard that works better on a cross-border basis, results in a net increase in transaction processing costs.

Impact of transaction cost	on Percentage of all affected parties	Percentage of affected PSPs	Percentage of affected PSUs
Increased significantly	16%	24%	0%
Increased slightly	23%	29%	18%
No change	26%	24%	36%
Lowered slightly	13%	12%	9%
Lowered significantly	23%	12%	36%

 Table 5.6: Impact of ISO 20022 XML on transaction processing cost

Source: Europe Economics' analysis based on 31 respondents.

Centralisation, consolidation and rationalisation

Much of the ex-ante commentary on SEPA implementation stressed how the move to a common messaging standard would facilitate the consolidation and centralisation of payment systems (and associated back office systems, e.g. cash management systems), as well as the rationalisation of bank accounts.⁹⁴ By providing organisations with such opportunities, it was seen to have the potential to significantly lower ongoing payment related costs. Here, ongoing payments-related costs refer to something much broader than the transaction processing costs discussed above, as the latter simply refer to the specific cost associated with one payment transaction being processed. 'Ongoing payments-related costs', on the other hand, refer to the broader ongoing costs of conducting payments-related activities, including the costs of operating, monitoring, maintaining and upgrading relevant systems and processes associated with payments-related activities.

It was clear from interviews that many large international PSPs took the migration to ISO 20022 XML as the opportunity to consolidate their back office systems in one country and then, from that one central location, have the ability to reach any system in the SEPA area.

In the absence of centralisation, PSUs previously held bank accounts across multiple geographies for transactions taking place within those different geographies. If a corporation operated through subsidiaries in different countries (with each subsidiary operating through a bank in its own country), then previously this corporation would have needed to initiate payments through each subsidiary's bank using the messaging standard(s) specific to that country. PSUs can therefore benefit by consolidating and thus centralising their accounts at one bank in the SEPA area. The PSU can then use that bank to initiate all of its payments, thus reducing the administrative costs of maintaining accounts in different countries and the operational costs associated with employing IT staff with experience in the messaging standard of each specific country.

Therefore, the migration to a single standard has the potential to create significant economies of scale for both PSPs and PSUs, lowering their per unit operational costs. These economies of scale are likely to be particularly significant for stakeholders who currently deal with multiple messaging standards on a regular basis as a result of their multinational operational scope. SMEs may also stand to benefit as, by streamlining the processes for both domestic and international payments, the ISO 20022 XML messaging standard may make it easier for firms to access other locations. Such an outcome could allow SMEs to expand their business beyond their domestic borders to other markets.

⁹⁴ See, for example, Deutsche Bank (2013), "The Ultimate Guide to SEPA Migration".
In terms of survey evidence, consolidation was rated by respondents as the most important interoperability benefit of ISO 20022 XML, with an average score of 3.35 indicating that this benefit was seen as quite significant. Furthermore, interview evidence suggested that consolidation, centralisation and rationalisation would be a key driving force behind ongoing processing cost savings. The survey evidence does indeed demonstrate such a reduction in ongoing processing costs for both PSPs and PSUs.

The majority of respondents (62 per cent) indicated a decrease in ongoing payment related costs as a result of the migration to ISO 20022 XML. Further, when decomposing the results across PSPs and PSUs, it can be observed that, among those PSPs who suggested a change in ongoing processing costs, the majority indicated a decrease. This finding is more pronounced among PSUs, with 77 per cent of PSU respondents reporting a decrease in ongoing processing costs. Noticeably, a little over a quarter of PSPs suggested an increase, while no PSU did so. Those who reported ongoing costs to be over 25 per cent more costly were non-Eurozone PSPs. The increased costs faced by these PSPs may be explained by the additional costs of operating two messaging standards (i.e. ISO 20022 XML and the legacy one) in parallel. It could also reflect the fact that, for PSPs with primarily non-Eurozone operations, SEPA may have represented an entirely new payment option for which the PSP previously offered no close substitute and, therefore, is a new service which brings with it the ongoing costs of running that service.

Impact ongoing costs	Percentage of all affected parties	Percentage of affected PSPs	Percentage of affected PSUs
Over 25% less costly	5%	0%	11%
10% to 25% less costly	24%	17%	33%
Up to 10% less costly	33%	33%	33%
No change in costs	19%	17%	22%
Up to 10% more costly	5%	8%	0%
10% to 25% more costly	10%	17%	0%
Over 25% more costly	5%	8%	0%

Table 5.7: Impact of ISO 20022 XML on ongoing processing costs

Source: Europe Economics' analysis based on 21 respondents.

Improved cash management and liquidity

For a PSU, interoperability can lead to greater automation of other back-office processes, such as timelier invoicing and account reporting. It is suggested that this can lead to increased transparency of cash flows and increased efficiency of cash management.⁹⁵ STP enhancements enabled by the new standard are also likely to shorten cash conversion cycles (which is the length of time required between a firm's purchase of inventory and the receipt of cash from accounts receivable). Improvements in the efficiency of cash management may also result from the consolidation and centralisation of cash management systems, for the reasons described above, as alluded to by one interview respondent. Ultimately, these improvements in cash management may translate into improved liquidity and, therefore, reduced liquidity risk. This could theoretically result in lower future interest rate payments, as a result of the reduced liquidity risk of a business.

One PSP interview said that ISO 20022 XML can help corporates better utilise their cash, improve liquidity and reduce overdrafts. This sentiment was echoed by a technology provider who said that the enhanced cashflow and cashflow reporting would enable better liquidity management by corporates. However, the respondent stressed that the extent to which these benefits are realised would very much depend on how the PSUs connect to their banks and the PSU's own initiative in exploring the benefits that ISO 20022 XML can unlock for their business. Among the list of interoperability benefits (shown in Table 5.8 below), improved cash management was rated, on average, as 3.17 indicating a material benefit, while improved

⁹⁵ See ECB (2016) "The single euro payments area (SEPA): An integrated retail payments market".

liquidity was rated, on average, as 2.83 indicating that benefits were of only marginal materiality (and less significant than most other interoperability benefits associated with ISO 20022 XML).

Improved transaction traceability and AML processes

It is suggested that a reduction in money laundering practices may be achieved as a result of the improved transaction traceability enabled by the move to a common messaging standard. However, relative to the aforementioned interoperability benefits of the move to ISO 20022 XML, this aspect was among the least important according to the surveyed stakeholders. This finding was supported by the interview evidence, which suggested little impact on AML processes as a result of the migration.⁹⁶

Rating of interoperability benefits

The following table includes a rating of all interoperability benefits as perceived by survey respondents. Survey respondents were asked to rate the significance of such benefits on a scale of I, 'highly insignificant', to 5, 'highly significant'. It can be observed that the most important benefits relate to greater consolidation of payment platforms/applications, more STP and improved cash management.

Table 5.8: Rating of interoperability benefits

Interoperability benefit	Rating	
Consolidation of payment platforms/applications	3.35	
More straight-through processing	3.30	
Improved cash management	3.17	
Consolidation of external communication interfaces	3.05	
Rationalisation of payment accounts/banking relationships	3.05	
Enhanced transaction traceability and tracking	3.05	
Lower transaction or clearing service costs	3.00	
Improved liquidity	2.83	
More bespoke offers from infrastructure service	2.61	
providers/payment service providers		
Improved anti-money laundering processes	2.39	

Source: Europe Economics' analysis based on 20 respondents. (1 = highly insignificant; 5 = highly significant)

5.3 Functionality benefits

Aside from the benefits associated with a move to a common messaging standard, it is also suggested that the move to ISO 20022 XML can provide several other benefits as it is a **technically superior** standard.

⁹⁶ Improved AML processes may also be considered as a result of the superior functionality of the ISO 20022 XML messaging standard, as described in Section 5.3.

Firstly, the ISO 20022 XML messaging standard can be seen to provide both more granular information and a more well-structured format. When stakeholders were asked to rate the significance of different functionality benefits, enhanced structured payments data was rated the most important functionality benefit of ISO 20022 XML (as shown in Table 5.9), with an average rating of 3.67 indicating that this benefit was seen as amongst the most significant of all the benefits (of any form) identified. The ISO 20022 XML messaging standard includes details such as account numbers, names, addresses and other identifying information, as well as offering discrete data on the relationships between parties (e.g. the <UltimateDebtor> and <UltimateCreditor> data fields), intermediate and receiving roles, and geographies of the participants. As a result, and as supported by a number of interview respondents, the structure of ISO 20022 XML can improve the automation of scanning and compliance processes, thus reducing the costs entailed in regulatory reporting, compliance and auditing.⁹⁷

Another functionally desirable feature of ISO 20022 XML is its rich XML-based syntax. As described in Section 2, the ISO 20022 XML format is very readable (as each piece of data has a discrete element). This can facilitate scanning and processing, thereby reducing the costs which may be associated with undertaking such processes more manually.

The XML format is also regarded as particularly transparent, as end-users can more easily interpret messages, trace and solve errors or identify inconsistencies during payments reconciliation. This improved transparency could support financial conduct investigations,⁹⁸ and improve the quality of AML processes to help facilitate the detection of fraud, organised crime financing and tax avoidance. That said, reduced risk of fraud and improved AML processes received the lowest average rating among survey respondents of 2.73 (see Table 5.9), suggesting that this is not a significant benefit. Some interview respondents said that, despite potential improvements in readability, the same information was available when using the legacy standard as is now available under the ISO 20022 XML standard and, therefore, they said that they did not anticipate any improvements in traceability and AML processes as a result.

It has also been suggested in the literature that existing payment standards have been limited in terms of the amount of remittance information they can support and that this has been a barrier to the greater adoption of electronic payments and thus prolonged the use of paper-based payment methods.⁹⁹ Therefore, by providing greater remittance information, the move to ISO 20022 XML may help support the transition from paper money to electronic money. This in turn could reduce the size of the criminal economy and the frequency of money-laundering as, in the greater absence of paper money, audit trails would not be so easily broken.¹⁰⁰ Despite the theoretical appeal of this argument, the survey evidence presented in Table 5.9 below suggests that any causal link between the adoption of ISO 20022 XML and improvements in AML processes or reduced fraud is weak (with a significance rating of only 2.73). Therefore, this somewhat undermines the plausibility of this benefit.

A further benefit of ISO 20022 XML is that it has the capacity, in theory, for unlimited remittance data. This is in contrast to many legacy data standards which offer only a limited number of characters in the data sent, which may have previously impeded the quality of payments reconciliation and transaction traceability. Even in cases where countries have set a limit on the data to be included in a message, additional optional fields can be used to enable the inclusion of all relevant information in the payment message. Stakeholders suggested that such features reduce the costs associated with retrieving and collating information that gets

⁹⁷ See e.g. NACHA (2015) "Introduction to ISO 20022 for US financial institutions".

⁹⁸ See e.g. <u>http://www.ibm.com/developerworks/data/library/techarticle/dm-1307isopayment/</u>

⁹⁹ See, for example: SWIFT (2016), "Adoption of ISO 20022 for Payments and Extended Remittance Information in Canada".

¹⁰⁰ Cash is widely used in the criminal economy and remains the raw material of most criminal activity. In many cases, even when the proceeds of a crime are initially generated in electronic form, criminals may choose to withdraw the funds from a bank account in cash, transport it to another country, and pay it into another account in order to break an audit trail. See FATF (2015) "Money laundering through the physical transportation of cash".

truncated during conversions, leading to additional information having to be sent via other channels (e.g. by emails or fax).¹⁰¹

As discussed in Section 5.2.2, PSPs in several SEPA countries have already started to offer several innovative features to their customers. This is in the form of Additional Optional Services (AOS) provided by individual PSPs, or communities of PSPs, to meet further specific customer requirements. This includes, for example:

- AOS2 is an AOS launched in Finland, one of the first countries to fully embrace the SEPA regulation.¹⁰² AOS2 allows corporates making SCTs to provide additional and more structured remittance information as part of the payment, thus allowing the further automation of reconciliation processes.
- SEPA Credit Transfer Reversal is an AOS available in France that allows for the reversal of wrongly sent SCT transactions using ISO 20022 XML messages. The types of errors covered are strictly limited to duplicate transfers, or technical problems resulting in erroneous BIC/IBAN specifications, or erroneous amounts being transferred.¹⁰³
- Change Account Information (CAI) is another AOS offered in France through which ordering parties of SCTs and SDDs are notified of any changes to the counterparty's account information (e.g. when counterparties had moved to another bank).¹⁰⁴ Subscribers to the CAI AOS can therefore enjoy efficiencies in the form of reduced time spent chasing changed account information.

While some of these are provided by local, national or pan-European communities of banks on a collaborative basis, other AOS are provided by individual banks to their customers as specific value added services to help PSPs differentiate themselves in the competitive space. Survey evidence finds that the development of such innovative products and services is the second most important functional benefit of ISO 20022 XML, receiving an average rating of 3.65. This was corroborated by interview respondents, who pointed to the potential for enhancements in customer-bank relations as a result of the increased functionality of the ISO 20022 XML messaging standard.

In addition to the above, the well-structured standardised format of ISO 20022 XML data could lead to more banks offering a digital exchange of the invoice document between a supplier and a buyer (i.e. e-invoicing).¹⁰⁵ For corporate buyers, e-invoicing could enable the full automation of supplier payment processes, while technology providers could also benefit from access to supply chain finance.¹⁰⁶ Moreover, when an invoice is presented electronically in a very short period of time, as opposed to say in 20-30 days, both buyers and sellers are likely to benefit from easier and quicker access to finance (i.e. short-term credit to optimise working capital). E-invoicing is also likely to reduce ongoing financial/administrative costs via the automation of the invoicing process.

Another benefit that is likely to be the outcome of the innovation effects of the transition to ISO 20022 XML relates to expanding the concept of harmonised payment formats to other fields of customer-bank communications (e.g. e-banking). More specifically, at present, account management functions (e.g. opening, closing, or changing the parameters of accounts), even when conducted online by the account holder, are considerably paper-intensive and heavily rely on email and fax exchanges across several bank divisions.¹⁰⁷ In

¹⁰¹ See, for example: SWIFT (2016), "Adoption of ISO 20022 for Payments and Extended Remittance Information in Canada".

¹⁰² See Federation of Finnish Financial Services (2016) "Description of additional optional service 2 (aos2) applied in Finland to SEPA credit transfer".

¹⁰³ See: <u>http://www.cfonb.org/fichiers/20130612181716_9_2_CFONB_AOS_SCTR_Overview_V01_2012_02.pdf</u>.

¹⁰⁴ See IBOS (2013) "SEPA information exchange: Transitional Provisions, Additional Optional Services, and other complications for the migration".

¹⁰⁵ See e.g. ECB (2015) "E-invoicing solutions related to retail payments-the way forward in SEPA".

¹⁰⁶ Supply chain finance is a set of solutions that link the various parties in a transaction (i.e. the buyer, the seller and the institution offering financing) in order to optimise cash flow by allowing businesses to lengthen their payment terms to their suppliers, while providing the option for their large and SME suppliers to get paid early.

¹⁰⁷ See NACHA (2015) "Introduction to ISO 20022 for US financial institutions".

this regard the use of ISO 20022 XML for e-banking related messages could enhance account management processes by fully automating them, thereby reducing processing costs.

Rating of functionality benefits

The following table includes a rating of all functionality benefits as perceived by our interviewed stakeholders. As described earlier, survey respondents were asked to rate the significance of such benefits on a scale of I, 'highly insignificant', to 5, 'highly significant'. It can be observed that the most important benefits relate to enhanced structured payments data, greater scope for innovations and value added services to emerge, and easier e-payments reconciliation and invoicing. It is worth noting that all three of these functionality benefits were rated as more significant than any of the interoperability benefits by respondents.

Table 5.9: Rating of functionality benefits

Functionality benefit	Rating
Enhanced structured payments data	3.67
More innovation/Value added services/applications	3.65
Easier (e-)payments reconciliation and invoicing	3.44
More timely and accurate account reporting	3.11
Reduced risk of fraud and improved anti-money laundering processes	2.73
Source, Europe Economics' enclusic based on 19 year endents. (1 - highly insignificanty E - highly significant)	

Source: Europe Economics' analysis based on 18 respondents. (1 = highly insignificant; 5 = highly significant)

5.4 Summary of benefits

As emphasized above, a number of benefits that might not yet be apparent might nonetheless be realised eventually. Therefore in the table below we compare the benefits identifiable so far to those that were expected in advance of the regulation.

Issue	Pre-regulation hypothesis	Has the benefit arisen as originally expected?	Strength of evidence
Core product benefits	Promptly executed and cost-effective euro- denominated credit transfers and direct debits	Survey evidence supportive of literature	Strong
Interoperability impacts	Increase in competition for infrastructure provision	Survey evidence mixed	Moderate
	Increase in competition among PSPs, especially for large corporates	Survey evidence supportive of literature	Strong
	Product differentiation and innovation in services provided by PSPs to larger PSUs	Survey evidence supportive of literature	Strong
	Reduced transaction processing times and costs	Survey evidence mixed	Weak
	Improved cash management and liquidity	Survey evidence supportive of literature, although suggesting a less significant effect	Moderate
	Centralisation and rationalisation of payment systems	Survey evidence supportive of literature	Strong
	Improved AML processes	Survey evidence not supportive of literature	Weak
	Facilitation of transition to electronic money and reduction in size of criminal economy	Survey evidence undermines plausibility of benefit	Weak
Functionality impacts	More granular information included	Survey evidence supportive of literature	Strong
	Readable and user-friendly message syntax	Survey evidence supportive of literature	Strong
	Increased remittance data	Survey evidence supportive of literature	Strong
	Transparent format	Survey evidence supportive of literature	Strong
	Facilitation of e-invoicing	Survey evidence supportive of literature	Strong
	Facilitation of e-banking	Survey evidence supportive of literature	Strong
Benefit differences across stakeholders	Interoperability benefits mainly accrued to PSUs	Survey evidence supportive of literature	Strong
	Large PSUs stand to gain from interoperability more than small PSUs	Survey evidence supportive of literature	Strong
	Functionality benefits mainly accrue to PSPs and large PSUs	Survey evidence supportive of literature	Strong
Do the benefits differ between Eurozone and non-Eurozone?	Benefits are more pronounced in Eurozone countries, given the large volume of transactions	Survey evidence supportive of literature	Strong

Table 5.10: Summary of the way benefits identifiable so far compared to those that were expected in advance

Source: Europe Economics research

6 Implementation

This section presents our analysis of the implementation of the SEPA Regulation and the ISO 20022 XML messaging standard from a top-down perspective. In other words, the focus is not on individual firm-level implementation, but on SEPA-wide and national implementation initiatives, focusing on three key areas:

- migration planning;
- the role of coordinating bodies; and
- the lessons learnt.

The analysis is based on evidence collected through desk-based research and discussions with coordinating bodies (including those outside the SEPA jurisdiction).

6.1 Migration planning

Migration from national legacy standards to ISO 20022 XML is an extensive project which involves all stakeholders in the payment industry – PSPs, PSUs, central infrastructure providers and IT suppliers. Hence, it is essential for there to be a clear planning, monitoring and coordinating roadmap.

The International Council of Payment Association Chief Executives (ICPACE) commissioned a study to understand best practices during migration processes. The preferred implementation process is summarised in the diagram below.





Source: Lipis Report - ISO 20022 Implementation best practices, p10.

According to the ICPACE commissioned study, before a migration is planned, stakeholders should identify the needs that ISO 20022 XML addresses. Often this step involves significant education of key decision makers to understand the benefits of ISO 20022 XML and how it can help stakeholders achieve goals their organisation or industry wants to achieve.

The approach to education differed by stakeholder types. One large PSP told us that for large corporates, they focused on educating them about the benefits of automation and reconciliation. For SMEs, the PSP encouraged them to consider expanding their businesses beyond national borders and consider the possibility of cross-border trading.

One coordinating body mentioned the importance of reaching out to SMEs indirectly through relevant technology providers who specialise in serving SMEs. The respondent said that it is often difficult to reach

out to, or even identify, the relevant SMEs directly and, therefore, one of the keys to successful reach out was actually via these niche technology providers. Interview evidence emphasised the importance of strong communication across all types of market participants, consistently throughout the implementation process.

Once the needs which ISO 20022 XML can address are clearly laid out, stakeholders need to achieve consensus that a change is needed. The decision could be on a company-level, a group of stakeholders or an industry level. At a company-level, the consensus should be reached at the top-management level. The report emphasised that it is insufficient to reach an agreement at the mid-management level. This is understandable as the wide-reaching benefits may require a top-down revamp of existing systems to achieve the optimal outcome. Reaching a consensus is even more important at an industry-level as costs tend to vary by firm due to their different implementation measures, risk appetite and business strategies. Without the buy-in of different stakeholders, potential benefits related to interoperability described in Section 5 would be more limited.

Once a decision is made to adopt ISO 20022 XML, the industry should establish centralised governance and management structures to determine the plan and timescale for implementation. The governance structure might vary at European-level to national-level, and at industry-level to company-level.

The timeline for migration can have significant impacts on the costs and benefits of migration. There are two fundamental types of migration. The first type is the 'big bang' migration. This was the model adopted in Denmark, where all banks migrated to ISO 20022 XML overnight. This was possible because Danish banks were familiar with using the standard in corporate-to-bank (C2B) communication, as well as in some internal processes.¹⁰⁸ The key advantages of this approach are that it avoids the additional cost of running two systems (i.e. the legacy system and new system) in parallel, and that it ensures industrywide interoperability from the point of migration and hence the benefits associated with that interoperability (see Section 5.2 for discussion of these benefits). However, the tight implementation timelines of a 'big bang' approach and the inability to run legacy systems in parallel with new systems, can be costly if the risks associated with the transition or the new systems materialise.

In the consultation responses to the IMR interim report, many UK stakeholders warned against the big bang approach and preferred a phased approach. Under a phased approach, the funds required are more spread out. It is typically carried out over a number of years. The advantage of this approach is that stakeholders have more time to plan and test. For those who just purchased new systems, it also allows additional years for depreciation before they renew these systems again. However, a longer migration period typically means more staff costs, with most respondents of the view that a longer migration period would increase total migration costs. In considering a suitable duration of migration, one UK PSP mentioned that in general, new payment solutions take about two years to implement. However, the same PSP also highlighted that any implementation at an industry level is limited by the slowest mover. In other words, even if most PSPs are ready to go live, they have to wait for the slowest member to complete their testing first.

ISO 20022 XML encompasses a wide range of business areas, hence, the industry needs to decide which aspects of the standard to use and which ones not to. It is equally important to consider how to migrate the old functionalities to the new standard. One UK bank raised concerns that ISO 20022 XML might result in some existing functionalities related to the Bacs system being lost, although no examples were provided to support this statement. On a related note, there was also concern that the SEPA implementation rules themselves would limit the functionality of the new messaging standard relative to the legacy standards and rules. There is existing precedent of this, such as in Finland, where the legacy standard allowed for unlimited remittance data but, under SEPA implementation rules, the number of characters is limited to 140. Therefore, to preserve the old functionalities, Finland created an AOS with 9 additional fields of unstructured data. In the LIPIS report, many interviewees stressed the importance of mapping all of

¹⁰⁸ Lipis Report – ISO 20022 Implementation best practices.

the legacy standard onto ISO 20022 XML, as the industry can always phase out redundant functionalities later.

The development of scheme rules at a national level can be a long process. One coordinating body said that it took them three years to establish the rules for Credit Transfer. The process involved constant exchange of information, both with stakeholders within its jurisdiction and other international counterparts to ensure consistency with the established international approach as much as possible. Once the scheme rules were drafted, stakeholders would be able to put together a realistic migration plan. The EPC published the migration plan for each country for SEPA migration. The content of these plans varied from country to country as each country's situation is different. The Dutch migration plan, for instance, set out clear mile stones and action points for each type of market participant.¹⁰⁹ Coordinating bodies stressed the importance of having a compulsory end-date for the migration process. Indeed, the SEPA experience shows that significant migration to SDD and SCT was only achieved once the end date regulation came into force.

6.2 The role of the co-ordination bodies

Migration to SEPA and ISO 20022 XML was a large and complex programme of work. There were, therefore, typically multiple coordinating bodies working together to organise and monitor the migration process. Coordinating bodies are essential in bringing together the diverse group of stakeholders involved in these types of projects and making sure all parties are on board to ensure a project's success. For example, as members of the Southern African Development Community (SADC) began developing a shared RTGS system, the presence of centralized management and the setting of clear milestones helped to alleviate the scepticism among a diverse group of stakeholders.¹¹⁰

As is shown in Figure 6.1, migration planning should be preceded by the setup of relevant governance structures and establishment of coordinating bodies. The governance structure at the European level has evolved over time. Initially, EPC governance was centred on the development and evolution of payment schemes and the administration of and compliance to the schemes. Its core engagements were all at the EU level, while assisting occasional implementation issues at a national level. The EU Forum of National SEPA Coordination Committees was set up in 2008 to facilitate discussions of common issues and exchange of good practice among national Coordination Committees.¹¹¹ The European Commission supported the SEPA process by closely monitoring the SEPA implementation and raised the political profile of SEPA at the European level.¹¹² At the EU level, the Payments Committee and the Payment Systems Market Expert Group discussed the developments with SEPA countries and stakeholders and fed back to the Commission. Similar to the Commission, the ECB also acted as an advocate in the delivery of SEPA. The ECB also coordinates the work of The Eurosystem (with The Eurosystem comprising of the ECB and the National Central Banks of the euro countries). The ECB conducted the SEPA High-level Meeting to debate and promote SEPA.¹¹³ In 2009, the Commission realised the need for an overarching governance which "fosters integration of the euro retail payments market in a way that meets the needs of end users",¹¹⁴ and called

¹⁰⁹ Dutch National Forum on SEPA Migration (Feb 2012): National SEPA Migration Plan Available at <u>https://www.ecb.europa.eu/paym/retpaym/shared/pdf/Netherlands_SEPA_migration_plan_en.pdf</u>.

¹¹⁰ Lipis Report – ISO 20022 Implementation best practices.

European Payments Council. SEPA at a glance: the infographics.

Available at: <u>http://www.europeanpaymentscouncil.eu/index.cfm/about-sepa/sepa-at-a-glance-the-infographic/</u>.
¹¹² European Commission (COM(2009) 471 final). COMMUNICATION FROM THE COMMISSION: Completing SEPA: a Roadmap for 2009-2012, p11-13.

Available at: <u>http://ec.europa.eu/internal_market/payments/docs/sepa/com_2009_471_en.pdf</u>.

¹¹³ Ibid.

¹¹⁴ Ibid.

for the establishment of the SEPA Council. In 2010, the SEPA Council was established to bring together the demand and supply sides of the market.¹¹⁵ Overall, the objective of this SEPA governance structure was to:

- "define a clear strategic vision for SEPA that is innovative, future oriented and user friendly;
- monitor and support SEPA migration, including implementation of the SEPA Roadmap, and identify remedial action; and
- ensure transparency and accountability to the wider economy." 116

At the national level, there are some variations in the governance structure. However, broadly speaking, there are four types of coordinating functions.

Firstly, there is a function responsible for developing the scheme rules. In the SEPA context, this was done in collaboration with their European counterparts. This coordinating group may also be responsible for various legal issues related to the transposition of European rules.

Secondly, countries typically have a National SEPA committee which is responsible for monitoring the migration to and implementation of SEPA. They typically consist of different stakeholders in the payments industry, including PSPs, central infrastructure providers, government bodies and customer representatives.

Thirdly, a forum is usually set up to formulate strategies by taking all users' needs into account. There are often different sub-group representatives for each type of stakeholder. For instance, Belgium's SEPA Committee has a SEPA working group which is made up of subgroups for corporates, consumers and public authorities respectively.¹¹⁷

Fourthly, working groups were set up for practical aspects of the implementation. For instance, France has six working groups under its National SEPA Committee: Working Group on payment instruments; Working Group on SEPA Direct Debit mandates; Working Group on the RIB to IBAN and BIC switchover; Working Group on the transitional period; Working Group on communication; and Legal Support Group.¹¹⁸ Belgium has similar working groups to France. In addition, it also has a working group for Infrastructure, and one for customer-to-bank (C2B) and bank-to-customer (B2C) standards.¹¹⁹

6.3 Lessons learnt

6.3.1 Education and communication

A strong education and training programme is fundamental to the implementation of ISO 20022 XML. This is emphasised by the National Automated Clearinghouse Association (NACHA) in the US. The programme should be continuous and cover all stakeholders. During the adoption phase, education should help stakeholders to understand "the formats, processes and its impact to underlying technology and business flows".¹²⁰ During the implementation phase, the focus should be on learning how to deal with the new standards and how to update existing applications. Lastly, during the go live phase, coordinated training

¹¹⁵ European Payments Council. SEPA at a glance: the infographics.

Available at: <u>http://www.europeanpaymentscouncil.eu/index.cfm/about-sepa/sepa-at-a-glance-the-infographic/</u>. ¹¹⁶ Ibid.

¹¹⁷ Febelfin and NBB (2008) – The Belgian SEPA Migration Plan (Belgium as part of the Single Euro Payments Area). [Online] Available at: <u>https://www.nbb.be/doc/ts/products/paymentsystems/sepa/belgianmigrationplan.pdf</u> [Accessed on 28 September 2016].

¹¹⁸ SEPA France. (2016). sepafrance.fr. [online] Available at: http://sepafrance.fr/?home?home [Accessed 28 Sep. 2016].

¹¹⁹ Febelfin and NBB (2008) – The Belgian SEPA Migration Plan (Belgium as part of the Single Euro Payments Area). [Online] Available at: <u>https://www.nbb.be/doc/ts/products/paymentsystems/sepa/belgianmigrationplan.pdf</u> [Accessed on 28 September 2016].

¹²⁰ NACHA (2015) – Introduction to ISO 20022 for U.S. Financial Institutions. <u>http://smarttokenchain.com/wp-content/uploads/2016/04/NACHA_Intro-to-ISO20022_WhitePaper.pdf</u>.

effort should focus on "areas such as Products, Customer Implementation Teams and Sales to develop and deliver consistent customer (or partner) education, on-boarding processes, and exchange of data between the bank and corporate clients".¹²¹

Successful education at each stage of the migration is underpinned by effective communication. This communication can be made through a variety of the channels. At a European level, the EPC created a SEPA toolkit website to update the progress of SEPA migration and showcase migration success stories. Meetings and workshops were also part of the engagement plan, while other channels included videos, presentations, information sessions, press releases and publication brochures.¹²² Communications were also made via relevant industry bodies and associations

The focus of communications also changes as the migration progresses. Initially, the communication focuses more on educating stakeholders about the benefits that ISO 20022 XML can afford them, while the focus later shifts to best practices during implementation. Later still, more weight would be placed on making stakeholders aware of the end date deadlines and ensuring that they have tools and knowledge in place to be compliant in time for this. As an example, the Belgium Central Bank organised meetings specifically for each type of participant focusing on specific issues to make the communications more targeted and thus effective.¹²³

From a PSP's perspective, they also need to communicate the changes to their corporate clients. Some corporate customers might be more affected than others. Interview evidence from PSPs suggested that their large corporate customers, who were with extensive internal systems were affected the most. They had extensive engagement with these corporates throughout the migration plan to discuss with them the migration process, both in terms of simply becoming compliant with the regulation but also in terms of strategic decisions the corporates could make to benefit most from the changes. PSPs also helped their corporate customers tackle any issues that arose during the migration process. However, other PSPs, with typically smaller corporate customers, said that most of their customers require very basic functionalities submitted via a basic online interface and, as such, the migration's impact to their customers was minimal as all customers saw was a few changes on the form they needed to fill in using the online interface. Their customers did not actually need to update any of their own systems.

A similar process needed to be undertaken by corporates with direct debits (such as utility companies), who needed to communicate the wider SEPA changes to their customers (including the conversion of BBAN to IBAN). One corporate survey respondent faced the administrative cost of re-printing materials for collecting payments information for direct debits mandates as a result of the migration to SEPA, which was described as particularly burdensome.

Given that strong communication is so vital to an effective migration, some national authorities even monitor the progress of the communication. The relevant Belgian authorities, for example, asked institutions present at the Steering Committee meeting to fill in a questionnaire on the communication of SEPA end dates. They found there to be large disparities among both different types of participants and the same type of participant.¹²⁴ Reaching out to SMEs was particularly resource intensive. France tackled this

¹²¹ NACHA (2015) – Introduction to ISO 20022 for U.S. Financial Institutions. http://smarttokenchain.com/wpcontent/uploads/2016/04/NACHA_Intro-to-ISO20022_WhitePaper.pdf

¹²² Belgium SEPA Working Group (June 2013): Fifth progress report on the migration to SEPA in Belgium, p10. Available at <u>https://www.nbb.be/doc/ts/products/paymentsystems/sepa/5de_mob_rapport_en.pdf</u>.

¹²³ Belgium SEPA Working Group (June 2013): Fifth progress report on the migration to SEPA in Belgium, p9-10. Available at <u>https://www.nbb.be/doc/ts/products/paymentsystems/sepa/5de_mob_rapport_en.pdf</u>.

¹²⁴ Belgium SEPA Working Group (June 2013): Fifth progress report on the migration to SEPA in Belgium, p9-10. Available at <u>https://www.nbb.be/doc/ts/products/paymentsystems/sepa/5de_mob_rapport_en.pdf</u>.

issue by holding expert-led information sessions for SMEs on SEPA, which presented the legal obligations imposed on businesses and provided practical advice on how to comply with them.¹²⁵

6.3.2 Other key lessons learnt

The importance of an end-date

The importance of having a migration end-date was emphasized by many stakeholders. One coordinating body told us that the voluntary adoption of ISO 20022 XML was effectively zero when an end-date was not mandated. A similar experience happened in SEPA. The initial adoption was very slow-moving until an end-date was mandated. While the long time period since the beginning of the voluntary initiative allowed time to render the new payment system throughout Europe fully operational, it was not sufficient to trigger a self-initiated migration in each SEPA country. There was some suggestion from interview respondents that this was due to the fact that, without a mandatory end-date, IT departments in large organisations would not have been able to secure the necessary funding to undertake the project. By an extension of that logic, one respondent told us that, even if a longer migration period was given, they would still not start the project until two years before the deadline, simply because there would be other more urgent regulatory requirements and commercial needs that would be given funding priority.

The trade-off between interoperability and flexibility

As different countries' legacy messaging standards have catered to different domestic needs, the new common messaging standard has to cater for this diversity. For instance, some countries have opted for Additional Optional Service (AOS). Currently, Belgium, France, Finland, Greece, Italy and Slovakia have adopted AOS for their SCT services. Although the adoption of AOS should not compromise the interoperability of the scheme, it does result in different national implementations. In addition, the EPC noticed that specifications of the ISO 20022 XML standard developed by national central infrastructure providers often serve to reinforce these national differences.¹²⁶ Moreover, while the EPC implementation guidelines flag the use of ISO 20022 XML in the interbank field as mandatory, the use of ISO 20022 XML in customer-to-bank communication is only flagged as 'indicative' or 'optional'. As a result, banks have the freedom to use certain fields in ISO 20022 XML that were not required by SEPA, or use the field for a different purpose in its communication with its customers.¹²⁷

However, these trends towards greater national flexibility can compromise the desired interoperability of adopting a common standard. As a result, some survey respondents called for more prescriptive implementation guidelines than currently in place. One coordinating body, for instance, suggested the need to be as detailed as possible in the development of the standard to avoid different interpretations.

The need to migrate all existing capabilities from the old standard

ICPACE's report also recommended migrating all old capabilities from the legacy standard onto the new standard, as redundant capabilities can be deleted later if so desired. This would ensure that no functionality is lost. That said, as ISO 20022 XML is typically much richer than legacy standards, it would be more efficient to develop new functionalities that are enabled by ISO 20022 XML, rather than focusing on

¹²⁵ French SEPA Committee (July 2012): The French migration plan to SEPA, p12. Available at <u>http://sepafrance-temp.fr/bds/data/esmb/Pleenier/120626/Plan_national_de_migration/120716_plan_national_de_migration_EN_fin.p_df</u>.

¹²⁶ EPC | Newsletter - Article. (2011). ISO 20022 Message Standards: Too many flavours?. [online] Available at: <u>http://www.europeanpaymentscouncil.eu/index.cfm/newsletter/article/?articles_uuid=3681C144-F444-461B-EBD7B3F77E7DC7CE</u> [Accessed 14 Oct. 2016].

¹²⁷ EPC | Newsletter - Article. (2011). ISO 20022 Message Standards: Too many flavours?. [online] Available at: http://www.europeanpaymentscouncil.eu/index.cfm/newsletter/article/?articles_uuid=3681C144-F444-461B-EBD7B3F77E7DC7CE [Accessed 14 Oct. 2016].

migrating all legacy standards. There is no strong evidence to suggest which of these routes is preferable, but this is one of the decisions that would be best made through industry coordination.

Early buy-in from key stakeholders

"Broad stakeholder involvement and early buy-in" was cited as the second most important lesson learnt by the participants Lipis interviewed for the ICPACE report. As described in Section 6.1, achieving consensus is a critical stage of the implementation process, particularly because the migration involves significant sunk costs for some stakeholders and thus having the commitment of these stakeholders is crucial in maintaining the momentum of implementation. During the early stages of SEPA migration, the EPC published articles on success stories and lessons learnt from early adopters to showcase and encourage wider adoptions.

7 Key findings

In this section, we set out the key findings of our analysis.

7.1 Migration costs

There are two fundamental migration strategies available to organisations affected by the SEPA Regulation, either an update of internal systems or the use of conversion services. Updating internal systems was found to be significantly the most common implementation method amongst survey respondents, with PSU respondents almost exclusively making use of this method for both SCT and SDD, and around two-thirds of PSP respondents in each case. That said, we are aware from interview discussions with PSPs and other stakeholders, that the use of conversion services is still common among their smaller corporate customers. The PSUs who responded to the survey were typically larger organisations and this is, therefore, likely to explain the disparity in survey and interview evidence.

Of those PSPs who made use of conversion services, only one-third did so on a temporary basis, with the majority continuing to operate these conversion services on an ongoing basis. The majority of respondents (67 per cent) who made use of conversion services said that they had helped to mitigate migration costs. Of those stakeholders who updated internal systems, most did so by upgrading their existing application with proprietary software (58 per cent in the case of SDD, and 56 per cent in the case of SCT). The purchase and implementation of a fully new processing package adapted to ISO 20022 and SEPA was significantly more common among PSPs than PSUs, with PSUs instead more likely to upgrade existing applications using an external package.

Total migration costs were found, on average, to be significantly higher for PSPs than PSUs (in the order of 20 times higher for PSPs in the case of SCT, and 10 times higher in the case of SDD). A number of reasons were posited for this in the interviews including: higher volumes of transactions; the need to migrate to both SCT and SDD; the need to implement both upstream (i.e. infrastructure/PSP) interfacing and downstream (i.e. PSU) interfacing; the need, in some cases, to connect to multiple central infrastructure providers; the obligation to set-up BIC search and validation engines; and the need to manage and offer several electronic communication channels to customers.

Systems analysis costs and systems costs were typically the main cost drivers of ISO 20022 XML adoption, with payment applications and communication interfaces being the key drivers of systems costs. The cost of storage systems were fairly limited, although relatively more material in the case of SDD. The ISO 20022 related costs were the primary component of the total SEPA Regulation costs for both PSPs and PSUs (and for both SDD and SCT), though it should nevertheless be noted that the SDD mandates were a significant cost driver for PSUs.

For PSUs, the one-off migration costs typically represented less than 10 per cent of their annual payment processing costs, while for PSPs they typically represented over 70 per cent. The key cost driver for PSUs, on both a one-off and ongoing basis was found to be the cost of systems (accounting for over 60 per cent of total one-off costs), followed by systems analysis costs. Systems analysis costs were a larger proportion of PSPs total costs (particularly for SDD), which is consistent with the finding that PSPs were more likely to develop solutions in house than purchasing external packages. Survey evidence suggested that a significant proportion of the external costs and time was related to testing. Our estimates suggest that the migration to SDD was more expensive for both PSPs and PSUs than the migration to SCT, which is in part explained by the complexity of the SDD rulebooks, e.g. exception handling.

ISO 20022 XML was found to be the significant cost driver within the SEPA Regulation. This was particularly true of SCT, were ISO 20022 XML is estimated to represent over 80 per cent of the total costs for PSPs and over 60 per cent for PSUs. For SDD, ISO 20022 is estimated to represent 64 per cent of total costs for PSPs, but only 41 per cent of total costs for PSUs, with the SDD mandates imposing a significant additional cost burden in the case of SDD.

Average migration times were in the order of 30 months, with the vast majority of respondents suggesting that the migration times allowed for were sufficient and that a longer implementation timeframe would have only served to increase costs unnecessarily. Most respondents were also of the view that the migration of euro payments to this standard, would make future migrations of other currencies to this standard cheaper due to the leveraging of existing experience, knowledge and systems.

In terms of the profile of affected PSUs, interview evidence suggests that a large number of PSUs (in the order of 65 per cent) are not materially affected by the SEPA Regulation and ISO 20022 XML as they use screen-based payment solutions (rather than batch file payments). However, these are typically small- or medium-sized PSUs and, therefore, collectively account for only about 10 per cent of the total transaction volume. The analysis shows that a 'typical' PSU would experience one-off costs less than 10 per cent of annual payment processing costs and no change in on-going costs. However, larger PSUs (who typically have larger payment volumes and submit batch file payments) face higher one-off costs, but also stand to gain more in terms of ongoing cost savings and additional service benefits (see Section 7.3).

Total transition costs for the SEPA Regulation, across the SEPA area, are estimated at £3.1bn for SCT and \pounds 7.1bn for SDD. This amounts to a total cost of transition to SEPA of £10.2bn, of which 90 per cent is estimated to be incurred by PSPs. While it should be acknowledged that there are difficulties in separating out ISO 20022 XML costs from the wider costs of the SEPA Regulation, it has been estimated that approximately two-thirds of the total costs are attributable to ISO 20022 XML, which equates to a cost of £6.9bn.

7.2 Indirect costs

The indirect costs were rated by survey respondents as less significant than the direct costs of migration. When asked about the challenges faced during the migration process, none of the challenges suggested (i.e. lack of internal resources, competition for external resources, internal glitches or problems with external stakeholders) were raised by more than 45 per cent of respondents. Competition for external resources was a particularly frequent challenge among PSPs.

Despite evidence of a significant increase in supply of SEPA compliant software solutions, with many out-ofthe-box solutions developed by technology providers, the common end-date created a big spike in demand and thus bottlenecks in the provision of these services. Often one market participant was ready, but waiting on the progression of other market participants due to such bottlenecks.

Although there was much discussion of the risks to system stability ex ante, there is little evidence that any such risks have materialised. Given the experience to date, it is considered of extremely low likelihood that any such issues will materialise in the remainder of the migration. Many respondents put this down to meticulous planning and testing. There have not been cases of any major crash to date, with occasional incidents arising at PSP level but resulting in no more than single day delays in the processing of payments. There was also very little evidence of any risks emerging with respect to the use of conversion services, relating to such consequences as incorrect payment error codes. However, although there was very limited incidence of risks materialising in relation to gaps between legacy formatted messages and ISO 20022 XML messages, risks were more likely to materialise where PSUs or PSPs took the opportunity to enlarge the use of ISO 20022 XML to non-SEPA payment transactions, as they were facing much more complex and varied fields (which in hindsight require more upfront analysis and testing).

Co-existence of new and legacy systems is seen to increase costs for those organisations tasked with running these systems in parallel, and can lead to delays in adoption by PSUs, particularly in the absence of any specified end date for adoption (as the SEPA case indeed shows). Delays can be exacerbated by weak business cases for adoption and/or low business priority, and can lead to market participants being significantly out of sync with each other to the detriment of early adopters.

It was clear from survey evidence that there are still significant national flavours to the implementation of SEPA and, therefore, there are limits to what ISO 20022 XML has achieved in terms of interoperability, though it is widely acknowledged to be a step, in the ongoing trend towards greater standardisation. Particular differences in interpretation are found in the case of bank account reporting standards and treatment of R-transactions. Although the risks associated with technological lock-in and wider changes to the payments industry are high, the likelihood of these risks materialising are considered extremely small.

7.3 Benefits

The benefits were considered along three key strands: the additional core product offering as a result of the SEPA Regulation; the move to a common interoperable messaging standard; and the move to a functionally superior messaging standard in ISO 20022 XML.

In terms of the **core product offering**, it was found that prior to the SEPA Regulation, cross-border credit transfers and direct debits in the euro area often took a long time to be completed, with payments subject to significant interbank fees. The SEPA Regulation now ensures that euro payments are completed within a guaranteed time and banks are not allowed to make any deductions of the amount transferred. In particular, the SEPA regulation eliminates the differences in charges for cross-border and national payments in euro. This translates into significant efficiency gains for corporates, consumers and government bodies alike, as cross-border payments in euros are rendered as simple and inexpensive as domestic euro payments. It is estimated that cross-border transaction costs for PSUs may have fallen by as much as 95 per cent. Such an outcome can significantly improve money management processes through greater efficiency, faster cash flows and lower transaction costs, offering SMEs the opportunity to more fully exploit the Single Market.

In terms of **interoperability benefits**, over 70 per cent of respondents said that they had witnessed an increase in competition as a result of the migration, with almost one-third describing it as a significant increase. Survey respondents perceived an increase in competition at all levels of the value chain (i.e. at the central infrastructure level, the PSP level and the technology provider level), although particularly so at the PSP level. Evidence of increased competition at the central infrastructure level was seen with the tendering for provision of central infrastructure services for the low-value bulk payments system in Belgium. That said, interview evidence on the impact of ISO 20022 XML on competitive pressures has been more mixed. While evidence suggests that central infrastructure providers have had to reduce their prices as a result of the migration, other evidence suggests that the migration had little impact on prices. There was some suggestion that while ISO 20022 XML in isolation may not have had a material impact on competition, it is nevertheless part of the ongoing trend to standardisation that should continue to promote greater competition. In line with this argument, others said that, while the move to a common messaging standard had lowered one barrier to switching provider and thus improved competition, other significant barriers still remained.

There was, however, a stronger consensus in the literature and survey evidence suggesting a more material increase in competition amongst PSPs, particularly in winning the business of larger corporates. This is both because of an increase in the number of viable PSPs that a PSU could switch to and because of an increase in competitive pressures among existing PSPs to offer additional services (AOS) that the richer ISO 20022 XML standard can support. Indeed, 80 per cent of PSP respondents said there was an increase in the products and services they could offer as a result of the migration to ISO 20022 XML.

Surveyed stakeholders rated the facilitation of systems consolidation and centralisation as the most important interoperability benefit of ISO 20022 XML, providing organisations with the opportunity to significantly lower ongoing payment processing costs, including the costs of systems maintenance and future upgrades.

The evidence of the impact on transaction processing times was very mixed (with 28 per cent of PSPs and 18 per cent of PSUs witnessing increased times). Some interviewees suggested that this might be driven by the switch to the ISO 20022 XML standard being accompanied by a switch to a "t+1" basis for domestic transactions, when domestic transactions had previously typically completed on the same day. While only 18 per cent of PSUs had experienced an increase in transaction costs (compared to 45 per cent experiencing a decrease), 53 per cent of PSPs said that transaction processing costs had increased as a result of the migration (i.e. the costs directly associated with the execution of any one transaction). That said, the majority of respondents indicated a decrease in wider ongoing processing costs as a result of the migration to ISO 20022 XML, due in part to the move to a common messaging standard driving consolidation, centralisation and rationalisation of existing systems and processes. Some PSPs suggested that ongoing costs may rise, which may be attributable to the fact that PSPs in non-Eurozone countries face duplicate costs as a result of the dual messaging standards (i.e. ISO 20022 XML and the legacy one) being operated in parallel.

Evidence of improved cash management and liquidity due to improved rates of STP are moderate, while ex ante research suggesting that the migration could lead to improvements in AML processes appears weak.

In terms of **functionality benefits**, evidence from our stakeholder engagement suggested that the most important functional benefits of ISO 20022 XML are the enhanced structured payments data it provides and the more innovative products and value added services this may help support. For instance, much interview evidence suggested that the well-structured standardised format of ISO 20022 XML data could lead to more banks offering a digital exchange of the invoice document between a supplier and a buyer (i.e. e-invoicing).¹²⁸

7.4 Implementation

The implementation process was assessed in three key areas: the migration planning process; the role of coordinating bodies; and the lessons learnt.

Interview evidence stressed the importance of thorough **migration planning**, involving all types of affected stakeholders. It is a multiple stage process, first involving identification of the needs ISO addresses and reaching consensus among affected stakeholders, particularly those who are likely to be most burdened by the costs, that change is necessary. Without this initial buy-in, delays are more likely to materialise and the potential benefits may be more limited as a result. After this has been agreed, it is crucial to establish centralised governance and management structures to oversee the process of migration. These would bring together the various market participants to determine a suitable plan and timescale for implementation, and subsequently determine the necessary financial commitments needed to deliver this. Once this high-level plan was in place, the focus turned to developing implementation guidelines and then a more detailed migration plan and end-date, before the migration itself could commence.

Migration to SEPA and ISO 20022 XML was a large and complex programme of work. There were, therefore, typically multiple **coordinating bodies** working together to organise and monitor the migration process. The governance structure at the European level has evolved over time. The EPC's role was centred on the development and evolution of payment schemes and the administration of and compliance to the schemes, while the EU Forum of National SEPA Coordination Committees facilitated discussions

¹²⁸ See e.g. ECB (2015) "E-invoicing solutions related to retail payments-the way forward in SEPA".

among national Coordination Committees. Other EU-level bodies were also involved in monitoring, promotion and obtaining feedback on the implementation process. The SEPA Council was established to bring together the demand- and supply-sides of the market so as to foster integration.

While variations in governance structure existed at the national level, there were generally four key types of coordinating functions: those functions responsible for developing scheme rules; those functions responsible for monitoring implementation of SEPA; those functions responsible for formulating strategies to support the needs of different market participants; and, finally, working groups set up to support practical aspects of implementation (e.g. the IBAN switchover).

Many of the key **lessons learnt** from the SEPA migration raised in the survey, related to the importance of engaging with all the different types of affected stakeholders and educating them in how they are affected and the strategic actions they can take to benefit most from the migration. Desk-based research emphasised the importance of an ongoing education and communication programme throughout the migration. Communication was seen as a multiple channel approach (workshops, presentations, brochures etc.), in order to maximise stakeholders' understanding of the changes and, in particular, to maximise the chances of reaching those stakeholders that are typically most difficult to reach, i.e. the smaller PSUs. Communication was a task of both the higher coordinating bodies and PSPs, as well as relevant trade bodies and associations capable of targeting communication at SMEs.

Other key lessons learnt from the migration process were the importance of an end-date to ensure migration of PSUs, as prior to the end date regulation coming into force, adoption rates for SDD and SCT across SEPA were very low. There is also a key trade-off between interoperability and flexibility, as different countries have adopted different national flavours to suit their existing systems, with specifications of the ISO 20022 XML standard developed by national central infrastructure providers often serving to reinforce national differences. Although the trend is continuing towards more standardisation, flexibility in the interpretation of the SEPA Regulation and the resulting national flavours have somewhat limited the extent of interoperability benefits through SEPA and ISO 20022 XML. Finally, we emphasised the importance of stakeholder involvement and early stakeholder buy-in, particularly because the migration involves significant sunk costs for some stakeholders and thus having the commitment of these stakeholders is crucial in maintaining the momentum of implementation.



Appendix



Overview of country sample

Retail payment systems in the EU handle mainly low-value, high-volume and limited time-criticality payments. In 2014, 42 retail payment systems existed within the EU as a whole. During that year, roughly 50 billion transactions amounting to a total value of €38.3 trillion were processed.¹²⁹ Faced with the above dynamics of the European payments landscape, in determining the impact of the migration to ISO 20022 XML, we resulted in a set of six EU countries, whose comparative performance vis-à-vis the UK would guide our assessment. These were:

- Belgium;
- Denmark;
- Finland;
- France;
- Ireland; and
- The Netherlands.

Our selection of the above SEPA countries was mainly guided by the extent of comparability of their payments landscape to that of the UK. The latter was assessed using the following criteria:

- the volume of CT and DD transactions, relative to all transactions executed;
- the legacy standards for euro transactions in lieu;
- the nature of infrastructure provision (i.e. centralised or decentralised); and
- the currency regime (i.e. euro or non-euro).

In what follows, we present a brief discussion of the selected countries along the lines of the above criteria.

Belgium – Belgian payment systems are characterised by a high degree of automation as a result of efforts made by credit institutions since the early 1970s towards rationalising the processing of payment operations.¹³⁰ More specifically, in 1974, the Centre for Exchange and Clearing (CEC) was established, responsible for the automated processing of all retail payments. As in the case of the UK, the provision of payments infrastructure is centralised and managed by CEC.

CTs and DDs in Belgium account for the majority of exchanges. Their share of all transactions amounted to 39.8 and 15.4 per cent, respectively in 2014. During the same year, the total number of CTs and DDs was 1,366.4 and 529.5 million, respectively, with a total value of transactions amounting to \in 6,678.55 and \in 120.07 billion, respectively.¹³¹

As in the case of the UK, legacy formats in Belgium (i.e. included the DOM80 for direct debits, and the CIRI-180 and CIRI-136 formats for credit transfers) had to be replaced in order to comply with the SEPA regulation. In particular, the accounts in the CT formats did not include the IBAN and two mandatory fields in the SEPA rulebook were missing (i.e. End2End reference and the BICs of debtor and creditor's banks).¹³²

Denmark – Denmark has a highly centralized payment system. A key feature of the Danish payments infrastructure is the high degree of cooperation within the financial sector in relation to the technical infrastructure. This cooperation has resulted in unified systems handling all types of retail payment (card

¹²⁹ ECB (2015) "Payments statistics for 2014"

¹³⁰ ECB (2007) "Payments and securities settlement systems in the European Union: Volume I Euro area countries".

¹³¹ ECB (2015) "Payments statistics"

¹³² BNP Paribas (2009) "Implementing SEPA in Belgium",

payments, direct debits, credit transfers and cheques).¹³³ More specifically, Nets, the only central infrastructure provider operates low-value bulk, low-value real-time and ATM systems serving all Danish banks.¹³⁴

In 2014, CTs and DDs in Denmark accounted for 16.7 and 10 per cent of all transactions, respectively. During the same year, the total number of CTs and DDs was 345.78 and 207.09 million, respectively, with a total value of transactions amounting to \notin 766.11 and \notin 90.95 billion, respectively.¹³⁵

Legacy formats in Denmark had to be replaced in order to comply with the SEPA regulation. More specifically, the decision to adopt ISO 20022 occurred as a result of the Danish central bank's mandate that Nets move from one daily clearing to four intraday clearing cycles.¹³⁶

Finland – Finland became the second country in the Eurozone to implement SEPA. As a country, it was characterised by a high degree of payments automation before the rollout of the SEPA regulation. In particular, the Finnish electronic payment systems had long been standardized with common file formats, which eased the migration to SEPA in 2011, in advance of the 2014 deadline.¹³⁷ National standards expired in Finland at the end of 2010 and had to be replaced with ISO 20022 XML.¹³⁸

Retail payments in Finland are centralised under the PMJ system, which was developed jointly by Finnish banks and the Finnish Bankers' Association. The participating banks were also in charge of operating the system.

In 2014, CTs and DDs in Finland accounted for 39.38 and 0.12 per cent of all transactions, respectively. During the same year, the total number of CTs and DDs was 866.5 and 2.55 million, respectively, with a total value of transactions amounting to $\leq 2,601.06$ and ≤ 2.32 billion, respectively.¹³⁹

France – similar to the UK, the field of retail payment systems in France has been centralised since the establishment of the French automated clearing house (Système Interbancaire de Télécompensation; SIT) in 2002, responsible for all retail payments.¹⁴⁰ In 2008, the new French system CORE (COmpensation REtail) operated by private company STET was launched, replacing the SIT system.

In 2014, CTs and DDs in France accounted for 18 and 18.4 per cent of all transactions, respectively. During the same year, the total number of CTs and DDs was 3,416.95 and 3,541.46 million, respectively, with a total value of transactions amounting to \notin 24,046.38 and \notin 1,514.55 billion, respectively.¹⁴¹

Legacy formats in France had to be replaced in order to comply with the SEPA regulation. More specifically, prior to the regulation, both CTs and DDs were conducted using the CFONB160 file format. However, this format did not include the IBAN.¹⁴²

Ireland – the field of electronic retail payment systems in Ireland is centralised and administered by the Irish Retail Electronic Payments Clearing Company Limited (IRECC), which is incorporated.¹⁴³

¹⁴¹ ECB (2015) "Payments statistics"

¹³³ ECB (2007) "Payments and securities settlement systems in the European Union: Volume I Euro area countries".

¹³⁴ Lipis Advisors (2015) "Payment system ownership and access models: Comparative analysis of 13 countries".

¹³⁵ ECB (2015) "Payments statistics"

¹³⁶ Lipis Advisors (2015) "ISO 20022 Implementation best practices".

¹³⁷ CGI (2014) "The Drive to Electronic Remittance Exchange in Business-to-Business Payment Automation".

¹³⁸ A small number of banks continued to offer payment transactions based on the incumbent standards as an additional service until the end of October 2011. See <u>https://www.gtnews.com/articles/sepas-nordic-angle/</u>.

¹³⁹ ECB (2015) "Payments statistics"

¹⁴⁰ ECB (2007) "Payments and securities settlement systems in the European Union: Volume I Euro area countries".

¹⁴² RBS (2009) "SEPA in France".

¹⁴³ ECB (2007) "Payments and securities settlement systems in the European Union: Volume I Euro area countries". IRECC was liquidated in 2014 so as to allow the implementation of the SEPA regulation.

In 2014, CTs and DDs in Ireland accounted for 22.85 and 12.14 per cent of all transactions, respectively. During the same year, the total number of CTs and DDs was 167.61 and 89.06 million, respectively, with a total value of transactions amounting to \notin 650.32 and \notin 64.73 billion, respectively.¹⁴⁴

Legacy formats in Ireland had to be replaced in order to comply with the SEPA regulation. More specifically, prior to the regulation, both CTs and DDs were conducted using the IPSO Standard 18 file format (similar to Bacs in the UK). However, this format did not include the IBAN, whereas transaction processing timelines differed across banks.¹⁴⁵

Netherlands – as in the case of the UK, the field of electronic retail payment systems in the Netherlands is centralised and administered by Equens, in which the majority of banks participate.¹⁴⁶

In 2014, CTs and DDs in the Netherlands accounted for 31.66 and 18.03 per cent of all transactions, respectively. During the same year, the total number of CTs and DDs was 2,043.23 and 1,163 million, respectively, with a total value of transactions amounting to \in 13,373.99 and \in 218.73 billion, respectively.¹⁴⁷

Legacy formats in the Netherlands had to be replaced in order to comply with the SEPA regulation. More specifically, prior to the regulation, both CTs and DDs were conducted using the Clieop03 file format. However, this format did not include the IBAN.¹⁴⁸

Overall, the preceding discussion illustrates several similarities between the payments systems landscapes in our choice of countries and the UK. More specifically, similar to the UK, all six of our selected SEPA countries are characterised by centralised payments infrastructures which had to abandon their national messaging standards in favour of ISO 20022 XML. Moreover, to a great extent, the national shares of CT and DD transactions, mimic those of the UK with the minor exception of the Finnish DD market. Nevertheless, the high degree of payments automation characterising the Finnish market (i.e. the standardisation of electronic payments with common file formats as in the case of the UK) in addition to its non-Eurozone membership render the inclusion of Finland in our list of selected countries appropriate. The above are summarised in the following table:

Country	Currency	Centralised infrastructure	Replacement of national standard	Share of CT transactions	Share of DD transactions
Belgium	EUR	\checkmark	\checkmark	39.76%	15.41%
Denmark	DKK	\checkmark	\checkmark	16.70%	10.00%
Finland	EUR	\checkmark	\checkmark	39.38%	0.12%
France	EUR	\checkmark	\checkmark	18.02%	18.68%
Ireland	EUR	\checkmark	\checkmark	22.85%	12.14%
The Netherlands	EUR	\checkmark	\checkmark	31.66%	18.03%
UK	GBP	\checkmark	\checkmark	18.53%	17.27%

Summary of country selection

¹⁴⁴ ECB (2015) "Payments statistics"

¹⁴⁵ Central Bank of Ireland (2012) "SEPA migration guide for Ireland".

¹⁴⁶ ECB (2007) "Payments and securities settlement systems in the European Union: Volume I Euro area countries".

¹⁴⁷ ECB (2015) "Payments statistics"

¹⁴⁸ RBS (2009) "SEPA in the Netherlands".