SLAUGHTER AND MAY

# TSB Review

## An Independent Review Following TSB's Migration onto a New IT Platform in April 2018

October 2019

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# CHAPTER 1: INTRODUCTION

## OUR REVIEW

1.1 This Report sets out the conclusions of our independent review ("**our Review**") of the facts and circumstances leading up to the issues that arose after TSB migrated its customers from the Lloyds Banking Group IT platform to a new platform built and hosted by SABIS. TSB went live with the new platform on 22 April 2018 ("**Go Live**"). Both TSB and SABIS are subsidiaries of the Spanish banking group, Sabadell.

1.2 In this Report we set out our understanding of the relevant facts and circumstances leading up to Go Live, and the context in which those facts and circumstances arose, as well as our observations.

## OUR APPOINTMENT

1.3 We were approached by the Chairman of the TSB Banking Group shortly after TSB experienced issues following Go Live. We were formally appointed in July 2018 to carry out our Review, and to provide this Report, in accordance with the terms of reference which are appended to this Report at Appendix 1 (the "**Terms of Reference**"). The scope and conduct of our Review is discussed further in chapter 23.

1.4 This Report is the product of an independent review. We considered it appropriate to take on this assignment as, at the time of our engagement in 2018, we had no client relationship with TSB. We have not taken on any work from TSB, other than carrying out our Review, since our engagement, nor do we intend to seek such a relationship for a period of three years following the date of this Report.

1.5 During the course of our Review we reported to an independent sub-committee of the TSB Board set up for the purposes of our Review (the "**Independent Sub-Committee**"). However, our engagement letter was clear that our duties to TSB were limited by the nature of our appointment and that we could not therefore take instructions from TSB, the TSB Board or the Independent Sub-Committee. TSB had its own separate legal advice throughout our Review.

## A GUIDE TO THIS REPORT

1.6 This Report is made up of 23 chapters, each of which addresses a certain issue, period or theme.

1.7 The Report is, broadly speaking, chronological in structure. It may be helpful for the reader to consider this Report - and the events described within - as being divided into three phases:

(A) Up to March 2016 - The flotation of TSB, its acquisition by Sabadell and the subsequent planning and mobilisation of TSB's IT transformation programme (the "**Programme**") (see chapters 4 to 8).

(B) March 2016 to September 2017 - The execution of the Programme up until September 2017, by which stage the project had fallen materially behind schedule and needed to be re-planned (see chapters 9 to 12).

(C) October 2017 to April 2018 - The replanning of the Programme and the execution of the new Programme plan up until Go Live (see chapters 13 to 18), and the events that followed Go Live (see chapters 19 and 20).

1.8 Certain chapters are anchored to a particular period of time or event (see chapters 4, 6, 12, 13, 18 and 19). Other chapters (including chapters 21 and 22) deal with thematic issues that span multiple phases of the Programme, and therefore do not fit neatly into one chronological phase. We have endeavoured to address each of these themes at the stage in the narrative that is, in our view, most logical and relevant.

1.9 The capitalised terms and acronyms used in this Report are defined in the Glossary, which can be found at Appendix 11.

## LEGAL DISCLAIMER

1.10 This Report is an independent report prepared by Slaughter and May and commissioned by the TSB Board. It remains confidential to TSB, until TSB publishes it or allows it to be published.

1.11 The findings and observations included in this Report are those of Slaughter and May. These findings and observations are based on Slaughter and May's assessment of the documents provided by TSB and others in response to requests and information gained from interviews. We have also been assisted by independent technical experts, as described in chapter 23. Slaughter and May has not carried out a forensic investigation or audit of the information made available to it. In some cases, restrictions were placed on Slaughter and May's access to documents or documents were redacted by TSB. Slaughter and May has generally assumed the accuracy and truth of the information provided. This Report should be read and taken together as a whole, including the matters set out in chapter 23.

1.12 Other firms or individuals considering the same information could form a different assessment of it. Similarly, Slaughter and May might have formed a different assessment had it considered or been given access to other information.

1.13 The findings and observations in this Report should not be treated as determinative of any fact, nor of the performance of, or compliance with, any legal or regulatory obligation.

1.14 This Report is not for the purpose of guiding or influencing the conduct or decisions of any person. Accordingly, it must not be relied on for that purpose. Slaughter and May accepts no liability for the contents of, or any omissions from, this Report.

Slaughter and May
31 October 2019

# CHAPTER 2: EXECUTIVE SUMMARY

## INTRODUCTION

2.1 Over the weekend of 20-22 April 2018, TSB transferred its c.5 million customers to a new platform designed, built and operated by SABIS. SABIS was the technology services provider to the Sabadell Group, and a sister company of TSB.

2.2 On the evening of Sunday 22 April 2018, TSB went live with the new platform ("**Go Live**"). Whilst the migration of customer records proceeded as planned, many of TSB's customers experienced significant problems with accessing and using their accounts online or via the Mobile App, and communicating with TSB (whether over the telephone, online or in branches).

2.3 In the days that followed, TSB's Internet Banking and Mobile App channels were *"unstable and almost unusable"*. On the first day after Go Live, customers waited an average of approximately 90 minutes to speak on the telephone to an adviser. TSB also faced widespread issues in its branches, with many services unavailable. By Wednesday 2 May 2018 (in the second week after Go Live), TSB had received 33,101 customer complaints, which was more than 10 times usual levels.

2.4 Problems with the new platform continued to cause significant issues in TSB's digital channels, branches and contact centres for a number of weeks. From Monday 30 April 2018, customers also began to experience an increase in opportunistic fraud attacks. These attacks peaked on Tuesday 15 May 2018, when they were approximately 70 times higher than usual levels.

2.5 Given the scope and complexity of TSB's IT transformation programme (the "**Programme**"), it was to be expected that some issues would arise. While TSB expected there to be "*bumps in the road*" following Go Live, the magnitude and duration of the problems went far beyond what was anticipated or acceptable.

2.6 On Monday 30 April 2018, the TSB Board instructed Slaughter and May to undertake an independent review ("**our Review**") of the facts and circumstances leading up to the issues experienced by TSB customers following Go Live (see chapter 23).

2.7 We have concluded that these issues arose because:

(A) the new platform was not ready to support TSB's full customer base; and

(B) SABIS was not ready to operate the new platform.

This Report examines why this happened and why TSB made the decision to Go Live without the necessary understanding and appreciation of these matters.

## PROGRAMME STRATEGY AND PLAN

### *The Programme was complex and unprecedented in the UK (see chapters 4 and 7).*

2.8 Following its initial public offering in June 2014, TSB continued to rely on the platform hosted by its former parent, the Lloyds Banking Group, and was contractually entitled to do so until 2024. However, as LBG was now a competitor, TSB believed this arrangement limited its ability to develop as an effective challenger bank. In addition, the core service charge payable to LBG was set to increase significantly from 2017.

2.9 TSB's acquisition by Sabadell in 2015 provided the opportunity for TSB to move from LBG's IT platform to a platform derived from Sabadell's existing Proteo platform. TSB's new platform, Proteo4UK, would be designed, built and operated by SABIS. The Programme would also enable Sabadell to realise the significant synergies envisaged at the time of its acquisition of TSB.

2.10 The Programme involved both the customisation of the Proteo platform to meet TSB's requirements and the modernisation of the Proteo architecture, upgrading from the Proteo3 platform software (which was used by Sabadell's operations in Spain) to Proteo4 (a platform with important new digital capabilities). This resulted in a major change to the software which underpinned the way in which customers interacted with the bank through its different channels. As TSB put it, its goal was to *"become the first major bank in the UK to have designed and built a new state-of-the-art banking platform for the digital age*".

2.11 TSB engaged SABIS as its prime contractor for the Programme, taking confidence from Sabadell's previous integration experience. The design, build and testing of the Proteo4UK Platform was a significant undertaking, which involved the management and coordination of services from over 70 third party suppliers and the efforts of over 1,400 people.

2.12 The Programme was an ambitious undertaking to improve TSB's IT capabilities and services. The scale and pace of the Programme were unprecedented in the UK retail banking sector.

### *A single event implementation approach was adopted, without sufficient consideration of the risks (see chapters 8 and 10).*

2.13 One of the key decisions in planning any IT transformation programme is the choice of implementation approach, that is, whether the migration onto the new platform will be implemented in phases, or as a single event or 'big bang' migration.

2.14 This is an important decision, particularly where there are major software changes and new infrastructure, and one which requires careful consideration of the trade-off of the risks involved with each approach. In this respect, it is important to understand that the Programme was not a straightforward migration of data onto an existing, proven platform; it was a migration of the functionality and data of an entire bank onto a platform that was substantially new.

2.15 In line with its previous experience, Sabadell's planning prior to its acquisition of TSB assumed that TSB would be taking live its new Proteo4UK Platform to the whole of its existing customer base over a single weekend. This approach was adopted by TSB in its first Programme plan, the March 2016 Integrated Master Plan.

2.16 The advantage of a single event migration is that it is the fastest, cheapest and least complex way to proceed. However, if a bank does opt for a single event migration, it is critical that the risks of this approach are understood and that the platform is robustly tested before it is put live to all customers.

2.17 Choosing a largely single event migration required consideration of the alternatives and a balanced assessment of the risks, drawbacks and benefits. It would not necessarily have been the wrong approach had the right mitigants been put in place.

2.18 TSB did not give sufficient consideration as to whether a largely single event migration was the right choice, what the risks of this approach would be, or how those risks would be mitigated. This choice was not substantively discussed by the TSB Board. In addition, it appears that neither the TSB Board nor the Executive requested or received any advice on this issue from their external advisers.

2.19 For a Programme of this nature, we would have expected the TSB Board to have been presented with the full range of implementation options (including the risks and benefits associated with each option) before a final decision on the approach was taken.

2.20 TSB sought to de-risk the Main Migration Event (the "**MME**") through a number of Transition Events (Early Cutovers and Live Proving) that migrated or piloted parts of the functionality ahead of Go Live. While the Early Cutovers allowed some problems with the Proteo4UK Platform to be identified and resolved, the functionality put into live use constituted only a small part of the Proteo4UK Platform, and therefore did not significantly de-risk the MME. The Live Proving was not carried out at sufficient scale to allow TSB to identify the problems that would arise when the Proteo4UK Platform was taken live to TSB's entire customer base.

2.21 The limitations of the Transition Events meant that they did not sufficiently reduce the risk of the Programme's largely single event implementation approach, and this risk would therefore only be mitigated if the Platform was subject to rigorous testing. We address the limitations of the Programme's testing below.

***An ambitious timetable was set from the beginning. TSB relied on Sabadell's previous experience and various protections that it put into place, but these failed to ensure that the bank did not Go Live before it was ready (see chapters 4 and 6).***

2.22 Although the scope and scale of the Programme would be unprecedented in the UK retail banking sector, Sabadell was confident in its ability to deliver the Proteo4UK Platform at speed due to its previous migration experience.

2.23 At the time of its offer for TSB in March 2015, and without detailed knowledge of TSB's requirements, Sabadell set an expectation that the Programme would be completed by the end of 2017. By as early as 1 July 2015 (the day after Sabadell's offer for TSB was declared unconditional), Sabadell had identified Sunday 5 November 2017 as the intended date for Go Live.

2.24 Nine months of planning within TSB culminated in the March 2016 Integrated Master Plan, which envisaged the same Go Live date of Sunday 5 November 2017. This timetable was ambitious and unrealistic. The pattern of setting a desired end date and then creating a plan to fit that date, whether or not it was realistic or involved taking too much risk, was set for the remainder of the Programme.

2.25 Taking confidence from Sabadell's track record, TSB accepted the timetable set by Sabadell. Sabadell (and SABIS) had previously integrated 12 separate banks onto its Proteo platform. TSB did not consider the extent to which this migration experience differed from what was required to meet the challenges presented by the Programme. There were some significant differences, which would have been discovered if TSB had conducted an appropriate due diligence exercise to understand SABIS' capability to deliver the Proteo4UK Platform.

2.26 TSB also believed it had various protections in place (including retention of the Carve-out Exit Option, being insulated from cost overruns, and the Assurance Matrix) to ensure that it would not Go Live before it was ready. In the event, these protections did not safeguard TSB from migrating to the Proteo4UK Platform before being ready.

## PROGRAMME DELIVERY AND READINESS

***The Proteo4UK Platform was not ready at Go Live because it had not been sufficiently tested or proved (see chapters 10, 11, 14 and 19).***

2.27 TSB went live with a platform that was, in the event, neither stable nor complete. The investigations carried out into the causes of the problems arising after Go Live point to a wide range of issues, many of which could have been identified in testing ahead of Go Live.

***Functional Testing was significantly delayed due to issues with SABIS' late delivery of software and fixing of defects (see chapter 11).***

2.28 Functional Testing was used to confirm that the Proteo4UK Platform's functionality worked as intended (for example, whether customers could make payments via the Mobile App). This was originally SABIS' responsibility, but TSB took over both test case design and execution in September 2016. SABIS remained in charge of fixing any defects that were detected by Functional Testing.

2.29 Functional Testing took 17 months, which was much longer than anticipated. Delays were mainly due to the volume of defects found and the pace at which SABIS could fix them. In addition, SABIS continually missed deadlines for the delivery of functionality into Functional Testing. As a result, significant amounts of functionality started Functional Testing late.

2.30 TSB had planned for a seven month period prior to Go Live, following the completion of Functional Testing (i.e. when the code was stabilised), when Live Proving and Non-functional Testing would be carried out. Non-functional Testing was needed to confirm that the Proteo4UK Platform as a whole could operate at the service levels expected by TSB and its customers at Go Live. However, the delays in Functional Testing meant that it ran in parallel with Non-functional Testing and did not finish until shortly before Go Live.

***As a result of the delays in the Functional Testing and other workstreams, TSB postponed Go Live and carried out a replanning exercise in October 2017. However, TSB did not take this opportunity to produce a realistic new plan, which would have taken into account the experience to date and addressed the causes of the delays (see chapters 12 and 13).***

2.31 Following the decision to delay the MME on Wednesday 20 September 2017, TSB replanned the entire Programme during late September and October 2017 (the "**Replan**") and agreed a new Programme plan (the "**Defender Plan**") on Tuesday 24 October 2017.

2.32 The Replan presented an opportunity for TSB to take a realistic view of the status of the Programme and to learn from the Programme's first 18 months. This opportunity was missed. The Replan was not a comprehensive, 'bottom-up' process and there was little attempt to investigate the technical causes of the delays that had been faced to date. In particular, TSB failed adequately to assess SABIS' capabilities and its ability to deliver to the new plan.

2.33 As a result, the Defender Plan did not clearly articulate the delays that the Programme had faced to date, the reasons for those delays, or the lessons that should have been learned from them. These should have informed the Programme going forward.

2.34 Risk Oversight (which was responsible for providing an independent opinion on the risks associated with the Programme) and Internal Audit (which was responsible for providing an independent and objective assurance of the risk management activities of the Programme Team) broadly concluded that the assumptions underlying the Defender Plan were *"reasonable"* and *"satisfactory overall"*. We find this surprising in light of the flaws that we have identified with the Defender Plan.

2.35 While the TSB Board asked a number of pertinent questions regarding the Defender Plan, there were certain additional, common sense challenges that the TSB Board did not put to the Executive (including why it was reasonable to expect that TSB would be *"migration ready"* only four months later than originally planned, when certain workstreams were as much as seven months behind schedule).

2.36 TSB also imposed an unnecessary constraint on the time available to complete the Programme by choosing to announce on Friday 29 September 2017 that Go Live would be replanned "*into Q1 2018*". TSB made this announcement nine days after formally commencing the replanning process, and therefore without any proper assessment of the volume of work remaining or when the Proteo4UK Platform was likely to be ready.

2.37 In addition, TSB was not transparent about the real reasons behind the decision to delay Go Live (namely that the Programme was several months behind schedule) and instead suggested that the Proteo4UK Platform was almost ready. Having suggested, incorrectly, in September 2017 that the Platform would be ready by the end of November 2017, this would have made it more difficult to announce that the Platform was not in fact ready in the lead up to the new Go Live date of April 2018.

***Following the Replan, the Programme quickly fell behind schedule once again. There were material limitations in the tracking and monitoring of the Programme's progress, and deviations from the Defender Plan were not sufficiently interrogated (see chapter 13).***

2.38 The Defender Plan was approved at the end of October 2017. By January 2018, it was clear that the Programme had deviated materially from the Defender Plan in a number of ways.

2.39 The intention had been to deliver and test the core functionality of the Proteo4UK Platform by the end of 2017, to avoid parallelisation in the Programme and to allow three months for additional assurance testing and proving. The reality was very different. Functional Testing continued into April 2018, and was only brought to a close by deferring and de-scoping significant elements of functionality for completion after Go Live. The dedicated regression testing phase included in the Defender Plan did not take place.

2.40 The Programme had therefore run out of time and, as a result, the majority of Non-functional Testing (which was needed to confirm that the Proteo4UK Platform as a whole

could operate at the service levels expected by TSB and its customers at Go Live) was conducted in a highly compressed period shortly before Go Live.

2.41 While the Programme's progress was tracked and monitored following the Replan, this had material limitations. For example, certain areas (in particular Non-functional Testing) received disproportionately less reporting than others, and updates on the Replan risks often lacked any commentary explaining the significance of the facts being reported. Consequently, as the Programme strayed further from the principles, assumptions, dependencies and milestones set out in the Defender Plan, TSB did not sufficiently interrogate these deviations, what they meant for the overall risk profile of the Programme, or how they impacted on the readiness of the Proteo4UK Platform.

***The design, execution and reporting of Non-functional Testing were flawed. As a result of these shortcomings, important issues in the Proteo4UK Platform were not identified (see chapter 14).***

2.42 Non-functional Testing was needed to confirm that the Proteo4UK Platform as a whole could operate at the service levels expected by TSB and its customers at Go Live. The design, execution and reporting of Performance Testing, a critical part of Non-functional Testing, were flawed. It was not sufficient to mitigate the risk of putting c.5 million customers live, for the first time, on a platform consisting of largely new software to support TSB's digital, telephone and branch channels, and entirely new infrastructure.

2.43 Shortcomings with Performance Testing included the following:

(A) There were issues with the configuration of the two data centres, which contributed significantly to the problems experienced by TSB digital customers immediately after Go Live. As the decision was taken to conduct Performance Testing on a single data centre, it was impossible to identify these issues before Go Live.

(B) During execution of the Performance Testing for Internet Banking and the Mobile App, test targets were lowered after tests did not pass at the original target load. The summary of Non-functional Testing results did not make it clear that the targets had been changed, and the actual volumes following Go Live exceeded the lowered test targets. As such, the Non-functional Testing results presented a more positive view than was warranted of the risk that the Proteo4UK Platform would not be able to perform at the volumes likely to be experienced after Go Live.

***In the lead up to Go Live, the TSB Board did not sufficiently engage in assessing, and did not provide a strong enough challenge to, the Executive's explanations on the adequacy of testing and the Programme's readiness (see chapters 17 and 18).***

2.44 In the lead up to Go Live, the TSB Board should have done more to assess, and should have provided a stronger challenge to, the Executive's explanation of the adequacy of testing. The TSB Board also should have requested more details about the status of the Programme's readiness, given the extent to which the Programme had deviated from the Defender Plan. There were clear indications, which the TSB Board should have interrogated, of the frantic pace at which key Programme activities were being finalised so close to the proposed date for Go Live. The 10 April 2018 TSB Board meeting was a missed opportunity to pause and reflect on these issues.

2.45 The TSB Board was not provided with an accurate view of the defects outstanding in the Platform at the point of Go Live; the actual number of defects was at least two and a half times the *"around 800 defects"* reported to the TSB Board.

***At the time of Go Live, SABIS was not ready to operate the Proteo4UK Platform at scale and TSB's approach to managing SABIS' readiness meant that this was not apparent (see chapters 15 and 18).***

2.46 SABIS had been operating some limited live services prior to Go Live. It had struggled for a period after each Transition Event put new services live, failing to satisfy agreed service levels.

2.47 The evidence requested and received by the TSB Board and the Executive from the Sabadell Group regarding SABIS' readiness to operate the Proteo4UK Platform ahead of Go Live was inadequate. A report by Deloitte Spain (commissioned by SABIS) which identified deficiencies in SABIS' internal controls was not shared with TSB.

2.48 Notwithstanding this, SABIS' readiness should have been scrutinised more carefully by TSB, given observations made about SABIS' immaturity as a service provider and its inability to meet TSB's service level requirements immediately after the Transition Events.

2.49 It is clear from statements made, and remediation work completed, after Go Live that SABIS had not been ready to operate the Proteo4UK Platform. For example:

(A) a September 2018 report prepared by the Sabadell Group COO stated that SABIS *"did not have sufficient capacity to respond and to resolve incidents"* at Go Live; and

(B) a November 2018 report prepared by the TSB CIO stated that SABIS' *"insufficient ability to operate the new IT platform"* had exacerbated TSB's problems after Go Live.

2.50 In addition, instead of a formal, evidenced attestation from either SABIS or Sabadell in the lead up to Go Live, TSB received only a letter from the SABIS UK Managing Director. This should not have satisfied TSB that SABIS would be ready to perform its obligations, as the statements in that letter plainly relate to the SABIS UK Managing Director's expectations regarding the performance of the Proteo4UK Platform, rather than his expectations regarding the ability of SABIS to operate it.

2.51 Had SABIS been an arm's length third party supplier, we expect that TSB would have obtained formal assurance from SABIS (and also Sabadell as its parent), together with supporting evidence demonstrating how SABIS had fulfilled its obligations to deliver the Proteo4UK Platform, and confirming its ability to operate the Proteo4UK Platform in accordance with its obligations. No such formal, evidenced attestation was sought by TSB or provided by SABIS or Sabadell.

## WHY DID TSB DECIDE TO GO LIVE?

***The TSB Board did not fully understand the scope and complexity of the Proteo4UK Platform and the Programme required to deliver it, and the limits of SABIS' comparable experience (see chapters 7, 9 and 18).***

2.52 The TSB Board understood that the Programme was a significant undertaking. However, there were gaps in the TSB Board's understanding of the Proteo4UK Platform's scope and complexity, particularly regarding the extent of the new software being developed to support TSB's digital, telephone and branch channels.

2.53 In addition, the TSB Board did not understand the extent to which SABIS' experience was different from what was required to design, build, test and operate the Proteo4UK Platform.

2.54 Had the TSB Board sufficiently understood these things, we expect that it would have acted differently at key points of the Programme:

(A) the Programme's initial planning stage (including the analysis of the single event implementation approach and the assessment of SABIS' capability to develop and operate the Platform);

(B) the Replan and the subsequent assessment of progress against the Defender Plan; and

(C) the decision to Go Live, including the interrogation of information available to the TSB Board in making that decision (such as the lack of focus on Non-functional Testing and the fact that the evidence from SABIS as to its readiness was informal and insubstantial).

***TSB did not take necessary steps to assess SABIS' capability to develop and operate the Proteo4UK Platform, and to manage SABIS as an arm's length and critical supplier (see chapters 9 and 15).***

2.55 In the context of the acquisition and Sabadell's experience, the decision to commit to the Proteo platform and to the use of SABIS to build and operate the Proteo4UK Platform was a natural starting point for TSB. However, it was necessary for TSB to assess the capacity and capabilities of SABIS as a key supplier at the outset and to continue to manage and oversee SABIS as the Programme progressed.

2.56 TSB did not conduct a comprehensive due diligence exercise to understand SABIS' capability to deliver the Proteo4UK Platform. In addition, TSB did not adequately exercise its contractual audit rights during the Programme in order to understand:

(A) the quality and completeness of the platform being designed, built and tested by SABIS; and

(B) SABIS' capacity to operate that platform and to deliver the service required by TSB and its customers.

2.57 The TSB CIO's role meant that he was the customer of SABIS' services to TSB, but also (having previously been the Chief Process and Information Officer at Sabadell and in effect run SABIS) continued in practice to direct much of SABIS' work as supplier. In our view, this made it difficult to manage SABIS on an arm's length basis. Without an appropriate arm's

length relationship, there was insufficient clarity between the parties as to who was assuming the risk in certain key decisions (including, for example, the decision to conduct Performance Testing on only one data centre).

***While the Assurance Matrix had the potential to be a useful framework for assessing the Programme's readiness, a number of factors undermined its effectiveness (see chapter 16).***

2.58 The Assurance Matrix was the principal tool used by TSB to assess the Programme's readiness to Go Live. While it had the potential to be a useful framework for that assessment, it was undermined by:

(A) the questions regarding SABIS, which were inadequate to assess its readiness to operate the Proteo4UK Platform;

(B) the quality of the Non-functional Testing evidence used to answer questions on the ability of the Proteo4UK Platform to support TSB and its customers; and

(C) the overreliance by the Executive on the TSB CIO when answering their Assurance Matrix questions on Non-functional Testing.

***Risk Oversight and Internal Audit failed to identify important issues, and ensure sufficient action, in respect of problems which then materialised after Go Live (see chapters 18 and 21).***

2.59 Risk Oversight and Internal Audit carried out an extensive programme of reviews, including into areas which were directly relevant to the issues that materialised for TSB after Go Live.

2.60 However, these reviews were in some cases inadequate, with issues not being identified and actions not being followed through appropriately. In particular, they missed the opportunity to provide a robust independent opinion on the Replan, SABIS' ability to design, build and test the Proteo4UK Platform, and the Non-functional Testing evidence at Go Live.

***The TSB Board should have sought independent advice on the Programme as a whole from a suitably qualified, resourced and experienced independent external adviser (see chapter 22).***

2.61 The nature, scale and complexity of TSB's IT transformation was unprecedented in the UK market. It was also a major IT change programme of the type that TSB had not undertaken before. The TSB Board recognised that it required external advice in order to assist it in making key Programme-related decisions and in overseeing the Programme more generally.

2.62 Although additional resource and capability was obtained through third parties (including the TSB Board Advisers), the TSB Board did not take independent advice on the Programme as a whole, nor appoint advisers with an appropriate mandate. This was required to provide an objective and authoritative view on the progress of the Programme and to assist the TSB Board in appropriately challenging the Executive. This advice therefore needed to be independent of the Executive, but also independent of Sabadell, given that TSB's prime contractor was a fellow subsidiary.

2.63 In view of the particular features of the Programme, the TSB Board required a much greater level of independent advice. Such advice is likely to have made a difference to the decisions made by the TSB Board at key points in the Programme, including when committing to the Proteo4UK Platform and to SABIS for its delivery, choosing the

predominantly single event implementation approach, overseeing the Replan, and assessing TSB's readiness to Go Live.

2.64 Had the TSB Board obtained independent advice on the evidence available to it to support the decision to Go Live, it might have identified, for example, the weaknesses in the Non-functional Testing evidence and in the assurances of SABIS' readiness, and therefore that TSB was not ready to Go Live on the weekend of 20-22 April 2018.

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2.65 TSB undertook a transformative programme with huge energy and commitment, and the reader of this Report should not lose sight of that when considering what follows. Our Review was intended to analyse what went wrong and not to dwell on the areas where no issues arose or where problems were dealt with appropriately.

2.66 All major IT transformations will encounter difficulties, and it was reasonable for TSB to assume that when it transferred its customers to the Proteo4UK Platform there would be *"bumps in the road"*. It would be naive to assume that any programme of the scope and scale of the one we have considered in our Review would be without some major challenges and difficult decisions along the way.

2.67 However, as will be seen in this Report, in our view there were a number of areas where a different approach should have been adopted, which would have prevented the *"bumps in the road"* escalating in a way which was unforeseen by TSB and unacceptable to its customers. The articulation of these will, we hope, be of assistance to those who undertake such programmes in the future.

# CHAPTER 3: CHRONOLOGY OF EVENTS

## Phase 1: TSB's Flotation and Acquisition; Initial Planning and Mobilisation (to March 2016)

| Date | Event(s) | Chapter |
|---|---|---|
| 9 September 2013 | LBG announces the separation of the TSB business | 4 |
| 9 June 2014 | LBG and TSB enter into the TSA and LTSA | 4 |
| 25 June 2014 | TSB is floated on the London Stock Exchange | 4 |
| March 2015 | Sabadell begins discussions with LBG, covering, amongst other things, the complexities of moving TSB onto Proteo | 4 |
| 20 March 2015 | TSB agrees to a takeover offer by Sabadell | 4 |
| 30 June 2015 | Sabadell's offer for TSB is declared unconditional in all respects | 4 |
| 22 July 2015 | TSB commences its 'migration assessment project' | 6 |
| 21 August 2015 | Sabadell announces that it has completed its acquisition of TSB | 4 |
| November and December 2015 | Board Deep Dives held to examine the process for creating, and the content of, the overall Programme Plan | 6 |
| 15 March 2016 | The Integrated Master Plan is presented to the TSB Board | 6 |

## Phase 2: Execution up to the Replan (March 2016 – September 2017)

| Date | Event(s) | Chapter |
|---|---|---|
| 26 July 2016 | TSB and Sabadell enter into a Funding Agreement to protect TSB against cost overruns | 6 |
| March 2017 to April 2017 | Mobile App Transition (T0) | 10 |
| April 2017 to April 2018 | Payment Schemes Transition | 10 |
| August 2017 to 6 March 2018 | ATM Transition | 10 |
| 19 April 2017 | TSB and SABIS enter into the MSA and OSA | 9 |
| 20 September 2017 | TSB Board asks the Executive to replan the MME | 12, 13 |
| 29 September 2017 | TSB announces delay to planned migration | 12 |

## Phase 3: Execution of the Defender Plan up to Go Live (October 2017 to April 2018)

| Date | Event(s) | Chapter |
|---|---|---|
| 24 October 2017 | The TSB Board approves the Defender Plan | 13 |
| January and February 2018 | Mortgage Sales and Origination Transition (T2a) | 10 |
| 10 April 2018 | TSB Board approves service of Definitive Notice of Migration on LBG | 18 |
| 18 April 2018 | Final TSB Board meeting before Go Live | 18 |
| 19 April 2018 | The MME Board Sub-Committee authorises initiation of the MME over the weekend of 20-22 April 2018 | 18 |
| 22 April 2018 | Go Live | 18 |

# CHAPTER 4: THE FLOTATION OF TSB AND ITS ACQUISITION BY SABADELL

## KEY POINTS

- Following its acquisition of HBOS in 2008, LBG was required under state aid rules to dispose of a portion of its business. This led to the creation of TSB, TSB's separation from LBG, and TSB's initial public offering on 25 June 2014.
- Although TSB was at this point operating as an independent bank, it continued to use the LBG IT Platform. TSB had the option to continue to use the LBG IT Platform for a period of up to 10 years, ending in July 2024, although the cost of doing so would rise significantly from 2017 and there were other perceived disadvantages to remaining on the LBG IT Platform.
- In late 2014, the TSB CEO commissioned a leading consultancy firm to review the different strategic options available for TSB to exit its transitional IT arrangements with LBG. The consultancy firm recommended that the best strategic option for TSB was to remain on the LBG IT Platform for as long as possible, prior to triggering its contractual option to require LBG to provide it with a separate copy of the LBG IT Platform (i.e. a clone) for TSB's independent use.
- Against this background, in March 2015, TSB received a £1.7 billion takeover bid from Sabadell. Sabadell had a significant track record of acquiring banks and integrating them onto its banking platform named Proteo. To deliver the anticipated financial benefits of the acquisition, it was critical for Sabadell that TSB be moved onto Sabadell's Proteo platform. Following the completion of the acquisition, TSB launched an IT transformation programme to put this into effect.
- At the time of its offer, and without detailed knowledge of TSB's requirements, Sabadell set an expectation that TSB's IT transformation programme would be completed by the end of 2017. Although the scale and pace of the programme would be unprecedented in the UK retail banking sector, Sabadell was confident in its ability to deliver due to its previous migration experience.
- The timeline set by Sabadell was too ambitious. The pattern of setting a desired end date and then creating a plan to fit that date, whether or not it was realistic or involved taking too much risk, was set for the remainder of the Programme.

## INTRODUCTION

4.1 TSB's IT transformation programme (the "**Programme**"), which culminated in TSB taking live its new banking platform on Sunday 22 April 2018, had its roots in TSB's separation from LBG

and subsequent flotation, its ongoing use of the LBG IT Platform, and its acquisition in 2015 by Banco de Sabadell, S.A. ("**Sabadell**").

## THE FLOTATION OF TSB

### Lloyds TSB's Acquisition of HBOS

4.2 On 18 September 2008, shortly after the collapse of Lehman Brothers, Lloyds TSB Group plc announced the terms of a recommended offer for the entire share capital of HBOS plc ("**HBOS**"), which was approved on 12 January 2009. On 16 January 2009, Lloyds TSB Group plc was renamed Lloyds Banking Group plc (with the enlarged group being rebranded as Lloyds Banking Group or LBG).

4.3 In light of the systemic importance of HBOS to the UK financial system, the UK Government facilitated the takeover by making a £17 billion capital injection, which resulted in the UK Government holding a 43.5% ownership stake in the combined group. On giving its approval to this recapitalisation under state aid rules, the European Commission made it a condition that LBG subsequently submit a restructuring plan with the aim of remedying the effect that the loss of HBOS as a 'challenger bank' would have upon the UK retail banking market.[1]

4.4 As part of the restructuring plan approved by the European Commission on 18 November 2009, LBG agreed to dispose of part of its banking business, which included the 'TSB' brand and at least 600 branches, by 30 November 2013 (subsequently extended to 31 December 2015). The divestment was intended to create a ring-fenced business (code-named 'Verde') with at least a 4.6% share of the UK Personal Current Account market.

### Building the Verde Bank

4.5 Following approval of the restructuring plan by the European Commission, LBG began the process of building and separating out the Verde business and preparing it for divestment. On 23 May 2011, LBG announced the executive management team for Verde, including the three people who would later become, respectively, the TSB CEO, the TSB CFO (until 1 July 2016), and the TSB COO.

4.6 On 14 December 2011, LBG announced that it had entered into exclusive negotiations with the Co-operative Group to purchase the Verde business. However, on 24 April 2013, the Co-operative Group announced it would not proceed with the proposed transaction. On the same day, LBG announced its intention to divest the Verde business through an initial public offering ("**IPO**").

4.7 In preparation for the IPO, on 9 September 2013, LBG announced that it had completed the separation of the Verde business (consisting of 631 branches in England, Wales, and Scotland and approximately 4.5 million customers). TSB began to operate as an independently functioning bank within LBG, and the 'TSB' brand reappeared on the high street.[2] The price

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[1] At this point in time, the UK retail banking market featured four larger banks (Lloyds TSB, The Royal Bank of Scotland ("**RBS**"), HSBC, and Barclays) and a number of smaller 'challenger banks' (including HBOS). The European Commission noted that these challenger banks tended to aid competition by competing aggressively on price to attract new customers, while the traditional larger banks tended to focus on their relationship with existing customers.

[2] From 9 September 2013 to 1 January 2014, TSB's executive directors and senior management were responsible for running TSB within certain parameters agreed with LBG (including as to risk appetite), though certain strategic decisions (including those in relation to TSB product pricing and marketing) required LBG approval. From 1 January 2014 until 25 June 2014 (being the date that shares in TSB Banking Group plc were admitted to trading on the Main Market of the

range prospectus for the IPO (dated 9 June 2014) described TSB as a *"challenger bank"* with the intention to *"differentiate itself from the established banks and gain market share"*.

4.8 On 25 June 2014, shares in TSB Banking Group plc ("**TSBBG**"), TSB's holding company, were admitted to trading on the Main Market of the London Stock Exchange. By October 2014, LBG's shareholding in TSBBG had been reduced to 50%.

## THE LBG IT PLATFORM

### Contractual Position

4.9 Although TSB was at this point operating as an independent bank, it continued to use LBG's IT platform (the "**LBG IT Platform**").

4.10 The key terms governing TSB's use of the LBG IT Platform were contained in two contracts, both entered into on 9 June 2014 between TSB Bank plc (TSB's principal operating subsidiary) and Lloyds Bank plc (LBG's principal operating subsidiary): the Transitional Services Agreement ("**TSA**");[3] and the Long Term Services Agreement ("**LTSA**") (collectively referred to as the "**LBG Agreements**"). While both agreements were signed at the same time, the LTSA was only to come into effect upon the expiry of the TSA (originally intended to be on 1 January 2017).[4] The charges payable by TSB to LBG under the LBG Agreements included an original core service charge of approximately £92 million per annum, rising to approximately £187 million per annum once the LTSA came into effect from 1 January 2017. These charges were inclusive of VAT and were to be adjusted periodically to reflect inflation and to account for pass-through costs for third party charges.[5]

4.11 Under the LBG Agreements, TSB had the option to continue to receive the services for a period of up to 10 years, ending in July 2024 (without the possibility of extension), or it could serve notice to exit the arrangements sooner. The LBG Agreements contemplated two possible alternate exit routes:

(A) "Carve-out Exit Option" - through which LBG would be required to create a separate copy of the LBG IT Platform (i.e. a clone) to be operated by a third party service provider for TSB's independent use. Under this option, TSB's liability for LBG's costs (including its third party costs) was capped at £50 million (excluding VAT), beyond which LBG would be responsible for any of its costs and the costs of its third parties; or

(B) "Migration Exit Option" - through which LBG would assist TSB in moving from the LBG IT Platform to a platform operated by a third party bank or IT supplier. Under this option, the LBG Agreements provided that LBG was obliged to bear: (i) its own costs of providing exit assistance to TSB; (ii) TSB's costs; and (iii) TSB's third party

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London Stock Exchange), TSB operated within its own business plan and budget (approved by LBG and within LBG risk parameters).

3 As set out in paragraph 6.35 of chapter 6, the TSA was later amended on 28 July 2016.

4 In the event, the LTSA never came into effect and the services continued to be provided under the terms of the TSA.

5 The lower costs payable by TSB under the TSA as compared to the LTSA partly reflected a downward revision (£20 million in total) of the TSA costs announced by LBG in response to recommendations made by the Office of Fair Trading to the Chancellor of the Exchequer on the impact of the Verde programme and (unconnected) RBS divestments on competition in retail and small and medium sized enterprise banking in the UK. The purpose of the reduction was to help enhance TSB's financial strength and its ability to compete.

costs, up to an aggregate amount of £450 million (excluding VAT), beyond which TSB would be responsible.

4.12 The LBG Agreements provided that it was in TSB's absolute discretion to choose which of these exit options would be pursued.

## TSB's Assessment of the LBG IT Platform

4.13 In making the decision as to how and when to exit the LBG Agreements, one of the factors for TSB to take into account was its assessment of the strengths and weaknesses of the LBG IT Platform.

4.14 A TSB presentation from June 2014 (prepared by the TSB COO) noted that the LBG IT Platform had "*[p]roven infrastructure and applications*" and was highly resilient. However, TSB had a number of concerns about its current IT arrangements with LBG, including the following:

(A) Lack of flexibility - TSB perceived the LBG IT Platform to be complex and lacking in flexibility, with the potential to hinder TSB's ability to fulfil its potential as a 'challenger bank'. A number of specific risks relating to the reliance on LBG were set out in TSB's 'material risk register' dated 26 May 2015, including the *"Risk that the combination of levers available to TSB - the TSAs, the monitoring trustee, LBG's capability as a service provider - hamper TSB in delivering change effectively to compete"* and the *"Risk that driving rapid change through a system infrastructure not designed for a Challenger Bank leads to manual workarounds and errors, causing poor bank and customer outcomes"*.

(B) Competition - TSB considered that, given LBG's status as a competitor, LBG's interests were not aligned with TSB's.

(C) Charges - As set out at paragraph 4.10, from 1 January 2017 there would be a significant increase in the charges payable by TSB to LBG to continue using the LBG IT Platform.

4.15 Certain of TSB's concerns about the LBG IT Platform were raised in correspondence with LBG, with LBG contesting TSB's views on a number of issues.

## The 2014 IT Strategy Reports

4.16 The TSB CEO commissioned a leading consultancy firm[6] to review the different strategic options available for TSB to exit its transitional IT arrangements with LBG. The consultancy firm prepared a draft report on 21 November 2014 and issued its final report on 9 December 2014 (together, the "**2014 IT Strategy Reports**").

### Assessment of the LBG IT Platform

4.17 The 2014 IT Strategy Reports noted that the LBG IT Platform had a number of strengths, including certain "*market-leading applications*", high service availability and high scalability. However, the LBG IT Platform was *"more complex"* than that of other banks of a similar size to TSB, having "*576 applications split across 21 functional areas*", "*many*

[6] While the consultancy firm agreed to allow us to refer in this Report to the content of the 2014 IT Strategy Reports, it asked not to be named in line with the terms of the agreement pursuant to which it had provided services to TSB.

*bespoke applications, built internally over many years, with a large number of interfaces*", and "*complex interconnected layers between applications and infrastructure*".[7]

## Assessment of the Carve-out Exit Option

4.18 The 2014 IT Strategy Reports listed a number of perceived advantages of the Carve-out Exit Option, including that:

(A) LBG would be responsible for the implementation risk and costs (beyond the £50 million which TSB was responsible for paying);

(B) it would not require data migration (which the 2014 IT Strategy Reports described as *"the most challenging, risky and expensive component of any major IT programme"*);

(C) the LBG IT Platform offered strong functionality and resilience which was *"better than any other mid-size UK bank and better than most large UK banks"*; and

(D) the Carve-out Exit Option would be the least disruptive option for customers and TSB employees.

4.19 The 2014 IT Strategy Reports noted, however, that:

(A) the standalone annual IT costs associated with the Carve-out Exit Option would be approximately £220-270 million per year on an ongoing basis (i.e. some £70-120 million more per year than the increased charges payable to LBG under the LBG Agreements from 1 January 2017);

(B) there was "*high key man risk associated with certain critical legacy applications*" required for operation of the LBG IT Platform; and

(C) the flexibility of the platform under the Carve-out Exit Option would likely be lower than what a newly built platform could be expected to deliver.

## Assessment of the Migration Exit Option

4.20 By way of comparison to the Carve-out Exit Option, the 2014 IT Strategy Reports considered two variants of the Migration Exit Option, neither of which were assessed to be attractive. These options were (i) migration to a new build platform; and (ii) migration to a third party bank platform (following a merger or acquisition of a bank by TSB).

### *Migration to a New Build Platform*

4.21 Under this variant of the Migration Exit Option, TSB would buy "*applications "out of the box""* from a single or multiple product vendor(s), who would customise the "*applications to meet TSB's requirements*". TSB would then "*enter into an agreement with a [supplier] for infrastructure…and ongoing management*" of the platform.

4.22 On reviewing the available options in the market, the 2014 IT Strategy Reports determined that the *"full IT landscape"* required to meet TSB's functional requirements could not be provided by a single vendor. As such, there was no *"bank in a box"* solution available and

[7] LBG has told us it believes that there were in fact over 700 Applications relevant to service provision on the LBG IT Platform.

TSB would need instead to *"[bring] together…applications"* from a number of different vendors, which *"would require a significant integration effort"*.

4.23 The 2014 IT Strategy Reports summarised the experience of several banks (both in the UK and overseas) that had attempted significant new build or re-platforming programmes as at November/December 2014 (see Figure 4.1).

**Figure 4.1: Summary From the 2014 IT Strategy Reports of Previous Banks' Experience With New Build or Re-platforming Programmes**

| Bank | Programme description | Duration and cost |
|---|---|---|
| **Overseas examples** | | |
| ING | *"Replacement of majority of infrastructure and applications; main exceptions were mortgages and corporate core applications"* | *"3.5 yrs"*<br>*"£300M (in progress)"* |
| BBVA Compass | *"Replacement of majority of applications; main exceptions were corporate core applications and half of the front end; changes largely supported by new infrastructure"* | *"4 yrs"*<br>*"£270M"* |
| Commonwealth Bank | *"Replacement of large number of applications [including] core platform; main exceptions were front end (focus of earlier work), retail lending and corporate core applications; refresh of most infrastructure"* | *"4.5 yrs"*<br>*"£600M"* |
| **UK examples** | | |
| Co-operative Bank | *"Replacement of majority of applications (main exceptions included mortgages, ATM and telephony channels) and about half of infrastructure"* | *"5 yrs (terminated)"*<br>*"Cost estimate varied"*[8] |
| Nationwide | *"Replacement of large number of applications [including] core platform and channels (with exception of branches) as well as infrastructure [including] mainframe"* | *"5 yrs"*<br>*"£1B"* |
| Tesco Bank | *"Migration of limited business (no mortgages or [Personal Current Accounts]) from RBS to new system resulting in IT costs of ~£100m p.a. (includes Insurance support)"* | *"3.5 yrs"*<br>*"£400M"* |
| Metro Bank | *"New and fully vendor-sourced system; no pre-existing business to be migrated"* | *"<1 yr"* |

4.24 The consultancy firm noted that none of these banks had tried to replace their entire platform, that some of the (relatively) more successful programmes had been *"more simple"* than would be required for TSB, and that even successful programmes were often

[8] According to the Kelly Report (an independent review into the events leading to the Co-operative Bank's capital shortfall), the final expected cost of the Co-operative Bank's re-platforming exercise was calculated to be £663 million, having previously been calculated to be £948 million.

delayed and more expensive than planned (citing Nationwide's programme which cost £500 million more than planned).

4.25 The 2014 IT Strategy Reports concluded that *"[a]s many banks fail as succeed"* and even *"success"* could mean delays and running over-budget by several hundred million pounds.

4.26 Given the extent of the newness of the IT platform to which TSB migrated in 2018 (the "**Proteo4UK Platform**"), discussed further in chapter 7, the new build programmes listed in Figure 4.1 were the best examples available at the time as to the likely duration and cost of the programme that would be required for TSB. In this regard, we note:

(A) the 2014 IT Strategy Reports' "*best estimate*" for the cost of a new build platform was "*£1B cost in total (with significant risk of over-spend), with LBG's contribution capped at £450M*"; and

(B) it is evident from Figure 4.1 that, in all but one case,[9] the new build or re-platforming programmes cited by the consultancy firm had a duration of 3.5 to 5 years.

### *Migration to a Third Party Bank Platform (Acquired by TSB)*

4.27 Under this variant of the Migration Exit Option, TSB would acquire or merge with a bank with a suitable platform and capability for the combined group. However, the 2014 IT Strategy Reports concluded that there were no obvious acquisition targets with suitable platforms available for TSB.

### Recommendation in the 2014 IT Strategy Reports

4.28 The 2014 IT Strategy Reports concluded with a recommendation that TSB should remain on the LBG IT Platform for as long as possible prior to triggering the Carve-out Exit Option. The 2014 IT Strategy Reports did not, however, contemplate the possibility of TSB itself being acquired and subsequently migrating onto an IT platform provided by the acquirer.

4.29 The final draft of the 2014 IT Strategy Reports was discussed at the 18 December 2014 meeting of the board of TSB (the "**TSB Board**"), at which (although this was not minuted) it appears the TSB Board confirmed its preferred exit route was via the Carve-out Exit Option.

## ACQUISITION OF TSB BY SABADELL

### Summary Timeline of the Acquisition

4.30 Against this background, in March 2015, TSB received a £1.7 billion takeover bid from Sabadell. At the time, Sabadell was Spain's fifth-largest bank, with a customer base of approximately 6.5 million, compared with TSB's approximately 4.6 million retail and 113,000 small business banking customers.

[9] Though Metro Bank's programme lasted less than one year, the 2014 IT Strategy Reports described it as a new bank with no back book and a *"vanilla product offering"*.

4.31 In early 2014, Sabadell had launched a three-year business plan, based on leveraging the Sabadell Group's improved capital position and market share. Internationalisation was an important part of this plan.

4.32 At the time, Sabadell already had a significant track record of acquiring and integrating banks (mainly in the Spanish market) and was working to identify regions in the world where it could expand. As part of this, Sabadell initially identified two potential UK targets (TSB and Williams & Glyn[10]) and concluded that TSB was preferable as it had already been subject to an IPO (whereas Williams & Glyn had not). Sabadell considered TSB to be an *"excellent fit"*, owing to its good asset quality and the fact that it was an *"active challenger"* in the UK market. Sabadell later described the acquisition of TSB as a *"major step forward"* in the Sabadell Group's international strategy.

4.33 On 12 March 2015, TSB confirmed that it had received a takeover bid from Sabadell and on 20 March 2015 the Sabadell and TSB Boards announced that they had reached agreement on the terms of a recommended cash offer by Sabadell for the entire share capital of TSB.

4.34 Sabadell's offer document (the "**Offer Document**") was published on 17 April 2015 and sent to TSB shareholders. Sabadell's offer was declared unconditional on 30 June 2015, and TSB was delisted from the London Stock Exchange with effect from 28 July 2015. Sabadell announced that it had completed the acquisition of TSB on 21 August 2015.

## Importance of Sabadell's IT Plans to the Acquisition

4.35 To deliver the anticipated financial benefits of the acquisition, it was critical for Sabadell that TSB be moved onto Sabadell's IT platform (named "**Proteo**"), which had been developed in 2000 with Sabadell's general acquisition strategy in mind.

4.36 Sabadell's preparations for making the offer included initial discussions with LBG (as TSB's major shareholder and the provider of TSB's IT platform),[11] which focused on, among other things, the complexities and costs of moving TSB onto Proteo. In parallel to these discussions, Sabadell started to develop its plans and identify the changes that would be required to adapt the Proteo platform for the UK market. This work was principally led by the Chief Process and Information Officer at Sabadell, who would later become TSB's Chief Information Officer.

4.37 In April 2015, Sabadell prepared a change in control application for the Prudential Regulation Authority ("**PRA**") and the Financial Conduct Authority ("**FCA**") (the "**Change in Control Application**"), which contained details of Sabadell's strategy and plans for TSB. With respect to the expected target IT model for TSB, Sabadell stated that the main objective was *"to provide a modern, legacy-free and digital IT platform fully customized to TSB's business needs, independent from LBG"*. Sabadell went on to explain that it was currently operating with Proteo3 and expected the upgrade to the next version of the Proteo platform (Proteo4) to include a set of modern digital capabilities and a global architecture model.[12]

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[10] Williams & Glyn was a division of RBS formed in anticipation of a potential divestment by RBS so as to comply with European State Aid requirements following the UK Government's provision of state recapitalisation to RBS in 2008. As of 2015, Williams & Glyn had not yet been subject to an IPO.

[11] Sabadell's attendees at these meetings included the Sabadell Group COO, the Sabadell Group CFO, and the Chief Process and Information Officer at Sabadell.

[12] See chapter 7 for further consideration of the differences between Proteo3 and Proteo4.

4.38 Sabadell anticipated that moving TSB onto Proteo would result in significant cost savings. Sabadell's Offer Document stated:

> *"Sabadell estimates that it can deliver, through the application of Sabadell's skills and technology, efficiency cost savings in IT amounting to approximately £160 million per annum on a pre-tax basis, in the third full year after completion of the Offer. These expected savings derive from a full migration of the IT transitional services currently provided by Lloyds onto Sabadell's proprietary Proteo technology platform."*

4.39 The TSB CIO told us that Sabadell made several assumptions in coming to its synergies estimate, including assumptions around the structure of the TSA with LBG and the anticipated running costs of the Proteo4UK Platform. We were told by the Sabadell Group COO that the £160 million comprised approximately £130 million in savings as a result of moving from the LBG IT Platform (thereby avoiding the increase in LTSA costs[13]), and approximately £30 million from improved operational efficiencies.

## The LBG 'Dowry'

4.40 In addition to these longer-term synergies, another financial factor was the fact that, as described at paragraph 4.11(B), LBG had committed (at the time of TSB's IPO, and under the LBG Agreements) to make a contribution of up to £450 million (excluding VAT) towards TSB and its third parties' costs of pursuing the Migration Exit Option from the LBG IT Platform. This arrangement was often referred to by Sabadell and TSB as the 'Lloyds dowry' or the 'dowry'.

4.41 With respect to this dowry, Sabadell's Offer Document stated: *"Sabadell expects that the £450 million contribution will be more than sufficient to meet the implementation costs of the IT migration onto Sabadell's platform"*. We were told by both the Sabadell Group COO and the Sabadell Group CFO that, at the time of making its offer for TSB, Sabadell's assessment was that the Programme would cost less than £450 million.[14]

## Sabadell's Proposed Timetable for the Programme

4.42 From as early as March 2015 (when it first announced its proposed offer), Sabadell had indicated that it intended TSB's migration to be completed before the end of 2017. Sabadell's confidence in its ability to complete the Programme by this date was, we understand, largely based on Sabadell's previous experience of having completed 12 such projects. In particular, we were told by the Sabadell Group COO that, based on its previous experience, Sabadell's *"initial hope"* was that the Programme would be completed in 2016. However, because of the need to adapt the Proteo platform for UK requirements (e.g. to modify the platform for TSB products and the need to connect with the UK payments scheme), an extra year was added to the initial estimate.

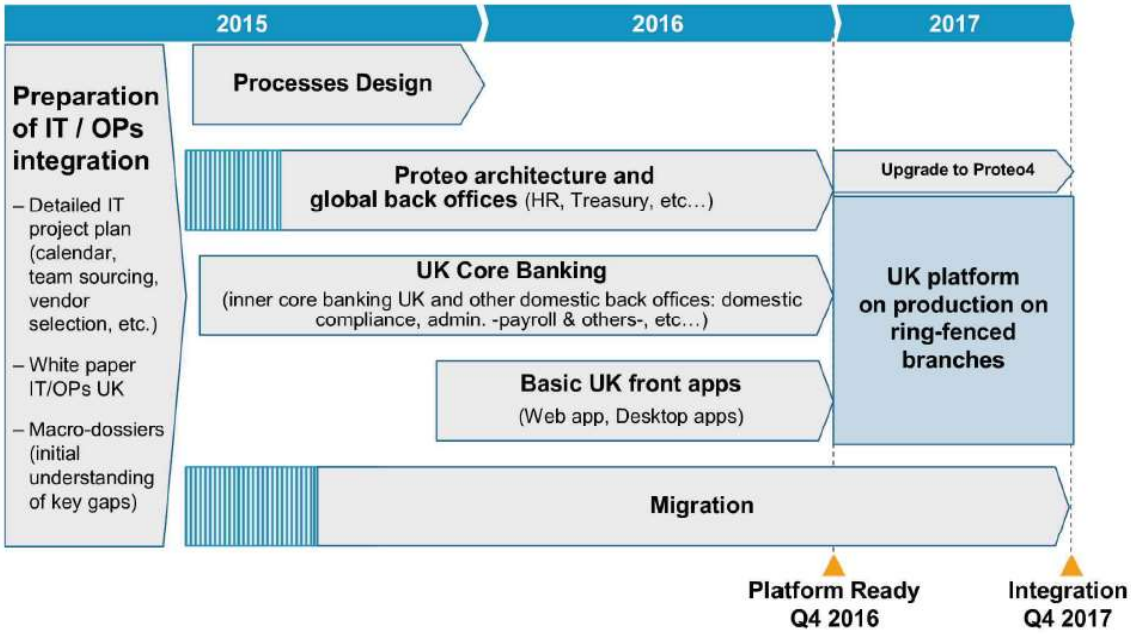
4.43 The regulatory business plan submitted to the PRA and FCA in April 2015 as part of Sabadell's Change in Control Application included a Programme timeline and model (see chapter 6 for further details). The timeline (see Figure 4.2) showed that a UK version of the

[13] See paragraph 4.10 for further detail on these increased costs.

[14] The Sabadell Group COO and the Sabadell Group CFO would later join the TSB Board as non-executive directors.

Proteo platform would be ready by the end of Q4 2016, followed by a year of live use for customers new to TSB in ring-fenced branches, ahead of Go Live in Q4 2017.

**Figure 4.2: Programme Timeline (From the Change in Control Application, Dated 16 April 2015)**




4.44 At a meeting with LBG on 1 July 2015 (the day after Sabadell's offer was declared unconditional) Sabadell informed LBG it intended the migration to take place on 5 November 2017.

4.45 As we will discuss in chapter 6, 5 November 2017 also became the target date chosen by TSB for the migration in its initial Programme plan and remained the target date for the next two years, until the replanning exercise in September 2017.

## Initial Reactions to Sabadell's IT Proposals

4.46 A Financial Times article published on 2 July 2015 questioned how straightforward Sabadell would find it to bring TSB on to the Proteo platform:

> *"The Spanish bank has ambitious plans to bring TSB on to its technology system by 2018 in an attempt to save millions of pounds a year. Given banks' patchy record of integrating new businesses into their existing IT platforms, experts are warning that the deal is 'high risk' and could prove far more expensive than Sabadell expects…*
>
> *The Spanish bank has a solid record. Between 2008 and 2014, it integrated seven acquired banks, including US-based Mellon United National Bank in 2009. But some experts have doubts about its ability to bring TSB on board without large expense."*

4.47 At the time of the acquisition, some TSB Board members and Executives were similarly cautious about Sabadell's IT proposals.

(A) The Former TSB Chairman told us that he found Sabadell's statement on expected synergies to be *"quite a bold statement"*, and commented that TSB did not know at that stage how long it would take, nor how much it would cost, to move TSB on to the Proteo platform.

(B) The TSB COO similarly told us that, although the Executives had not previously seen projects on this scale completed within such a time frame, they did not have the information behind, or the facts to challenge, Sabadell's plans at the time of its offer for TSB.

(C) The TSB CEO also wrote to the Former TSB Chairman in mid-June 2015, stating:

> *"as you are aware…I still have concerns that Sabadell are not fully appreciative of the breadth of scope of the required migration (it is not just the customer facing systems but systems such as the general ledger, HR systems etc. that need to be migrated)…*
>
> *The positive view on this is that the governance and scope will become clearer as we engage with Sabadell through July."*

4.48 The TSB Board did not publicly comment on the IT proposals in Sabadell's Offer Document, and simply stated that it believed that TSB could benefit from Sabadell's track record of successful business and IT integrations.

## FURTHER OBSERVATIONS

4.49 At the time of its offer in early 2015, Sabadell set an expectation that the Programme would be completed by the end of 2017. Sabadell did so without detailed knowledge of TSB's requirements and yet this remained the timetable for the next two years, until the replanning exercise in September 2017.

4.50 However, at the time of Sabadell's acquisition of TSB:

(A) some TSB Board members, Executives, and third party commentators were cautious about Sabadell's ability to complete the Programme before the end of 2017; and

(B) the experience of other banks that had attempted significant new build or re-platforming programmes suggested that the timeframe set by Sabadell was too ambitious.

4.51 As we will describe in later chapters, this pattern of setting a desired end date and then creating a plan to fit that date, whether or not it was realistic or involved taking too much risk, was set for the remainder of the Programme.

# CHAPTER 5: INTRODUCTION TO PROGRAMME LEADERSHIP, GOVERNANCE AND RISK MANAGEMENT

## KEY POINTS

- Leadership of the Programme resided primarily with the TSB CEO (who was personally accountable for the successful delivery of the Programme) and the TSB CIO and TSB COO (who jointly led the Programme on a day-to-day basis). All three had relevant experience and provided stable leadership throughout the Programme.
- A number of TSB committees were involved in the Programme, and some were created specifically for the Programme. The Programme's governance structure also included a number of cross-entity committees involving TSB, LBG, SABIS, and Sabadell.
- The TSB Board was responsible for making key strategic decisions in relation to the Programme. The Audit Committee was the primary TSB Board level governance forum for oversight of the Programme.
- The core of the Programme's approach to risk management was based on TSB's business as usual 'three lines of defence' model. TSB recognised at the outset of the Programme that the second line of defence (Risk Oversight) and the third line of defence (Internal Audit) did not have the required capacity and capability to oversee the Programme. To address this, a number of hires (including a new Chief Risk Officer and a new Chief Audit Officer) were made and additional capacity was obtained from third parties on a co-source basis.
- However, a bank's day to day risk function, even if supplemented by co-source capacity, is likely to be insufficient to provide risk management and assurance for a Programme of this scale and complexity. The Programme needed independent specialist advice. The extent to which independent advice was obtained, and TSB's risk management are considered in more detail in chapters 21 and 22.

## INTRODUCTION

5.1 Sabadell's proposal to migrate TSB onto the Proteo4UK Platform was one of the most complex and challenging IT transformation programmes ever undertaken in the UK financial services sector. Given this, it was imperative that TSB put in place effective leadership, governance and risk management processes to ensure that key risks were actively identified, reported and managed.

5.2 In this chapter, we describe the leadership and governance arrangements that TSB put in place for the Programme, and provide an overview of the 'three lines of defence' model that TSB used to manage risk.

## LEADERSHIP OF THE PROGRAMME

5.3 Leadership of the Programme primarily resided with three members of TSB's Bank Executive Committee (the "**BEC**" also referred to as the "**Executive**"): the TSB CEO, the TSB CIO, and the TSB COO. These three individuals brought considerable experience to the Programme.

### Role of the TSB CEO

**Figure 5.1: Role of the TSB CEO in the Programme (From the T3 Memo, Dated 17 April 2018)[1]**

- Personally accountable for the successful delivery of the TSB/Sabadell migration and through delegation to BEC members. This includes the successful delivery of the overall programme and associated business readiness activities
- Provision of issue resolution for items that impact the ability of TSB to deliver changes on time and on budget
- Recommendation to "go live" to the TSB Board (ratification that systems, data and business "is ready"). This will be issued in the form of the CEO T3 Memorandum and will request that the Board give the Executive the authority to initiate the Migration Weekend (the "T3 Event")

5.4 The TSB CEO was personally accountable for the successful delivery of the Programme (see Figure 5.1). He was the author of several key Programme-related papers and memoranda presented to the TSB Board (including one in December 2015 recommending that the TSB Board initiate the Programme, and one in April 2018 recommending that TSB proceed to migrate from the LBG IT Platform to the Proteo4UK Platform (the "**T3 Memo**")).

5.5 The TSB CEO was a member of the TSB Board and chaired the BEC and the BEC Design Executive ("**BEC DE**") throughout the Programme. The roles of these committees are described at paragraphs 5.23 to 5.25.

5.6 The TSB CEO had joined LBG in 2010 and was appointed to the executive management team for the Verde Programme in 2011 (see chapter 4), through which he led the development and establishment of TSB. He had previously held senior positions at Santander UK, and during his tenure there Bradford & Bingley had been integrated onto Santander's IT platform.

[1] The T3 Memo was the document that contained the TSB CEO's recommendation (together with supporting evidence) to the TSB Board regarding the decision to Go Live.

## Role of the TSB COO

### Figure 5.2: Role of the TSB COO in the Programme (From the T3 Memo, Dated 17 April 2018)

- Accountable for the design and business readiness of the TSB/Sabadell Migration programme - namely a functioning TSB Bank
- To own and ratify the baseline, transition and end state Target Operating Model for the Migration programme and ensure its viability is not compromised throughout the programme delivery
- Assurance of [TSB's] acceptance of system deployments
- Accountable for development of the migration communications strategy and approval of the customer and partner impact and all mitigation strategies (ensuring disruption is minimised as far as possible)
- Accountable for maintaining regular engagement with UK regulators (joint accountability with [the TSB CIO] and co-ordinated with [the Chief Risk Officer])

5.7 The TSB COO and the TSB CIO were the joint leaders of the Programme on a day-to-day basis. The TSB COO reported directly to the TSB CEO. She also had a "*functional reporting*" line into the Sabadell Group COO.

5.8 The TSB COO was a member of, and in some cases acted as the chair or deputy chair of, a number of Programme-related committees including the Migration Delivery Committee ("**MDC**") (which is discussed further in chapters 9, 11, and 14). In addition to her core BEC accountabilities, the TSB COO was also responsible for (among other things) overseeing all the business-led workstreams to ensure that each business area was ready for Go Live. Alongside her Programme-related responsibilities, she retained significant responsibility for TSB's business as usual operational performance during the Programme.

5.9 The TSB COO had joined Lloyds TSB in 2005. She was appointed to the executive management team for the Verde programme in 2011 and stayed with TSB after its divestment. The TSB COO therefore had significant knowledge and understanding of the IT systems and operations of both LBG and TSB.

## Role of the TSB CIO

### Figure 5.3: Role of the TSB CIO in the Programme (From the T3 Memo, Dated 17 April 2018)

- Accountable for the building of and effective implementation of the TSB/Sabadell Migration programme - namely a functioning TSB Bank
- Management and assurance of LBG delivery within the programme
- Management of the overall BEC migration governance, communication and decision making process
- Accountable for maintaining regular engagement with UK regulators (joint accountability with [the TSB COO] and co-ordinated with [the Chief Risk Officer])

5.10 The TSB CIO had a number of roles and responsibilities throughout the Programme. As with the TSB COO, the TSB CIO sat on and served as the chair of a number of the Programme's committees, including the MDC.

5.11 The TSB CIO reported directly to the TSB CEO. As depicted in the group organisational chart, he also had a *"functional reporting"* line to the Sabadell Group COO.

5.12 Before the acquisition of TSB, the TSB CIO had been the Chief Process and Information Officer at Sabadell. During his time at Sabadell, the TSB CIO had been involved in nine of Sabadell's previous IT migrations. In a report to the TSB Board dated 25 June 2015, the TSB CEO noted that Sabadell had proposed his appointment as TSB's Chief Information Officer (with a direct reporting line to the TSB CEO) to take responsibility for the design and delivery of the proposed Programme. The TSB CIO was not formally appointed until September 2015, but attended TSB Board and BEC meetings from July 2015.[2] The TSB CIO also sat on the Global Technology Executive Committee ("**GTEC**"), which was a Sabadell Group committee.

5.13 The TSB CIO's 2016 performance review described him as *"the driving force behind the technical build of the Proteo4UK platform"*, and he spent a significant amount of time managing SABIS,[3] including during his frequent visits to Spain. The list of the TSB CIO's responsibilities contained in the T3 Memo (see Figure 5.3) does not mention that the TSB CIO was also the accountable executive with responsibility for TSB's relationship with SABIS (which is discussed further in chapter 9). The TSB CIO remained a director of SABIS Spain from before Sabadell's acquisition of TSB right up until 19 August 2016 (i.e. nearly a year after he joined TSB).

5.14 As will become apparent in subsequent chapters of this Report, several critical Programme decisions were made by the TSB CIO. In addition, overarching governance and decision-making for testing occurred in the Testing Delivery Forum (also known as the Migration Testing Steerco), which was chaired by the TSB CIO and attended by representatives of TSB and SABIS (see chapters 11 and 14).

5.15 TSB disagrees with our characterisation of the TSB CEO, the TSB CIO, and the TSB COO as the primary leaders of the Programme. TSB has told us that the entire BEC was responsible for the Programme through each member's individual and collective BEC responsibilities. We accept that other BEC members had Programme-related responsibilities, but these were largely limited to their relevant functions (see Figure 5.5). It is clear from both the documentary evidence and from the interviews that we conducted that the TSB CEO, the TSB CIO and the TSB COO were responsible for leading this Programme. For example:

(A) it was the TSB CEO who was "*[p]ersonally accountable for the successful delivery*" of the Programme, and the TSB CEO who made the key recommendations to the TSB Board about the Programme.

(B) it was primarily the TSB CIO and the TSB COO who sat on Programme-related committees, and reported to the TSB Board in relation to the Programme.

(C) the Former TSB Chairman requested that the TSB CIO and the TSB COO provide written documentation to explain the reasons why the Proteo Exit Option was

[2] There were discussions at the time of the TSB CIO's appointment about whether he should be seconded from Sabadell, or whether he should become an employee of TSB. It was decided that the latter option was preferable, and that, following his initial secondment from July to September 2015, he became a TSB employee.

[3] As explained in chapters 1 and 9, SABIS was, like TSB, a subsidiary of Sabadell, and was TSB's prime contractor on the Programme and systems integrator under the Migration Services Agreement ("**MSA**").

preferable to the Carve-out Exit Option, which they did in their 4 February 2016 memorandum to the TSB Board (see chapter 6)

(D) the TSB CIO and the TSB COO presented the primary overall plan for the Programme, the Integrated Master Plan, to the TSB Board on 15 March 2016 (see chapter 6).

(E) the Defender Plan Guiding Principles (the Programme plan used after the re-planning exercise in October 2017) were presented to the TSB Board by the TSB CIO and the TSB COO (see chapter 13).

(F) the TSB CIO and the TSB COO presented the 22 January 2018 Audit Committee Migration Deep Dive paper to the Audit Committee regarding how the Programme was tracking against the Defender Plan (see chapter 13);

(G) the TSB CIO and the TSB COO introduced the Assurance Matrix questions and evidence requirements for each question to the TSB Board in their paper which was presented at the 15 May 2017 Audit Committee meeting (see chapter 16);

(H) the TSB CIO and the TSB COO were the 'Gold Command & Control' leads for the Executive Gold Team. The Executive Gold Team was authorised by the MME Board Sub-Committee to initiate the MME over the weekend of 20-22 April 2018 (see chapter 18); and

(I) the TSB CIO and the TSB COO were the key point of contact with Deloitte when Deloitte was supporting the first line, and received the monthly 'programme review reports' from Deloitte, as well as weekly email updates from the Deloitte Partner (see chapter 22).

## GOVERNANCE

### The TSB Board and the TSB Board Committees

5.16 The TSB Board was responsible for making key strategic decisions in relation to the Programme.

5.17 Immediately following Sabadell's acquisition of TSB in June 2015, the TSB Board comprised the Former TSB Chairman, the TSB CEO, the Former TSB CFO, four independent non-executive directors ("**TSB INEDs**") and two non-executive directors appointed by Sabadell (the "**Sabadell NEDs**"): the Sabadell Group COO, who was also the chairman of SABIS until 8 November 2016, and the Sabadell Group CFO.

5.18 Throughout the Programme, a number of further changes were made to the membership of the TSB Board, many of these resulted from a review of the appropriate composition of the TSB Board following Sabadell's acquisition of TSB, which had identified two main issues: (i) a lack of expertise in IT projects among the TSB INEDs; and (ii) a feeling of stretch among the TSB INEDs, and concluded with a view that one or two additional INEDs were needed. An overview of the composition of the TSB Board during the course of the Programme is set out in Appendix 2.

5.19 Three TSB Board Committees had responsibility for overseeing specific aspects of the Programme in order to allow the TSB Board to "*focus on the key risks and opportunities created by the Migration Programme*". A summary of the Programme-specific roles of these committees is set out in Figure 5.4.

### Figure 5.4: Summary of the Programme-related Roles of the TSB Board Committees

| TSB Board Committee | Role |
|---|---|
| **Board Audit Committee** | The Board Audit Committee (the "**Audit Committee**") was the primary TSB Board level governance forum for oversight of the Programme, receiving regular updates and scrutinising the progress of the Programme (though ultimate decision-making powers were reserved for the TSB Board). The Audit Committee also oversaw the management of Programme risks, and assured the internal controls and risk management system in respect of these risks.[4] |
| Board Risk Committee | The Board Risk Committee ("**Risk Committee**") oversaw the management of the Programme risks as they may have affected TSB's business as usual activities. For example, the Risk Committee considered (among other things): (i) management distraction, in order to ensure that BAU operations were receiving an appropriate amount of risk oversight; and (ii) the integration of functions and areas such as anti-fraud and anti-money-laundering controls, for which TSB would become responsible (rather than LBG) as a result of the Programme. |
| Board Remuneration Committee | The Board Remuneration Committee ("**RemCo**") oversaw the management of TSB's human capital to ensure it was aligned with the oversight and management of 'people' risks (for example, management stretch) both generally within TSB and as they applied to the Programme. |

5.20 The TSB Board (particularly through the work of the Audit Committee) dedicated a significant amount of time and energy to the Programme. The Chairs of the three key TSB Board Committees remained the same throughout the Programme, which provided important continuity.

5.21 The TSB Board considered appointing an additional INED to provide IT transformation experience, but instead elected to appoint an independent adviser to the TSB Board in respect of the Programme (we explain the role of "The TSB Board Advisers" in the next insight box, and consider it in more detail in chapter 22).

5.22 The TSB Board subsequently did appoint a new INED with extensive experience in SME banking and digital transformation (considered in more detail in the "A New INED – An Opportunity Missed" insight box).

## The Bank Executive Committee and the BEC Design Executive

5.23 The BEC is TSB's principal executive committee and is chaired by the TSB CEO. Its role is to *"develop and implement the strategy, business objectives and operations of the Bank"*. Its terms of reference note that it: *"provides support to the CEO in performing his/her duties through collective support, monitoring and decision making on issues that affect the Bank and other TSB group entities"*. Each month the BEC also reviews all papers that are going to the TSB Board and TSB Board Committees that month. During the Programme, this review included papers on the status and progress of the Programme.

[4] By way of example, the Audit Committee carried out a number of 'deep dives' on key elements of the Programme.

## The TSB Board Advisers

- At the TSB Board meeting on 16 December 2015, the TSB CEO recommended that the TSB Board appoint an external adviser who could provide an *"independent voice"* and help the TSB Board to *"'ask the right questions' of the Executive"* and *"discharge its oversight responsibilities effectively"* during the Programme. Two such advisers were appointed during the Programme.
- The First TSB Board Adviser was appointed with effect from 21 March 2016. He had previously been the Global Managing Director of Accenture's Banking Industry Practice and had 35 years' experience advising financial institutions.
- The First TSB Board Adviser left his role in December 2016, following which a new Board Adviser was not appointed until April 2017, meaning that the TSB Board was without independent advice for several months.
- The Second TSB Board Adviser (also a former Accenture partner), who had been recommended to TSB by the First TSB Board Adviser, was engaged in late April 2017.
- The contracts of both TSB Board Advisers were nearly identical. Both contracts stated that the TSB Board Adviser was to act as an *"independent facilitator and adviser"* who could ensure the TSB Board was:
  - *"Well informed about the IT target model, its execution strategy and its delivery plan"*;
  - *"Clear about the interaction between future IT strategy, operating model and business model"*;
  - *"Able to understand the downstream implications and risks from multiple perspectives (regulatory, shareholder, customer, staff, delivery partner etc)"*;
  - *"Able to make balanced and informed judgments about when and how to take acceptable risk in the Programme"*; and
  - *"Informed sufficiently to hold management to account for its actions including how to stress-test the options and course-of-action proposed by management"*.
- The contracts also noted that there was *"a collective desire to build informed challenge into the interactions with the Board and to help the Board become confident about the management team's capacity and capability to execute successfully"*.
- The First TSB Board Adviser's contract stipulated that he should work approximately six to seven days per month, though with *"frequent checkpoints"* to see if that estimate should be increased or decreased. The Second TSB Board Adviser's contract stipulated that he would work four to five days per month; however, his invoices suggest that he worked the equivalent of one to three days per month from April 2017 to April 2018.
- We consider the efficacy of the TSB Board Advisers further in chapter 22.

## A New INED - An Opportunity Missed

- The TSB Board considered appointing an additional INED with IT transformation experience; however, this option was discounted as the TSB Board determined that it wanted someone who could act as an independent adviser to the TSB Board in respect of the Programme,[5] as opposed to an INED who would have had broader obligations and responsibilities to TSB.
- In September 2017, a new INED with extensive experience in SME banking and digital transformation was appointed to the TSB Board. This INED previously had spent 22 years in executive roles with Accenture, predominantly in technology and strategy. We were told that he was appointed to assist with moving forward TSB's digital strategy, rather than with the Programme specifically in mind, and the INED confirmed to us that he was *"brought on to the TSB board really to strengthen its forward-looking strategic digital flavour, so not as an IT expert for migration"*.
- As noted in Figure 5.4, the Audit Committee was used as the primary TSB Board level governance forum for oversight of the Programme (in addition to its general role and responsibilities). Because of this, a number of TSB's other NEDs regularly attended Audit Committee meetings when Programme-related items were on the agenda. Given the central role the Audit Committee played in overseeing the Programme, and this INED's undoubted relevant experience, it might have been expected that he would have attended the Audit Committee meetings. However, we understand from this INED that he did not sit on the Audit Committee because he had an existing relationship with PwC, TSB's auditors, and, therefore, *"both parties in [his] appointment analysed it would be inappropriate"*. He told us that it was his view that *"if you are precluded from joining a committee you don't show up at all the meetings"* as that would be *"inappropriate and leading to conflicts of interest"*. This is despite the fact that PwC had no direct delivery or assurance role in the Programme.
- Our Review has not identified any evidence to suggest the Audit Committee itself considered whether or not it was appropriate for him to attend for those portions of its meetings which covered Programme-related matters. While he attended the 22 January 2018 Audit Committee Migration Deep Dive (which was attended by all TSB Board members), the only ordinary course Audit Committee meeting that he attended before the MME was on 18 April 2018, two days before the MME Weekend.
- The TSB Board recognised that as a challenger bank with digital capabilities they would need a NED with experience of, and expertise in, digital transformation. Having appointed this INED, however, it should have been made clear to him that he could (and should) attend Audit Committee meetings and that this would not compromise his independence. This was a missed opportunity for the TSB Board given that this INED's relevant knowledge and experience would have been helpful for the work of the Audit Committee, as the primary forum through which the TSB Board monitored the Programme. This was particularly the case as this INED joined the TSB Board at the time the Programme sought to address significant delivery challenges through the Replan in October 2017. Although this INED had access to Audit Committee materials, and participated in discussions at the TSB Board level, in our view, this INED's participation in Programme-related discussions at the Audit Committee meetings ahead of TSB Board meetings might have provided his fellow directors with a valuable resource to assist them to understand better the more technical aspects of the Programme.

[5] Chapter 22 contains further information about the two individuals appointed to act as independent advisers to the TSB Board.

5.24 The BEC DE was established in early 2015 as a means of ensuring the design of TSB's business was aligned to its strategy. Given that the primary focus of BEC meetings was TSB's business as usual operations, the BEC DE became the main Executive level forum through which TSB ran the Programme. While the BEC received progress updates on the Programme, it was at the BEC DE where key Programme-related decisions were made by the BEC members. The BEC DE was chaired by the TSB CEO.

5.25 The BEC DE met fortnightly and reported to the BEC, although the members of these two committees was largely the same. As discussed in subsequent chapters, in addition to having core accountabilities common to all BEC members (see Figure 5.5), individual BEC members were also given Programme-specific responsibilities relating to their business areas, including: (i) accountability for ensuring the effective implementation and delivery of the business functionality that related to their business area (see chapter 16); and (ii) responsibility for attesting that the relevant functions were ready to Go Live (see chapters 16 and 18).

**Figure 5.5: Role of Each BEC Member in the Programme (From the T3 Memo, Dated 17 April 2018)**

- To own and ratify the baseline, transition and end state Target Operating Model for the relevant function and ensure its viability is not compromised throughout the programme delivery
- Ultimately accountable for ensuring the effective implementation and delivery (even where delegation has been made to a Material Risk Taker / direct report) of relevant functional dossiers, ensuring the programme delivery is monitored and controlled against the baseline plan, and that threats to progress are proactively identified and mitigated
- Completion of the Assurance Matrix for relevant function. This will be the primary 1st line input into the CEO T3 memo and will provide confirmation of functional readiness for the T3 Event
- Ongoing ownership of material programme elements which impact a BEC members function but may require discussion at BEC to ensure satisfactory programme delivery
- Ensure the delivery of transparent and fair customer outcomes for customers
- Identification and management of dependencies that impact the relevant [BEC member's] function
- Accountable for ensuring that [TSB employees] within the [BEC member's] function have carried out the required training to ensure that they are migration ready and able to use the new systems effectively

## Other Committees

5.26 There were a number of other Programme-specific committees and working groups that operated below the BEC and the BEC DE. The committee governance structure for the Programme, which is contained in Appendix 3, included a number of 'cross-entity' committees that included representatives from LBG and/or SABIS. These cross-entity committees included the MDC, the Migration Deferred Defects Forum ("**MDDF**"), and the Testing Delivery Forum (also known as the Migration Testing Steerco), which are referred to later in this Report.

## THE THREE LINES OF DEFENCE

5.27 The core of the Programme's approach to risk management was based on TSB's business as usual 'three lines of defence' model: (i) the Programme Team, (ii) Risk Oversight, and (iii) Internal Audit.

### First Line of Defence - Programme Team and BUCF

5.28 In relation to the Programme, each BEC member had the primary responsibility for risk decisions and actions within his or her area of accountability. Each business area was required to establish controls to ensure compliance with TSB's policies and the risk appetite parameters set by the TSB Board.

5.29 Each business area had a Business Unit Control Function ("**BUCF**"), whose role was to report all Programme risks to the relevant committees and governance bodies and to support the relevant BEC members and other employees engaged in delivering the Programme (the "**Programme Team**") in their risk management responsibilities.

### Second Line of Defence - Risk Oversight

5.30 TSB's risk oversight function ("**Risk Oversight**") was responsible for providing *"an independent opinion on the risks associated with the programme and the way the "1st line" programme is managing and mitigating them"*. Risk Oversight teams reported to the Chief Risk Officer (the "**TSB CRO**"), who reported to the TSB CEO and was a member of the BEC. Risk Oversight provided regular reports on the Programme to the BEC, the Risk Committee and the Audit Committee.

### Development of Risk Oversight

5.31 During the early stages of the Programme, it was widely acknowledged that Risk Oversight was underdeveloped. The Former TSB CRO noted in her March 2016 opinion to the TSB Board that the operational risk migration oversight team lacked the necessary capability and technical expertise given the scope and complexity of the Programme. She noted that there was a risk that Risk Oversight would not be able to oversee the Programme to a sufficient level of coverage or depth and proposed investing in more *"professional"* change oversight capability.

5.32 The issues with the resourcing and expertise of Risk Oversight were discussed again upon the arrival of the TSB CRO. During their handover, the Former TSB CRO told the TSB CRO that *"capabilities and resources are a challenge"* in second line oversight of the Programme and that he would have to consider how to use co-source partners to augment the existing Risk Oversight team.[6]

5.33 At the start of his appointment, the TSB CRO shared these concerns. During his induction in December 2016, the TSB CRO emailed the TSB CEO to share his first impressions of Risk Oversight, which he noted was *"struggling to support the business in key areas"*. He added that *"no-one can see [Risk Oversight] asking the right questions of [the TSB CIO's] and [TSB*

[6] Co-source arrangements typically involve supplementing a client's team with appropriately skilled individuals to fill gaps in expertise or capacity under the direction of the client. See chapter 22 for further information about the use of co-source arrangements in the Programme.

*COO's] teams."* In other words, it appears that the TSB CRO considered that Risk Oversight did not have sufficient expertise to challenge the Programme Team on the more technical aspects of the Programme. The TSB CRO's concerns were also recorded in the note of an introductory meeting with the PRA on 20 December 2016.

5.34 Capability and resource issues in Risk Oversight were also highlighted in the H2 2017 oversight plan, dated 17 July 2017. The plan noted that there were *"known technical capability gaps in the 2nd line, particularly in fraud, financial crime and IT Security"*. In a meeting on 31 July 2017, the FCA saw a challenge with *"the speed of on-boarding new colleagues and the timeline of the Migration Programme"*. The FCA also asked *"how TSB is comfortable that [Risk Oversight] has been looking at the right things, given they didn't have the skills and capabilities required within the team from the beginning."* The TSB CRO responded that EY and Deloitte were providing subject matter expertise to support Risk Oversight, although a senior member of the TSB CRO's team conceded that there were still gaps in skills and capabilities, even with these third party resources.

5.35 An EY Director with extensive technical expertise and migration experience had been procured to support the Former TSB CRO in September 2016. The EY Director's role was to observe the governance of the Programme and raise observations to feed into Risk Oversight's reporting. The EY Director was engaged for 2.5 days per week (and for only one day a week from July 2017), and we have been told that the EY Director left in either October or November 2017.

5.36 The TSB CRO continued efforts to bolster the technical expertise of Risk Oversight by recruiting new people with IT, fraud and financial crime expertise. He told us that the "*first material hire*" made to achieve that was the TSB Head of Operational Risk Oversight, who joined TSB in July 2017 from Nationwide, where he had also been Head of Operational Risk Oversight and, like the TSB CRO, was involved in a major data migration programme. The TSB CRO told us that he considered that these new hires, alongside additional resourcing from Deloitte from August 2017 (see chapter 22), created a much more technically adept Risk Oversight and led to oversight activity getting progressively stronger.

## Third Line of Defence - Internal Audit

5.37 TSB's internal audit function ("**Internal Audit**") provided *"independent and objective assurance of the risk management activities of the [Programme]"*. Internal Audit was led by the Chief Audit Officer (the "**TSB CAO**"), who reported to the TSB Audit Committee Chair, and was a member of the BEC. Internal Audit provided reports on the Programme to the BEC and the Audit Committee.

5.38 In the course of the Programme, Internal Audit made a number of hires:

(A) the TSB CAO joined TSB in March 2016. He had been Chief Risk Control Officer at Sabadell from 2013 to 2016 and before that had been the Chief Financial Officer at Catalunya Bank. In these roles, the TSB CAO had experience in a number of IT programmes in Spain; and

(B) the TSB IT, Change and Operations Audit Director joined in March 2017 to bring in relevant expertise to enhance Internal Audit's capabilities. He had been global head of technology audit at HSBC and had relevant experience in the IT migration of Santander UK.

5.39 Additionally, Internal Audit used a co-source model to access and utilise technical skills from a number of external suppliers during the course of the Programme.

5.40 In chapter 21, we will discuss how well TSB's 'three lines of defence' model worked in relation to this Programme.

# CHAPTER 6: INITIAL PROGRAMME PLANNING

## KEY POINTS

- The initial timeline for the Programme prepared by Sabadell in April 2015, envisaged that the migration of customer data from the LBG IT Platform to the Proteo4UK Platform would occur in Q4 2017. Sabadell communicated the target date of 5 November 2017 as early as July 2015.
- In December 2015, the TSB Board decided that the Proteo Exit Option (i.e. the development of Sabadell's Proteo platform to meet TSB's requirements, and the migration of TSB's data from the LBG IT Platform to the Proteo4UK Platform) was its preferred option to exit its IT arrangements with LBG (rather than the Carve-out Exit Option which had been intended before the acquisition by Sabadell).
- Following Sabadell's offer to acquire TSB becoming unconditional in June 2015, TSB and SABIS had been developing a plan for moving TSB to Sabadell's Proteo platform. This project culminated in the March 2016 Integrated Master Plan. The plan also envisaged a migration of all TSB's customer data to the Proteo4UK Platform on 5 November 2017.
- The Integrated Master Plan set an ambitious timetable, and ultimately proved not to be achievable. It was not developed on a sufficiently left-to-right basis, and therefore did not incorporate realistic timescales for the design, build and testing of the new Platform. It is therefore unsurprising that TSB had to undertake a re-planning exercise in October 2017.
- TSB put in place protections (including retention of the Carve-out Exit Option, being insulated from cost overruns, and the Assurance Matrix) to mitigate the risk that it would Go Live before it was ready. These mitigants and protections did not, in the event, assist TSB in ensuring that TSB did not Go Live before it was ready.

## INTRODUCTION

6.1 In chapter 4, we described how Sabadell's acquisition strategy contemplated moving TSB onto Sabadell's IT platform, named Proteo. This chapter focuses on the period immediately after Sabadell's offer to acquire TSB became unconditional (July 2015 to March 2016). During this period, TSB undertook its assessment of, and its preliminary preparations for, the Proteo Exit Option. We use the term "**Proteo Exit Option**" to describe the option (now available to TSB, following its acquisition by Sabadell) to exit the IT arrangements with LBG through:

(A) the development of Sabadell's Proteo platform to meet TSB's specific requirements. This new iteration of the Proteo platform (including the upgrade to the new version

of Proteo, Proteo4, and its customisation for TSB) became known as "Proteo4UK"; and

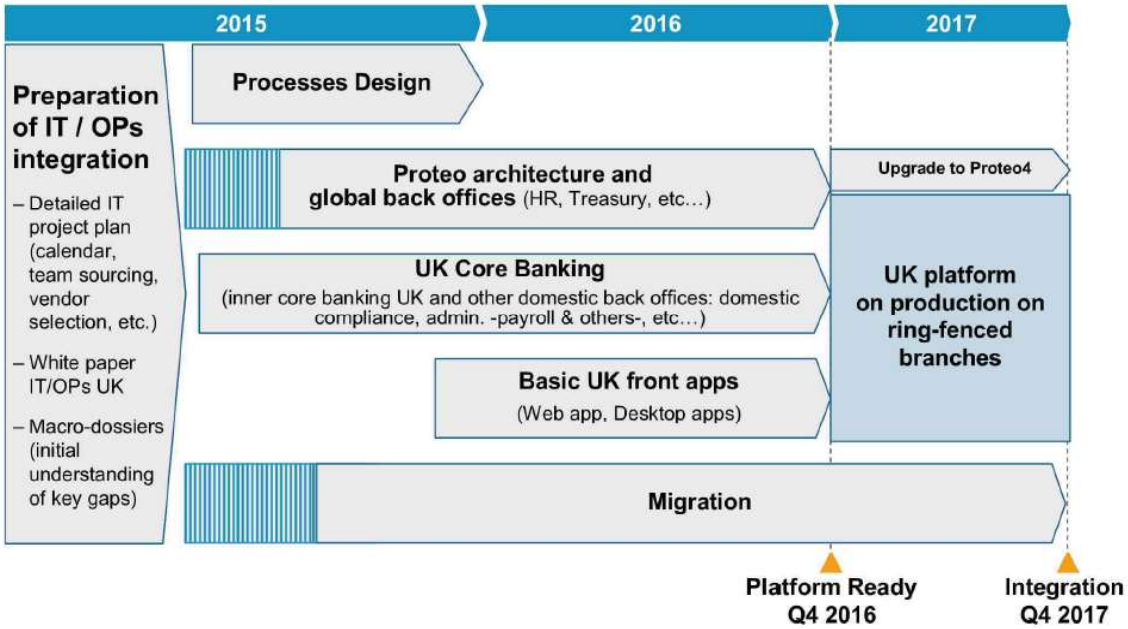
(B) the migration of TSB's data from the LBG IT Platform to the Proteo4UK Platform.

6.2 TSB worked with Sabadell, SABIS, and LBG to assess TSB's requirements for the Proteo4UK Platform with a view to developing an initial programme plan. The plan had to take into account the scope and complexity of the Platform, as well as the extent to which it was new (as will be described in chapter 7) and the implementation approach that had been selected (as will be described in chapter 8). The nine month period of assessment between July 2015 and March 2016 culminated in the creation of the Programme's first overall plan, the Integrated Master Plan, which set out the key milestones for the Programme and was presented to the TSB Board in March 2016.

## SABADELL'S INITIAL TIMELINE

6.3 As described in chapter 4, in April 2015, Sabadell prepared a Change in Control Application for the PRA and the FCA. The Regulatory Business Plan submitted as part of the Change in Control Application also included an early timeline for the Programme ("**Sabadell's Initial Timeline**") (see Figure 6.1).

**Figure 6.1: Sabadell's Initial Timeline (From the Change in Control Application Prepared by Sabadell, Dated 16 April 2015)**




6.4 As shown in Figure 6.1, Sabadell planned that a UK-customised version of the Proteo3 platform would be ready by the end of 2016 ("*Platform Ready Q4 2016*").[1] The Change in Control Application explained that following this, the UK-customised version of the Proteo3 platform would be in live use for *"new business in ring-fenced branches"* for nearly a year, ahead of the Main Migration Event (the "**MME**" or "**T3**"), i.e. the migration of TSB's

[1] As will be described in chapter 7, Proteo3 was the version being used by the Sabadell Group in Spain.

customer data from the LBG IT Platform to the Proteo4UK Platform in Q4 2017.[2] In parallel with this proving period, the UK-customised version of the Proteo3 platform would also be upgraded to Proteo4.

6.5 Sabadell started to share the target date at an early stage in the Programme (i.e. even before the planning work described in the next section, culminating in the Integrated Master Plan, had been completed). Sabadell "*communicated [its] intention of having a big bang migration on the night of the 5th November 2017*" to LBG as early as 1 July 2015, and to the Programme Team from at least 9 September 2015 (at the migration project kick-off meeting in Spain, which is discussed in paragraph 6.8).

## ASSESSMENT AND PLANNING

### Assessing TSB's Requirements

6.6 Between July 2015 and March 2016, TSB undertook its assessment of, and made preliminary preparations for, the Proteo Exit Option.

6.7 A paper was presented to the TSB Board on 22 July 2015 which proposed the establishment of a *"migration assessment project"*. The aim of the project was *"to investigate the migration option and to develop a migration plan/proposal"*, which would be put before the TSB Board for consideration in late 2015 or early 2016. This project would be led by TSB's newly appointed Chief Information Officer, who had previously been the Chief Process and Information Officer at Sabadell. The TSB Board paper contained an almost identical version of the Programme timeline contained in Sabadell's Change in Control Application of April 2015 (see Figure 6.1), again showing that, following customisation for TSB's requirements in 2016 (*"UK Core Banking"* and *"Basic UK front apps"*), there would be an *"Upgrade to Proteo4"* in Q4 2017.

6.8 On 9 and 10 September 2015, a migration project kick-off meeting was held in Spain and attended by a number of individuals from TSB, Sabadell, SABIS, and LBG. A presentation prepared by the TSB CIO for the opening session noted that the Programme's migration methodology would be *"based on successful Banc Sabadell past integrations tailored to TSB migration reality"*.

6.9 A key part of this methodology was the Macro Dossier and Dossier structure developed by Sabadell on its previous migration programmes,[3] where a collection of Dossiers would provide the framework for gathering TSB's requirements and developing designs for the Proteo4UK Platform.

6.10 In November and December 2015, three 'deep dives' (the "**2015 TSB Board Deep Dives**") were held with the TSB Board to examine in detail the process for creating, and the content

[2] See chapter 10 for details about how early use of the new Platform by real customers, known as 'Live Proving', was actually undertaken in the Programme.

[3] Note that TSB generally referred to the development of the Macro Dossiers and Dossiers as the "Macro Dossier Phase" and the "Dossier Phase".

of, the overall plan for the Programme. The papers for the second 2015 TSB Board Deep Dive on 30 November 2015 described the plan as follows:

> *"The current plan is aspirational: it has been created to meet the deadlines for the Proteo build and the data migration in 2017. As such it has been created on a top-down and 'right-to-left' basis. This plan will be verified, and the detailed plans created as the dossier phase is concluded."*

### 'Right-to-Left' and 'Left-to-Right' Planning

- The phrases 'right-to-left' and 'left-to-right' are used to describe two contrasting methods for developing a project plan.
- Project planning on a left-to-right basis starts by identifying the relevant project milestones, determining their correct sequencing and interdependencies, and calculating the amount of time, effort and resource required to achieve each of them. In this type of planning, the project's end date is a consequence of these steps – i.e. it is an output.
- Conversely, a project plan is developed on a 'right-to-left' basis if the end date is an input to the plan – for example, if the project team is tasked with completing the project on or before a specified end date. In such circumstances, the planning must therefore work backwards from that end date to determine the timing and sequencing of the project milestones.
- Both of these planning methodologies have their uses, and a programme may in fact develop a right-to-left plan in order to identify the relevant project milestones before then validating it by planning on a left-to-right basis.
- It is important that plans for complex projects, such as transformational IT programmes with multiple interdependences, involve sufficient left-to-right planning; otherwise they face a greater risk that the Programme will fall behind schedule, particularly if the plan does not include any contingency. This can result in one or both of:
  - a need to replan the project and a corresponding deferral of the end date; and
  - compromises in the quality or scope of the project's work in order to try to meet the original end date.

## Assessment of the Proteo Exit Option

6.11 The 2015 TSB Board Deep Dives were also used to assist the TSB Board to assess whether to proceed with the Proteo Exit Option or the Carve-out Exit Option (which had been TSB's preferred option before it was acquired by Sabadell – see chapter 4).

6.12 Following the 2015 TSB Board Deep Dives, the TSB Board met on 16 December 2015 to decide whether to continue the investment of time and resources in the migration assessment project. Included in the papers for this meeting was a memorandum prepared by the TSB CEO, which recommended that the TSB Board adopt the Proteo Exit Option as its preferred strategy, based on:

> *"our growing understanding of the challenges of managing the current LTSA arrangements with LBG, the potential transformational and value generation*

*benefits of a migration to the Sabadell platform and the risks inherent in such a migration".*

6.13 This memorandum set out the benefits and *"major strategic challenges"* of the current IT arrangements with LBG, before explaining the *"new exit option"* created by Sabadell's acquisition of TSB. It also described the potential strategic benefits of the Proteo Exit Option, which included materially increased agility and ability to implement change, access to business banking capability, lower cost of ownership, increased capital efficiency and strategic optionality (i.e. enabling TSB to participate in consolidation in the UK mid-tier or challenger bank market). The memorandum stated:

> *"if the initial analysis of the potential of the [Proteo Exit Option] proves correct, this is a transformational opportunity for TSB".*

6.14 Consequently, the TSB CEO recommended to the TSB Board that they take certain actions, including to:

(A) commit *"emotionally"* (but not yet contractually) to the Proteo Exit Option *"as its preferred long term solution for TSB's banking infrastructure"*;

(B) authorise the Executive to commit the required human and financial resources to developing the Proteo Exit Option to the point where it could, ultimately, *"become an actionable option for TSB"*;

(C) authorise the Executive to request that the Sabadell Group *"build Proteo4UK"* to the specifications designed by the BEC DE and continue to prepare for migration;

(D) request that the Executive engage with the Sabadell Group to define how TSB would operate as part of the Sabadell Group after any potential migration; and

(E) request that the Executive engage with LBG to negotiate and develop exit/cooperation agreements, while maintaining as much of the protection and optionality from the LTSA as possible.

6.15 During the meeting, there was some debate between TSB Board members as to the extent to which TSB should commit to the Proteo Exit Option, and whether or not it should seek to retain the Carve-out Exit Option. The Sabadell Group COO *"requested that the Board be firmer in its decision"*, and stated that he believed that the Proteo Exit Option was the best option because it would *"create value for TSB"*. In his view, *"continuing to work on a possible carve-out would compromise the migration work".*

6.16 The Former TSB Chairman queried whether there was enough evidence to support the Proteo Exit Option, and requested that the TSB CIO and the TSB COO provide written documentation to explain the reasons why the Proteo Exit Option was preferable to the Carve-out Exit Option (see paragraphs 6.20 to 6.21).

6.17 The TSB Board ultimately agreed at the meeting that *"they were minded to consider migration to Proteo4UK to be their preferred solution"*, but decided not to give up TSB's contractual right to the Carve-out Exit Option under the LBG Agreements at that stage. The TSB Board approved each of the other actions that the TSB CEO had recommended.

6.18 A preliminary report by Deloitte (dated 10 December 2015) was also included in the papers for this meeting. Deloitte had been engaged to provide a point-in-time review of the Programme's planning, management, controls, and governance, as well as a high-level review of *"TSB Sabadell's target state for completeness".*

6.19 The Deloitte report concluded that the status of the governance of the Programme was *"Evolving"* and not yet *"Mature"*, and that planning and controls in different areas were still largely *"Immature"* or *"Basic"*. Deloitte's first recommendation in this report was:

> *"TSB Sabadell must prioritise the development of a detailed programme plan, substantiated by 'bottom up', 'left to right' planning."*

6.20 On 4 February 2016, the TSB CIO and the TSB COO issued a memorandum in response to the Former TSB Chairman's request (see paragraph 6.16) for written documentation explaining the reasons why the Proteo Exit Option was preferable to the Carve-out Exit Option.[4] This memorandum briefly recapped the analysis included in the 2014 IT Strategy Reports, which had concluded that the Carve-out Exit Option was preferable to the Migration Exit Option.[5] It then explained that two main changes had occurred since that analysis had been carried out:

(A) TSB had become part of the Sabadell Group, and therefore the Proteo Exit Option was now available; and

(B) TSB had a year's more experience of using the LBG IT Platform, and had developed a greater understanding of its limitations (in particular, *"its responsiveness in implementing change"* which *"sits poorly with our positioning as a challenger bank"*).

6.21 The memorandum described Sabadell's IT platform as "*a proven platform with commensurate levels of stability to LBG's*" and concluded that *"Proteo4UK [is] a unique opportunity"* - it was a *"functionally rich and mature platform and therefore able to service TSB's product and service offerings"*. Although the memorandum noted that the Proteo4UK Platform would need to be *"proven at scale"* through testing, it emphasised that:

> *"In comparison with the previous migration options considered, the infrastructure is known and the systems proven"*.

6.22 As described in chapter 7, given the extensive development of new Front-end Applications and Middleware required for the upgrade from Proteo3 to Proteo4UK, these comments provided the TSB Board with an incomplete picture of the scope and complexity of the work required to design, build, and test the new Platform.

## THE INTEGRATED MASTER PLAN

6.23 Following the TSB Board's decision in December 2015 that the Proteo Exit Option was its preferred solution, programme planning continued to March 2016. The planning work completed between July 2015 and March 2016 culminated in the creation of the Integrated Master Plan (see Figure 6.2).

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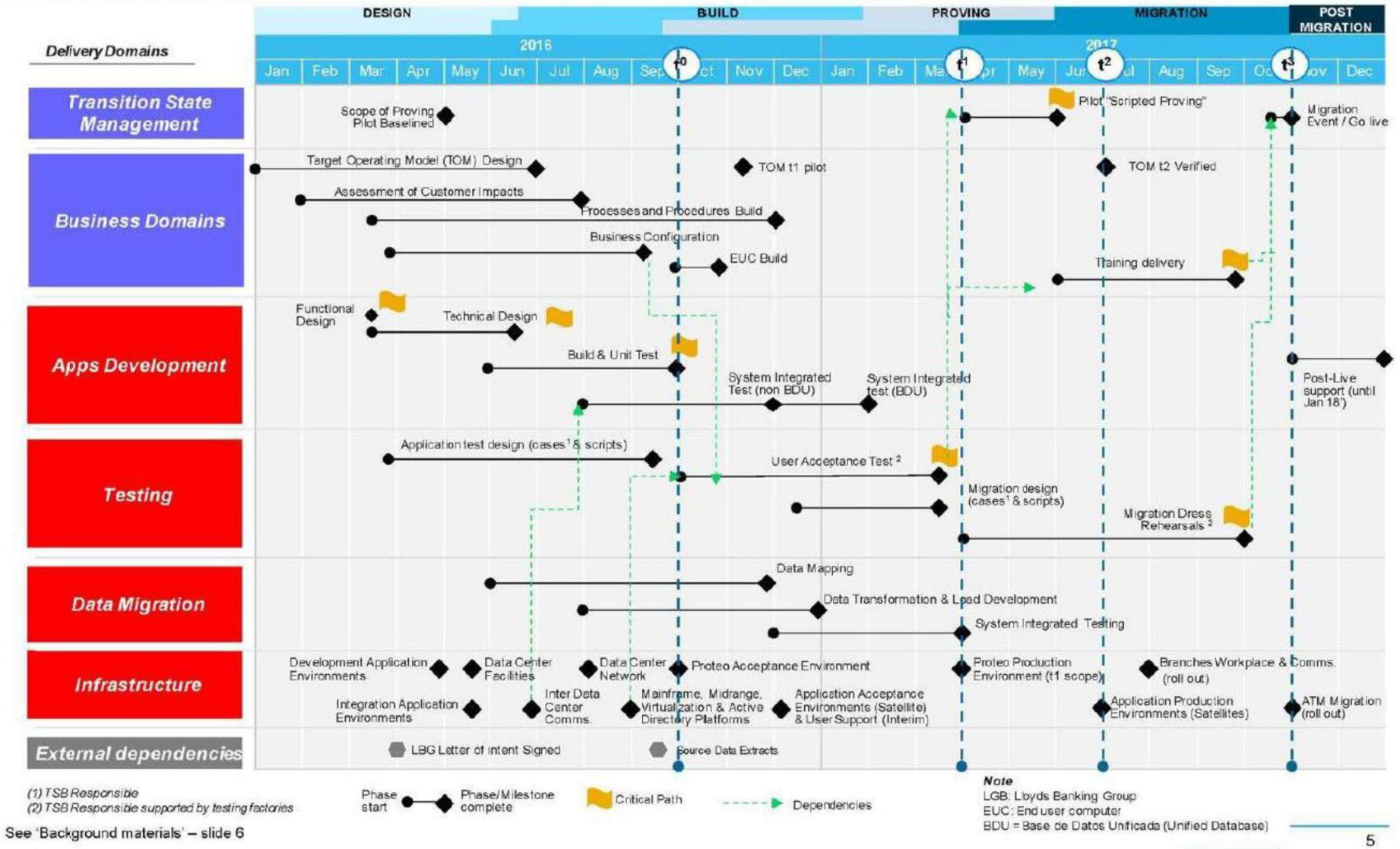
[4] This paper does not appear to have been discussed at subsequent TSB Board meetings (e.g. in February, March, April or May 2016).

[5] See chapter 4 for further discussion on the 2014 IT Strategy Reports.

## Figure 6.2: Integrated Master Plan (From TSB Board Pack, Dated 15 March 2016)



6.24 The Integrated Master Plan was the primary overall plan for the Programme, until it was superseded by the Defender Plan in October 2017 (see chapter 13). The Integrated Master Plan was presented to the TSB Board by the TSB CIO and the TSB COO at its meeting on 15 March 2016. TSB shared a later version of the Integrated Master Plan with its regulators, the FCA and the PRA.

## Presentation of the Integrated Master Plan to the TSB Board – 15 March 2016

6.25 At the 15 March 2016 meeting of the TSB Board, the TSB CEO advised that the case for migration was strong and recommended *"that we continue the work to develop the migration to the Proteo4UK platform as a real, actionable option for TSB"*. One of the reasons for this recommendation was that:

> *"The phased plan is robust – covering the design phase, build phase, proving and testing phase, migration phase and post-migration phase. The plan has been developed 'left to right' and bottom-up with a series of milestones having been identified and documented"*.

6.26 Key milestones in the Integrated Master Plan at this time included:

(A) completion of the Proteo4UK Application software build[6] by the end of January 2017, followed by the completion of User Acceptance Testing ("**UAT**") by March 2017;

(B) completion of the data migration build by the end of March 2017, followed by completion of Migration Acceptance Cycles ("**MACs**") and Dress Rehearsals ("**DRs**") by the end of September 2017;

(C) delivery of the data centres by the end of March 2017; and

(D) the Main Migration Event (also known as 'T3') in early November 2017.[7]

6.27 Compared to Sabadell's Initial Timeline (see Figure 6.1), which envisaged the Platform build and upgrade to Proteo4 being undertaken in two stages and completed by Q4 2017, the Integrated Master Plan envisaged that both the Platform build and upgrade would be completed in one stage by the end of March 2017 (i.e. approximately seven months earlier). In addition, Live Proving of the Platform, which had been planned to last for 9-12 months was reduced to approximately seven months.[8]

6.28 Given the reduced time available for designing, building, and testing the Platform, and the reduced time period for Live Proving, the risk in the plan had increased.

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6 This is explained in chapter 9, and includes coding, Unit Testing and System Integration Testing.

7 In the event, these milestones were not achieved by the dates specified in the Integrated Master Plan (see Figure 13.1 for a summary). The reasons why the Programme did not achieve these milestone dates are explained in subsequent chapters.

8 The Live Proving period depicted in the Integrated Master Plan, albeit compressed, was to be undertaken over the completed Proteo4UK Platform, and arguably was therefore more valuable than the Live Proving period in Sabadell's Initial Timeline.

6.29 We also note that:

(A) there is no mention of Non-functional Testing ("**NFT**") in the Integrated Master Plan. As described in chapter 14, NFT is used to confirm that an IT platform as a whole will operate at expected service levels from the moment it is put live to the anticipated volume of users (see chapter 14 for further details on NFT); and

(B) the Integrated Master Plan had no contingency built into it.

(i) The TSB COO described the plan to us as lacking contingency – as an "*everything-goes-well plan*" or a "*happy path plan*". She told us that "*This plan never had contingency in it and that was acknowledged at the executive – at the board table*".

(ii) The TSB CEO also noted in his report to the TSB Board on 15 March 2016 that "*the target migration date of November 2017 is accommodated in the plan – but timescales are, of course, challenging with little contingency*".

## Deloitte's Review of the Integrated Master Plan – 20 April 2016

6.30 The materials provided to the TSB Board for the next TSB Board meeting on 20 April 2016, included a *"Programme plan review report"* from Deloitte. In its report, Deloitte stated that *"considerable work [had] been completed to date to develop workstream milestones"*, and that the Integrated Master Plan covered the major activities typically seen in programmes of a comparable size. However, Deloitte offered no view on the achievability of the timescale of the Programme other than to note its "*ambitious nature*".

6.31 Deloitte's report made four key recommendations which, in our view, reflected fundamental risks to the achievability of the Integrated Master Plan:

(A) *"Define the interlinkages between workstreams - these are currently unclear within the existing plan. Particularly important are the links between the business and technology. From this more work is required to define and understand the critical path."*

(B) *"Integrate third party delivery milestones into the plan and secure their commitment to deliver – given the range of third party package suppliers, dependencies on LBG and other third party providers, slips to their plans could significantly impact the critical path."*

(C) *"Further develop the testing workstream plans and application development plans – the end-to-end testing strategy, approach, dependencies and milestones could be more mature at this stage."*

(D) *"Further develop the data migration – engaging with the LBG data teams, additional work is required to define the migration milestones, the number and type of cutovers and scope for ETL development. All migration activities*

*should be interlinked with other workstream activities and assessed for their customer and business impact."*[9]

6.32 We return to these recommendations at paragraph 6.40.[10]

## TSB's View of the Programme Timetable

6.33 The timeframe for the MME, and the target MME date of November 2017, remained the same in the Integrated Master Plan as it was in Sabadell's Initial Timeline. It was acknowledged by a number of the individuals we interviewed that the Programme's timetable (and the November 2017 migration date in particular) was considered ambitious.

(A) The TSB CIO told us that the MME date was derived from analysis completed by Sabadell before the acquisition, and that Sabadell wanted to share the date because Sabadell's previous experience demonstrated that setting a deadline usually helped programmes to *"run at pace from the very beginning"*. We were told by the TSB COO that Sabadell ran its projects by having *"an ambitious flagpole in the sand to drive momentum"*.

(B) The TSB CIO also recalled other people commenting that the date seemed very aggressive. He was told: *"you are not going to be able to do that, or that is impossible, not even five years"*. Despite this, he considered that they could do better than other comparable programmes, based on the migration methodology that Sabadell had developed over the past 15 years, and which had proven effective in previous migrations.

(C) In contrast, the TSB COO told us that she was unfamiliar with the Proteo platform and that she had not endorsed the time period of two and a half years for completion.

6.34 Notwithstanding acknowledgement of the ambitious Programme timetable, the overarching message from interviews with TSB Board members was that the mind-set of the TSB Board was: *"we weren't going to go until we were ready."* The TSB CEO told us that the publication of the November 2017 date *"didn't commit anybody to anything…I don't believe it committed TSB, and I don't believe it changed the behaviours of TSB."*

6.35 In addition, we understand from TSB that it was not concerned about the ambitious Programme plan because TSB had put in place a series of protections to ensure that it would not make the decision to Go Live until it was ready, including:

(A) Retention of the Carve-out Exit Option - the TSA provided that it was in TSB's absolute discretion to choose which of the two exit routes would be pursued (i.e. the Carve-out Exit Option or the Proteo Exit Option). On 28 July 2016, the TSA was amended to specify that if TSB chose the Proteo Exit Option, it could nonetheless switch to the Carve-out Exit Option at a later date,

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[9] Extract, Transform and Load ("**ETL**") is explained further in chapter 11.

[10] Deloitte provided a further report in May 2016 regarding TSB's progress in the development of the Integrated Master Plan, which suggested that *"the focus should be on integration of remaining plans, confirmation of interlinkages and the critical path"*.

provided it did so before the earlier of either serving a notice confirming the date on which TSB would execute the MME, or 31 March 2019. The TSB Board considered that the resulting flexibility that TSB had to pursue the Proteo Exit Option whilst still retaining the right to the Carve-out Exit Option would allow it to ensure that the Proteo Exit Option was viable before a final decision was made.

(B) Protection from cost overruns - as a result of a Funding Agreement negotiated between TSB and Sabadell, TSB was insulated from the cost overruns incurred by the Programme. Under that Funding Agreement, Sabadell agreed to fund the costs of the Programme, including any costs incurred by TSB that exceeded the £450 million 'dowry' that TSB was entitled to receive from LBG under the TSA (as described in chapter 4). Furthermore, as described in chapter 9, under the MSA,[11] SABIS was required to develop the Proteo4UK Platform in return for the payment of a fixed fee by TSB. Accordingly, TSB considered that it was protected from facing costs pressure during the Programme and when making the decision to Go Live.

(C) The Assurance Matrix - TSB developed the Assurance Matrix, which was a key first line tool for assessing TSB's readiness to Go Live (and is described in more detail in chapter 16). Along with the 12 Attestations from members of the Executive, which confirmed that the Assurance Matrix for his or her area was complete, the Assurance Matrix and the T3 Memo (which was the TSB CEO's recommendation to the TSB Board to Go Live and contained the 12 Attestations from members of the Executive as described in chapter 18) were intended to capture the body of evidence that would demonstrate that TSB was ready to Go Live.

6.36 The first two of these protections gave TSB alternatives to proceeding with the November 2017 MME date: being insulated against cost overruns allowed TSB to do further work on the Programme without facing time pressure; and retaining the Carve-out Exit Option gave TSB an alternative to migrating to the Proteo4UK Platform. Our observations regarding TSB's protection from cost overruns in the Programme are discussed in chapter 9.

6.37 In relation to retention of the Carve-out Exit Option, while we were told by the TSB CEO that retaining the Carve-out Exit Option was an important protection for which he forcefully negotiated, we have not identified any contemporaneous evidence demonstrating that TSB expended material resource trying to work towards the Carve-out Exit Option between 16 December 2015 (being the date of the TSB Board meeting at which the TSB Board agreed to make the Proteo Exit Option their preference) and 12 April 2018 when TSB eventually surrendered the Carve-out Exit Option.

6.38 In any event these two perceived protections were of little relevance because of the flaws in TSB's key readiness framework, the Assurance Matrix, which meant that TSB did not have an accurate indication of whether or not it was in fact ready to Go Live (see chapter 16 for a detailed explanation of the Assurance Matrix and its flaws).

[11] The MSA is the Migration Services Agreement between TSB Bank plc and SABIS Spain dated 19 April 2017, defining the approach to the build of the Proteo4UK Platform and the migration of TSB's data from the LBG IT Platform.

## FURTHER OBSERVATIONS

6.39 TSB should have developed a Programme plan and timetable that was achievable.

6.40 In order for TSB to have had an achievable Programme plan, it needed to have completed sufficient left-to-right planning. However, and in spite of the TSB CEO's comment that the Integrated Master Plan was *"developed on a left-to-right basis"* (see paragraph 6.25), it does not appear that it was in fact created on a sufficiently left-to-right basis because:

(A) each of Deloitte's recommendations describe processes that would typically need to be completed in order to prepare a left-to-right plan; and

(B) the TSB Migration Director told us: *"I don't think we ever did left to right bottom up planning"*.

6.41 Furthermore, even after the completion of TSB's detailed planning exercise, and after the change in approach explained at paragraph 6.27, the target date for the MME remained the November 2017 date that Sabadell had set at the time of TSB's acquisition.

6.42 The fact that TSB's planning exercise did not result in any movement of the targeted November 2017 MME date suggests that the Integrated Master Plan was not developed on a sufficiently left-to-right basis, despite being described as such by the TSB CEO. Instead it was a plan designed to ensure that the Programme would end at a given date, whether or not that date was realistically achievable.

6.43 TSB relied on Sabadell's previous experience and confidence in being able to meet the Programme timeline. TSB has told us that the initial timeline set by Sabadell was merely an *"aspirational date that could be changed during the execution of the project"* as more information about TSB's requirements was gathered.

6.44 The TSB Board should have looked more critically at Sabadell's timetable, and the effect that conforming to this timetable might have had on the Programme, in circumstances where:

(A) the analysis in the 2014 IT Strategy Reports (and more generally the history of IT transformations in the UK) suggested that other core banking programmes had taken significantly longer;

(B) the recommendations made by Deloitte in April 2016 signalled that significant further work was required to complete the plan and validate the timetable;

(C) the Integrated Master Plan had no contingency built into it; and

(D) there was no movement of the planned MME date from that selected by Sabadell in 2015, despite the nine month assessment and planning phase that TSB undertook before the Integrated Master Plan was presented to the TSB Board.

6.45 In light of the above, it is unsurprising that the timescale set by Sabadell and adopted by TSB in the Integrated Master Plan proved unachievable and that TSB had to delay the MME date in September 2017 and undertake a re-planning exercise as a result.

6.46 It is not in itself a problem to set an ambitious timeline to drive progress, but it is important to: (i) understand and acknowledge how ambitious it is, and therefore the amount of additional time that might eventually be required; and (ii) understand how far behind the Programme is, in order to replan properly.

6.47 As will be examined in chapter 13, the September 2017 re-planning exercise was itself problematic. It was not helpful that the Integrated Master Plan had set such an ambitious timeline: it appears to have made it difficult for TSB to confront how far behind it actually was at the time of the re-planning exercise, and may well have constrained TSB's ability to postpone Go Live to a more realistic date.

# CHAPTER 7: THE SCOPE AND COMPLEXITY OF THE PLATFORM

## KEY POINTS

- The overall scope and scale of the Programme was unprecedented in the UK.
- Although the Sabadell Group's existing banking platform in Spain was used as the foundation for TSB's new Proteo4UK Platform, a substantial amount of software and Infrastructure development was required.
- The TSB Board understood that the implementation of the Programme was a significant undertaking. However, they thought that the Proteo4UK Platform was largely proven, as they thought it was substantially the same platform that was used to support other Sabadell Group companies, with adaptations for the UK market and TSB's requirements.
- In fact, the development required was extensive. It included largely new components (the Channel Applications and Middleware) critical to the delivery of service to TSB's customers. In addition, any significant issues with the newly developed software and newly implemented Infrastructure would have serious implications for the operations of the bank.
- This meant that the Programme needed to be approached as if it were, in effect, a programme to deliver a new and unproven IT platform. Such an approach would have informed TSB's decisions, in particular, its decisions on planning, governance and risk management.

## INTRODUCTION

7.1 No established UK bank had attempted a re-platforming or IT transformation programme of the scope and scale of the Programme.

7.2 The Programme was, in effect, four substantial pieces of work, each of which could be considered a major undertaking in its own right:

(A) the development of new software for the Proteo4UK Platform including largely new Front-end Applications and Middleware;

(B) the implementation of new Infrastructure in new data centres, connected by a new Network;

(C) the migration of TSB's data from the LBG IT Platform to the Proteo4UK Platform; and

(D) building the capability to operate the new Proteo4UK Platform to the required service levels.

7.3 All of this was in addition to the work that TSB would need to do to prepare its business for the new Proteo4UK Platform, including changes to its business processes and organisational structure, as well as training employees to use the new Platform.

7.4 This chapter explains the scope and complexity of the Platform to be delivered by the Programme and the extent to which it was understood by the TSB Board.

## DEVELOPING THE PROTEO4UK PLATFORM

7.5 The foundation for the Proteo4UK Platform was Sabadell's existing banking platform, which was known as Proteo. Proteo was in use by (and had been used to integrate) various banks in the Sabadell Group. The version of Proteo being operated by Sabadell in Spain was Proteo3, although Sabadell had started to develop the next version of Proteo, Proteo4, which was to be used as the basis for the Proteo4UK Platform.

7.6 The Proteo4UK Platform would consist of Back-end Applications, Middleware and Front-end Applications.[1] The sections below explain each of these elements of software, as well as the scale of development required (which was significant).

### Back-end Applications

7.7 In a retail banking context, Back-end Applications are software programs that banks use to: (i) store data about customers and their accounts; (ii) process requests raised by Front-end Applications (for example, a request for an account balance); (iii) interface with other banks and third parties (for example to make or receive payments); and (iv) support internal management functions (for example, the finance, risk, human resources and treasury functions).

7.8 The Proteo4UK Platform Back-end Applications incorporated many of the Proteo3 Applications but still required significant development work, including:

(A) modifications to meet UK requirements; and

(B) the addition and integration of new third party Applications to meet TSB's requirements, for example, in the areas of loans, mortgages, cards, and payments.

7.9 TSB purchased third party Applications where possible in order to reduce the overall development effort.[2] However a significant amount of work would still be required to integrate these third party Applications into the Proteo4UK Platform.

### Front-end Applications

7.10 Front-end Applications include the software programs that provide TSB's customers with access to their TSB products, services and data, either: (i) directly, through customer-facing

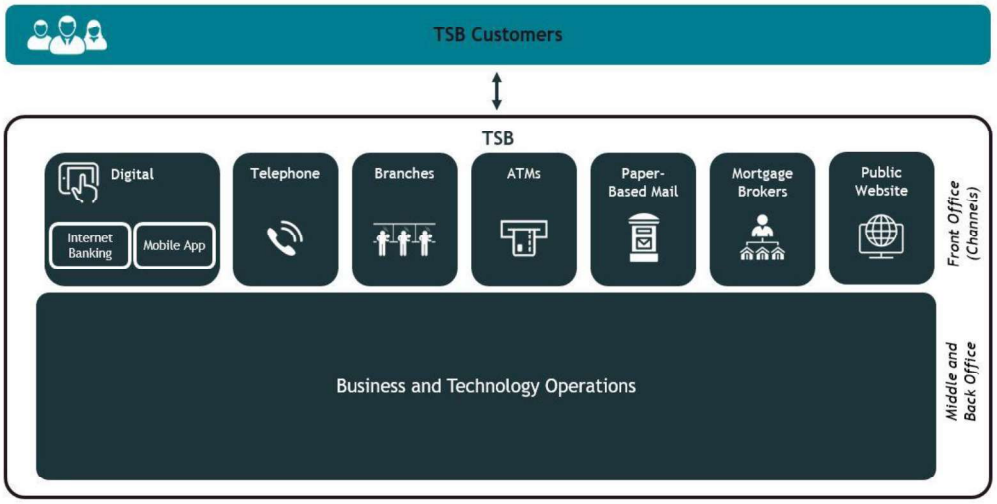
[1] This is the taxonomy adopted by IBM in the IBM Report.

[2] The TSB CIO told us that, in general, the extra cost of purchasing third party solutions would be outweighed by considerations regarding the complexity (and associated risks), 'migration effort' and time taken for Sabadell to develop them in-house.

Front-end Applications (such as Internet Banking and the Mobile App); or (ii) indirectly, through employee-facing Front-end Applications, that are used when serving TSB's customers (for example branch or telephone Applications).

7.11 Figure 7.1 provides a summary of the Channels (sometimes referred to as 'distribution channels') that customers use to interact with TSB. Each of these Channels would have been supported by different Front-end Applications. For example, the Digital Channel would include Internet Banking and the Mobile App. The Telephone Channel would include the Intelligent/Interactive Voice Recognition ("**IVR**") system and part of the Customer Relationship Management ("**CRM**") system, and the ATM Channel would include its own dedicated Application.

**Figure 7.1: Channels Used by Customers to Interact with TSB**




7.12 The Front-end Applications that needed to be developed specifically for TSB included the following:

(A) Digital Channel - Internet Banking was to be substantially rebuilt. The Mobile App was also completely new.[3]

(B) Telephone Channel (IVR and contact centre) - TSB was to purchase new telephone systems (IVR and Automated Call Distribution ("**ACD**")) from BT. The Telephone Channel would also make use of a new feature that allowed contact centre agents to act on behalf of customers during service calls (known as Web on Behalf of "**WOBO**"). The individual elements of the Telephone Channel are set out in Figure 7.2.

(C) Branch Channel - Significant elements of the Applications to be used in TSB branches were to be re-written. In part, this was to modernise the coding of the Applications in line with the target Proteo4UK Platform architecture[4] and to customise the

[3] This was to be produced and released ahead of the MME (although it would not connect with the LBG IT Platform until the MME).

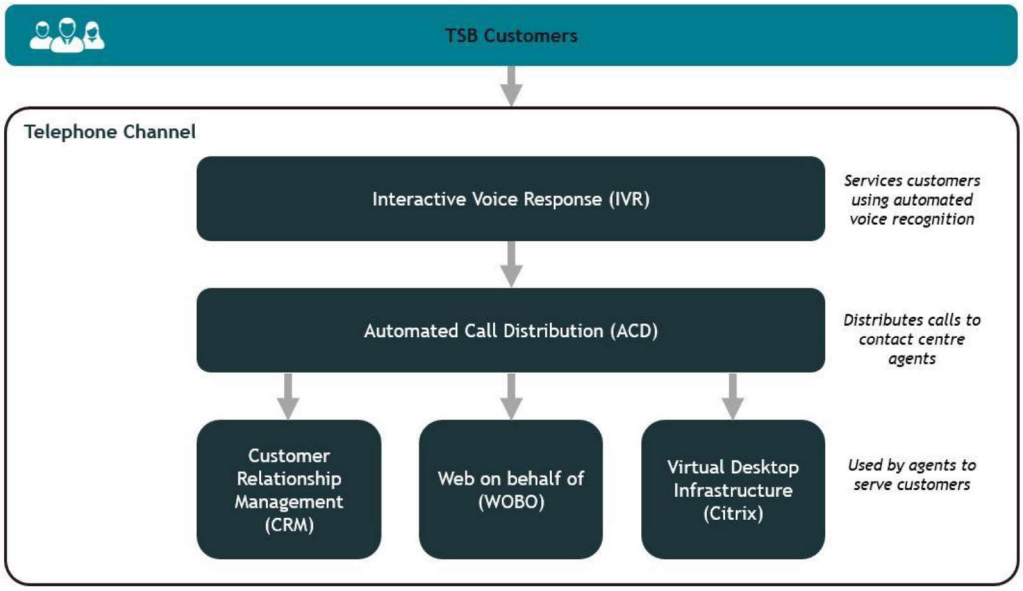
[4] The TSB CIO explained to us that, in 2015, the Spanish Proteo platform relied on a combination of different coding techniques - 'Visual Basic' (c.5%), 'e-branch' (c.70%) and 'browser' (c.20%) depending on the type of transaction. The branch Application elements of the Proteo4UK Platform were intended to eliminate any reliance on Visual Basic coding (referred to by the TSB CIO as an *"outdated technology"*) by rewriting those transactions as 'browser'-based coding. For

Proteo4UK Platform so that it would look as similar as possible to the equivalent Applications on the LBG IT Platform, to ensure consistency for the end user.

(D) ATM Channel - An entirely new Application was built and connected to the new Middleware and the Network.

(E) Mortgage Broker Channel - A new Application for mortgage sales and origination was provided by a third party provider called IRESS. This was integrated with the Proteo4UK Platform (including the back-end mortgage administration system provided by Unisys Financial Services System).

**Figure 7.2: Elements of the TSB Telephone Channel**




## Middleware

7.13 Middleware provides the critical conduit through which messages are communicated (i.e. routed, transformed and coordinated) between Back-end Applications and Front-end Applications. Problems with Middleware may therefore significantly impact the ability of customers to access their bank's products and services.

7.14 The Proteo3 Middleware was to be updated significantly for the Proteo4UK Platform. Proteo3 had a separate set of Middleware services for each Front-end Application. In contrast, Proteo4 was to have a single set of microservices-based Middleware supporting all Channels. The new Middleware would allow TSB to offer a more consistent experience to its customers as they moved between different Channels by allowing all the Front-end Applications access to the same functionalities.

7.15 This upgrade to the Middleware was not technically necessary. TSB's new Platform could have been developed using the Proteo3 Middleware. However, the upgrade to Proteo4

'e-branch'-based transactions, if they required significant customisation, the plan was to move those transactions to 'browser'-based coding. If they did not, the plan was to maintain them as 'e-branch' transactions. Consequently, there was a significant rewriting of the Spanish branch platform software.

served a key aim of the Programme, which was to allow TSB in the future to differentiate itself from, and compete with, other UK high street and challenger banks.

7.16 The introduction of the new Middleware architecture was a significant and complex change from Proteo3, as it involved re-engineering business process rules that were traditionally managed by the Back-end Applications into the Middleware software.

## Implementation of New Infrastructure and Network

7.17 An entirely new Infrastructure and Network needed to be developed for the Proteo4UK Platform, in particular:

(A) two data centres provided by IBM would need to be set up for TSB (to provide the server, storage and Network Infrastructure required to host TSB's new Applications);

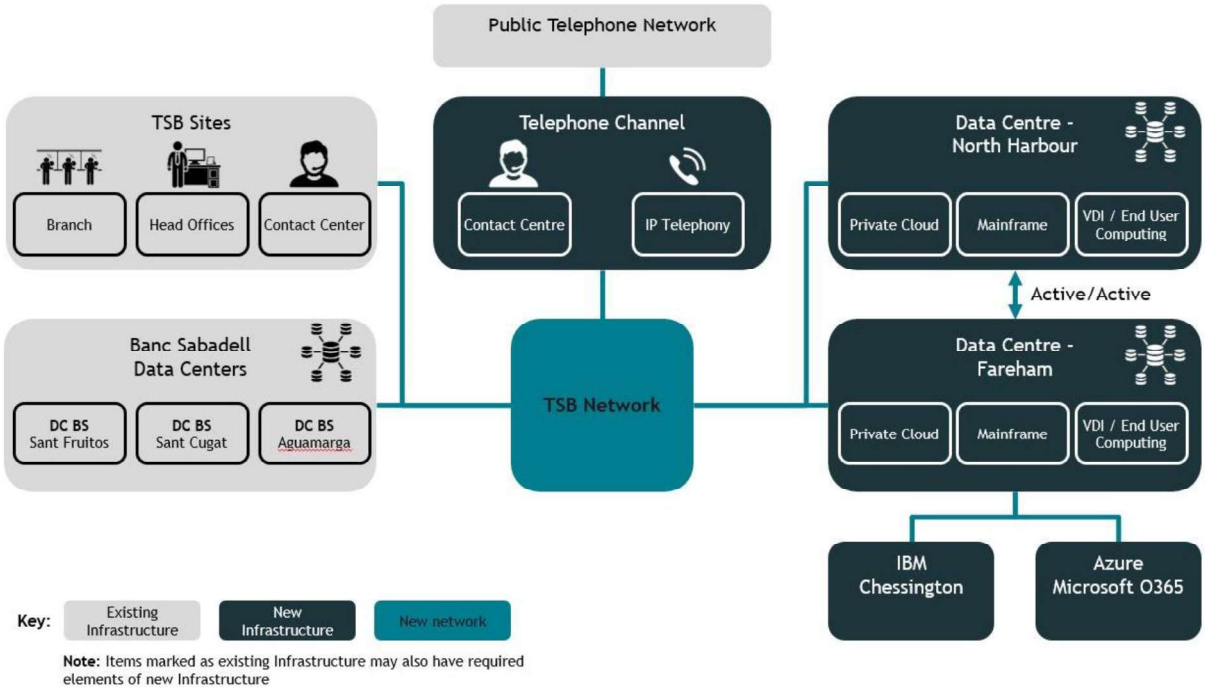
(B) new Cloud Infrastructure and a new Virtual Desktop Infrastructure ("**VDI**") were required;

(C) most of the physical Infrastructure in TSB's branches would need to be replaced; and

(D) entirely new Network components were also needed, including a Wide Area Network ("**WAN**"), local area Network and data centre communications services.

7.18 Figure 7.3 highlights the elements of the Infrastructure and Network that were new.

**Figure 7.3: Infrastructure and Network Elements of the Proteo4UK Platform**




7.19 The most complex aspect of this would be setting up the TSB data centres, in particular managing and coordinating the design and delivery of components from various vendors, and configuring as well as integrating the components so that they all worked together. This role would be undertaken by SABIS, as part of its wider role of systems integrator.

7.20 TSB's decision to adopt an 'Active/Active' configuration for its two new data centres would introduce additional complexities. In an Active/Active configuration, Applications are hosted in two data centres and transactions can be serviced in either data centre at any time. This Active/Active configuration would provide greater resilience than alternative configurations (such as Active/Passive) if one of the new data centres failed. The TSB CIO has explained that in the event of a disaster in one data centre, all critical services would switch to the other *"with no interruption or loss of customer data, transactions or services"*.

7.21 However, SABIS did not have experience of the Active/Active configuration option in conjunction with the Proteo core banking Applications hosted on the mainframe (the Proteo3 platform in Spain used an Active/Passive configuration). It therefore required additional development and testing work to ensure that the Applications would be able to make use of this configuration.

7.22 Additionally, IBM had only limited experience of providing an Active/Active data centre configuration in the UK, as at that point in time they did not currently have any UK customers with an Active/Active configuration across data centres (although IBM did use Active/Active configuration for its own services). This meant that the additional development and testing work needed to be particularly rigorous given the newness of this combination of Application software and Infrastructure.

## Migrating TSB's Data

7.23 The Programme needed to develop software and procedures to migrate TSB's data from the LBG IT Platform to the Proteo4UK Platform. This would require extraction of the relevant data from the LBG IT Platform, transformation of the data into the format required by the Proteo4UK Platform and loading the data on to the Proteo4UK Platform.

7.24 The 2014 IT Strategy Reports explained that data migration was always one of the most complicated aspects of delivering a new platform. However, an additional complexity for this Programme was the fact that Sabadell/TSB did not own or otherwise control the source system from which the data was being extracted (the LBG IT Platform). This was recognised as one of the Programme execution risks in the 30 November 2015 TSB Board Deep Dive paper: *"risk that implementation is impaired due to not owning the source platform, and therefore an inability to control the timeliness and quality of required deliverables."*

## Building the Capability to Operate the Proteo4UK Platform

7.25 Technology Operations refers to the process of managing the Proteo4UK Platform during its live operation. Day to day, the Technology Operations team would be involved in the management of events, incidents, problems, and access relating to the Proteo4UK Platform. Although TSB's Technology Operations team would have oversight and accountability for Technology Operations, SABIS would operate the Proteo4UK Platform. In order to carry out these tasks, SABIS would need to define and agree appropriate processes with TSB, and put in place the necessary supporting software tools.

7.26 In addition, both TSB and SABIS would be required to build new teams and structures to fulfil these functions. Previously, the Technology Operations functions had been provided to TSB by LBG, with TSB managing LBG as a third party supplier. Now, these functions would be provided by SABIS, and TSB would need to establish a relationship with SABIS as its new supplier.

7.27 The development and provision of Technology Operations by SABIS would involve significant complexity because SABIS did not have prior experience of operating the new elements of the Proteo4UK Platform, or of providing Technology Operations in the UK. SABIS' readiness to operate the Platform is discussed in chapter 15.

## THE TSB BOARD'S UNDERSTANDING OF SCOPE AND COMPLEXITY

7.28 It was apparent from the interviews we conducted that the TSB Board did not understand the full extent of Front-end Application and Middleware development until after Go Live, and that they had therefore underestimated the scope and complexity of the Platform to be delivered by the Programme. For example:

(A) The TSB Audit Committee Chair explained that: *"The bit that was complete news to us was that it was a development of a new banking platform…we thought we were getting a proven Spanish retail banking system with some wraparound that made it work from a UK point of view"*. In relation to the new Middleware, she added that *"up until micro services [i.e. the new Middleware] was raised as an issue by IBM in their first draft report, [i.e. following Go Live], that was the first any of us knew. And then, and I don't know who it was from Spain, made the comment that they [i.e. Sabadell] were actually trying to develop a ground-breaking banking product off the back of the TSB migration…that was not a good day."*

(B) The Current TSB Chairman said *"I don't think the board was aware as it is now, that actually this wasn't simply the Spanish operating platform adapted for UK additional complexity and products, actually they were taking at the same time a chance to, an opportunity to advance it in some stages…but I don't think the board was aware, I certainly wasn't aware, that it wasn't the Spanish platform plus get it fit for UK, they were also lifting the Spanish platform and its capability. I don't think we were aware of that."*

(C) When we asked another TSB INED whether he understood that the Middleware was new and different from what was in use in Spain he replied: *"Not really, you know, middleware is a funny thing. It's something we talk about a lot as technical people but I don't think it is a word that any board member would understand. I don't remember any conversations specifically about middleware. The conversations I was mostly briefed on was 'it's the Spanish architecture,' and to me that implies the middleware is going to use the same coding standards approach…I wasn't expecting it to be wildly different."*

(D) The TSB CFO said *"I understood the platform to be a close copy of the platform in Spain"*.

7.29 Additionally:

(A) The TSB COO told us, in the context of a discussion about the TSB Board's state of knowledge during the Programme assessment phase, that she thought TSB was *"migrating on to a mature Spanish platform, proven at scale, of a full-functioning bank with all the channel systems, all the back office systems, all the accounting systems, as well as the core banking platform"*.

(B) The Second TSB Board Adviser told us that *"I assume[d] we had inherited Spain and changed it a bit. Actually it turned out that quite a lot of that was brand new which I don't think anyone on the board fully appreciated"*. He added that *"the*

*impression the Board got was that we were inheriting something that was largely proven in Spain…but the level of change required to it to make it work in the UK was bigger than we thought"*. Finally, he explained that *"Our assumption was, great, you know, we are getting a nice modern platform, a platform that other banks would like, and, by the way, it's something that they are running at scale in Spain, and it wasn't."*

7.30 The Board's lack of understanding as to these issues may, in part, be attributable to the board memorandum dated 4 February 2016, which we discuss at paragraphs 6.20 to 6.21. Although this paper explained that the Proteo4UK Platform would need to be "*proven at scale*" through testing, it emphasised that:

> *"In comparison with the previous migration options considered, the infrastructure is known and the systems proven"*.

7.31 In addition, the extent of the development required for Front-end Applications and Middleware were not matters that were sufficiently highlighted in the TSB Board papers, nor were they raised for discussion at meetings of the TSB Board or Audit Committee:

(A) In relation to Front-end Applications, it is clear that some of the development required would have been apparent to the TSB Board without explanation. For example, they would not have thought that TSB would be operating using Sabadell's Spanish website or Mobile App. In addition, the TSB Board papers do contain references to the development of Front-end Applications. However, the full scale and complexity of the overall development required for the Front-end Applications would not have been apparent to the TSB Board without it being specifically drawn to its attention.

(B) In relation to Middleware, the TSB Board did receive materials which referenced the fact that the Proteo4UK Middleware would need to be designed, built and tested. However, this content was not sufficiently highlighted. It appeared in a section of *"background materials"* to the March 2016 Programme review paper, on two pages of a 737 page board pack. In addition there was no explanation in TSB Board papers (nor discussion at TSB Board meetings) of the scale of the development that was required.

## CONSEQUENCES OF THE TSB BOARD'S UNDERSTANDING OF SCOPE AND COMPLEXITY

7.32 The development required for the Proteo4UK Platform was extensive and included components critical to the delivery of services to TSB's customers. In addition, any serious issues with the newly developed software and newly implemented Infrastructure would have critical implications for TSB's operations.

7.33 This meant that the Programme needed to be approached as if it involved the development of what was, in effect, a new and unproven IT platform. Such an approach would have informed TSB's decisions, in particular as regards its decisions on planning, governance and risk management.

7.34 If the TSB Board had sufficiently understood the true scope and complexity of the Platform, we expect TSB would have made different decisions at key points of the Programme. The

TSB Audit Committee Chair explained to us that if she had understood the extent of change required to the Front-end Applications, *"I suspect it would have changed the whole nature of the project"*.

7.35 Had the TSB Board sufficiently understood the true scope and complexity of the Platform, we expect the TSB Board and/or the TSB Executive would have:

(A) assessed the risks of its decision to opt for a migration that was predominantly 'single event' in nature, and which meant that it would Go Live for its full customer base of c.5 million people at the same time. See chapter 8 for further detail;

(B) arranged for the TSB Board to receive independent advice on the Programme as a whole, and which was independent from the Executive and Sabadell. See chapter 22 for further detail;

(C) managed SABIS as an arm's length supplier for the design, build, testing and operation of the Proteo4UK Platform. This would have included exercising TSB's audit rights over SABIS to understand the quality and completeness of the Proteo4UK Platform. See chapter 9 for further detail;

(D) not taken material comfort from the Transition Events (i.e. the Early Cutovers and Live Proving carried out ahead of Go Live). The Early Cutovers (putting functionality into live use ahead of Go Live) were not designed in a way which significantly reduced the risk of the Programme's single event implementation approach and Live Proving was of limited utility in identifying the problems that arose after Go Live. See chapter 10 for further detail;

(E) considered the potential effects that delays in completing Functional Testing would have on Non-functional Testing (particularly Performance Testing) and Live Proving (crucial to ensuring the Platform was able to support all of TSB's customer base) and requested more information about the design and execution of Non-functional Testing. See chapters 10, 11 and 14 for further detail; and

(F) obtained, prior to Go Live, robust confirmation and supporting evidence of SABIS' readiness to operate the Platform to the required service levels following Go Live. This might have identified deficiencies with SABIS' internal controls, including those which were highlighted in an external report commissioned by SABIS but not shared with TSB. See chapter 15 for further detail.

# CHAPTER 8: IMPLEMENTATION APPROACH

## KEY POINTS

- One key decision in planning an IT transformation programme is the choice of implementation approach (i.e. whether the migration onto the target platform will be implemented in phases, or as a single event or 'big bang' migration). This is an important decision, and one which involves careful consideration of the trade-off of the risks involved with each approach.
- It is a particularly important decision in circumstances where the target platform is substantially new, as was the case for TSB.
- At the time of its offer to acquire TSB, Sabadell presumed that TSB's migration to the Proteo4UK Platform would be a predominantly single event migration. TSB did not appear to challenge this presumption, nor did it give sufficient consideration to the risks involved with this approach.
- If a bank does opt for a single event migration, it is critical that the risks of this approach are understood and that robust mitigants are factored into the programme plan. This was particularly important in TSB's case, given the newness of the Proteo4UK Platform and the scope and complexity of the Programme.
- TSB did not include these risks in the Programme's risk register, and consequently lost sight of the importance of the relevant mitigants as the Programme progressed.
- Although TSB took some steps to de-risk the Main Migration Event through the Transition Events, those steps were not adequate to mitigate the risks of a largely single event migration.

## INTRODUCTION

8.1 The planning process for any IT transformation programme requires consideration of the implementation approach, i.e. whether the migration of functionality and data to the new platform should take place all at once (a 'single event' or 'big bang' migration), or whether the migration should be separated into a number of phases or stages (a 'phased' migration).

8.2 As discussed in chapter 7, TSB's IT transformation programme was one of significant scope and complexity. In these circumstances, the adoption of an appropriate implementation approach (and the appreciation, and subsequent mitigation, of the risks attached to the approach adopted) was particularly important. The Programme was not a straightforward migration of data onto an existing, proven platform; it was a migration of the functionality and data of an entire bank onto a platform that was substantially new.

8.3 There are, broadly, four ways in which the migration of a banking business to a new IT platform can be split:

(A) by products and services (i.e. certain products and services are migrated before others);

(B) by functionality, for example between Front-end Applications and Back-end Applications (i.e. the Front-end Applications would be migrated onto the new platform first, and would remain connected to the Back-end Applications of the old platform until that was migrated at a later point in time, or vice versa);

(C) by customer base (i.e. the data of certain groups of customers are migrated before others, for example by choosing to migrate the customer data attached to a particular set of sort codes first); and

(D) between new customers (often referred to as 'new to bank' customers) and existing customers (i.e. the data of new customers are added directly onto the new platform, in advance of the migration of the data of existing customers).

8.4 These different methods of phasing an IT transformation programme are not mutually exclusive, and they are often employed to varying extents and in combination with one another.

8.5 The most appropriate implementation approach will depend on the circumstances of the programme in question. There are trade-offs involved, as every implementation approach carries risks, drawbacks and benefits, as summarised in Figure 8.1.

8.6 TSB opted for a migration that was predominantly single event in relation to functionality (with the exception of a limited amount of functionality that was transferred through the Early Cutovers, explained further in paragraphs 8.21 to 8.27 and in chapter 10). TSB's migration was entirely single event in relation to customer data (i.e. all customer data was to be migrated onto the Proteo4UK Platform over a single weekend).

8.7 This chapter considers two key questions in relation to the Programme's implementation approach:

(A) Did TSB give adequate consideration to the decision of implementation approach and the risks involved in a single event migration?

(B) Once a decision had been made, were the risks of the chosen implementation approach adequately recorded and appropriately mitigated?

## TSB'S CHOICE OF IMPLEMENTATION APPROACH

8.8 In line with its previous migration experience, Sabadell's planning prior to its acquisition of TSB assumed that TSB's existing customers would be migrated onto the Proteo4UK Platform over a single weekend.

8.9 Sabadell's intention to adopt a predominantly single event migration is clear from contemporaneous notes from meetings between Sabadell and LBG held between March and July 2015, prior to the completion of Sabadell's acquisition of TSB. For example, the minutes of a meeting on 19 May 2015 noted that it was *"Sabadell's preference that final migration be completed in a 'big bang' approach"*.

### Figure 8.1: The Trade-off of Risks and Benefits between a Single Event Migration and a Phased Migration

| | Risks | Benefits |
|---|---|---|
| **Single event migration** | • The new platform turns out not to be able to support full customer volumes (i.e. the platform does not meet its Non-functional Requirements, or "**NFRs**")<br>• Issues not identified in testing affect multiple elements of the new platform at the same time, causing significant customer detriment (i.e. the platform does not meet its functional requirements)<br>• The IT operations team has not built up the capability and experience to operate the new platform at full volume at the required service levels<br>• There is not enough time to migrate all customer data onto the new platform safely in one weekend | • It avoids the complexity for the bank's customers and employees of running two platforms in parallel<br>• It is typically quicker and cheaper than a phased migration |
| **Phased migration**[1] | • Running two platforms simultaneously during the phasing increases operational and technical complexity and leads to additional cost<br>• It can create customer inconvenience (e.g. if a customer has multiple products, or multiple accounts, some of which stay on the old platform and others which move onto the new platform)<br>• Building (and testing) complicated bridging software between the old and new platforms is expensive<br>• It typically takes more time than a single event migration | • There is a gradual build-up of customer volume, which allows the platform to be tuned incrementally as additional volume is taken on (i.e. reducing the risk of not meeting NFRs)<br>• Key functional elements of the new platform are gradually proved in stages, therefore minimising the risk of unexpected problems arising and affecting all the bank's customers at once (i.e. reducing the risks associated with not meeting functional requirements)<br>• The IT operations team has time to build up the capability and experience to operate the new platform at full volume at the required service levels |

8.10 These documents also show that Sabadell had initially planned to de-risk the Main Migration Event (the "**MME**") by undertaking a pilot phase trialling the Proteo4UK Platform with 'new to bank' customers. However, by the end of 2015 this pilot phase had been removed from Programme plans (see paragraphs 8.26 to 8.27).

8.11 Our Review has not identified any substantive discussion at TSB Board level of whether a largely single event migration was the right approach for the Programme, or the risks that such an approach might involve. The Programme's implementation approach was mentioned briefly at a small number of TSB Board meetings:

[1] The extent of the risks and benefits of a phased migration will depend on the combination of phasing methods used.

(A) The minutes of the TSB Board meeting on 21 October 2015 record that a TSB INED *"asked whether a decision had been taken regarding a 'big bang' migration"*. The TSB CIO responded that *"consideration was being given to what could be migrated in advance"* and the TSB COO added that *"it would be necessary to build risk trade-offs in to the discussion"*. The TSB INEDs *"considered it important for the Board to understand the factors which had gone in to the decisions"* (though no such factors appear to have been discussed). The papers for that meeting suggest that a *"big bang"* migration strategy had already been decided upon.

(B) At the first of the 2015 TSB Board Deep Dives on 10 November 2015, the Former TSB Chairman *"asked whether the potential to migrate in two stage[s], such as [Personal Current Accounts] first followed by Mortgages, had been assessed"*.[2] The TSB COO's response was that it *"would be difficult for TSB to split the migration in that way but that the Executive were considering circumstances where current outsource arrangements (such as credit cards) may be retained"*. The Sabadell Group COO added that *"multiple stages would cause capacity challenges at Group"*.

8.12 During the course of our Review, TSB has emphasised that the TSB Board understood the risks posed by the different migration approaches. However, we have seen no contemporaneous evidence that the relevant risks of a single event migration were highlighted to, or discussed at, the TSB Board. For a Programme of this nature, we would expect the TSB Board to have been presented with the full range of implementation options (including the risks and benefits associated with each option) before a final decision was taken.

8.13 We have only identified one material piece of analysis by a member of the Executive of the Programme's implementation approach: a paper dated 12 December 2015, which considered phasing the Programme by product. This paper was commissioned by the TSB COO due to her concern that the migration of all product data in a single weekend was *"beyond UK experience"*. The paper correctly identified that this Programme was different to Sabadell's previous migrations, due to the risk appetite of UK regulators and the nature of the Proteo4UK Platform (*"a 'new' modified local instance of the Sabadell Proteo software, augmented by local IT solutions/ services"*).

8.14 The paper concluded that:

(A) the bulk of the risk of the MME was associated with products that could not be de-coupled; and

(B) the benefit of de-coupling the remaining products was outweighed by the extra cost of investing in complex bridging software.

8.15 The paper then suggested other early migration activities that could de-risk the MME, including an early Transition Event to migrate the payment schemes, which TSB did complete before the MME. However, as described in paragraphs 8.21 to 8.27 and in chapter 10, we do not consider that the Transition Events significantly de-risked the MME.

8.16 It does not appear that this paper was provided to the TSB Board.

8.17 TSB has told us that decisions as to the extent of phasing were informed by external third party advice. However, we have not found any advice from TSB's external advisers on the

[2] In the event, the functionality for new mortgage sales and origination on the Proteo4UK Platform was launched in advance of the MME (known as "**T2a**").

Programme's implementation approach, and TSB declined to identify any contemporaneous evidence to support this statement.[3]

## RECORDING AND MITIGATING THE RISKS OF A SINGLE EVENT MIGRATION

8.18 The second important question is whether TSB, once it had opted for a predominantly single event migration:

(A) clearly recorded the relevant risks in its risk framework so that it could keep track of them; and

(B) ensured its Programme plan included appropriate mitigants to address these risks.

### Recording the Risks

8.19 The relevant risks of a single event migration are described in Figure 8.1. Of the four risks set out in this table, it is clear that the fourth risk (*"There is not enough time to migrate all customer data onto the new platform safely in one weekend"*) received continued attention from the TSB Board and the Executive throughout the Programme and was successfully mitigated.

8.20 However, the other risks of a single event migration were not adequately captured in TSB's formal risk framework. The only Programme risk that related to a single event migration was the *"Risk that changes in approach (e.g. from a single event to product-by-product releases or technical advancement), cause delays in overall delivery and execution of Migration"* (emphasis added). The risk register therefore did not capture the risks of choosing a single event approach, which were therefore less likely to be tracked or factored into the Programme's decision-making processes.

### Mitigating the Risks

8.21 Due to the fact that a single event approach involves a target platform being taken live to all customers simultaneously, it requires the highest standard of testing and Live Proving and the highest degree of readiness to operate the platform. Once TSB had opted for a largely single event migration, it was therefore essential that the Platform underwent particularly rigorous testing, and in particular Non-functional Testing ("**NFT**"), in order to establish that the Platform could meet the service levels required.

8.22 In TSB's case, although some steps were taken to de-risk the MME through the Transition Events, the evidence we have seen, and the events that took place following Go Live, suggest that TSB did not take adequate steps to mitigate the risks of a largely single event migration. The shortcomings in TSB's testing are discussed further in chapters 11 and 14.

8.23 TSB stressed to us the importance of the Transition Events (comprised of Early Cutovers and Live Proving, as described more fully in chapter 10) as a means of de-risking the MME, so that the decision not to adopt a phased implementation approach was reasonable in the circumstances. For example, in his post-MME report dated 20 November 2018, the TSB CIO wrote that the Programme had been *"designed very consciously to de-risk the final event*,

[3] See further chapter 23, paragraph 23.12(A) and Figure 23.1.

*to the extent of investing significant efforts at going live with as many services as possible ahead of MME"*.

8.24 The Transition Events did, to some extent, reduce the level of risk and change that TSB's customers were exposed to at Go Live. In particular, TSB was prudent to de-couple the payment schemes transition, the ATM transition, and the mortgage sales and origination transition - each of which involved complex areas of the bank's operations - from the MME.

8.25 However, the Transition Events had limitations, as described further in chapter 10. In summary, the Transition Events were not extensive enough to achieve the most crucial form of mitigation: testing the Channels through which TSB's customers would access their accounts and proving that the Proteo4UK Platform was ready to service all of TSB's customers.

8.26 Sabadell's initial proposal in 2015 to have a 'pilot phase' during which the new Platform would be tested on 'new to bank' customers in a small number of existing branches (see paragraph 8.10) might have assisted with this aim. For example, the minutes of a meeting between Sabadell and LBG on 19 May 2015 noted that *"the new Proteo4UK platform [would] be validated and certified in production with a limited number of new customers (or even new branches)"*, and the MME would only take place once the Platform had *"demonstrated its correct operation during this validation period"*.[4] This pilot phase would have been a valuable opportunity for a group of real customers to prove the key functionality of the new Platform.

8.27 However, by the time of the 2015 TSB Board Deep Dives in November and December 2015, the 'new to bank' pilot phase had been removed from the Programme plan. TSB has suggested that Sabadell's thinking as to the feasibility of the pilot phase was revisited as a result of meetings with LBG on 19 May 2015 and 1 July 2015, at which Sabadell learned more about the sort code structure and payments in the UK. However, a presentation to the TSB Board on 22 July 2015 and a document sent by TSB to LBG on 20 October 2015 both contained plans that still included this pilot phase. The reasons for its removal from the Programme plan are therefore unclear.

## OUR ENGAGEMENT WITH TSB ON THE ISSUE OF IMPLEMENTATION APPROACH

### TSB's Justifications for Choosing a Single Event Migration

8.28 Given the lack of contemporaneous evidence, we asked TSB to explain the decision to adopt a predominantly single event migration approach. The two justifications most commonly given to us by TSB interviewees were:

(A) LBG, as the source platform owner, was not willing to support a phased migration process; and

(B) phasing the migration by customer group or splitting up certain key products would have caused an unacceptable level of customer disruption, and would have been more costly, complicated, and time consuming.

[4] In addition to being relayed to LBG, this proposal was also communicated to: (i) TSB's regulators, in the regulatory business plan that formed part of Sabadell's Change in Control Application, dated 16 April 2015; and (ii) the TSB Board, in a paper presented to them by the incoming TSB CIO on 22 July 2015.

8.29 In relation to the first, we discovered later in our Review that the possibility of a phased migration was never formally raised or discussed with LBG. TSB eventually accepted (after we had repeatedly been told by TSB that LBG would not have supported a phased migration) that *"there was no formal discussion with LBG about phased customer migration"*. Some of the interviewees who told us that LBG would not support a phased migration appear to have been told this second hand and arguably had no reason to disbelieve it; however, others should have been fully aware that LBG was never asked.

8.30 We have seen WhatsApp messages between the TSB CIO and the TSB COO dated 4 June 2018, in which the TSB CIO stated that they *"never had an explicit debate with LBG"*. This conversation took place:

(A) before the TSB CIO finalised and circulated his post-MME report (see paragraphs 8.23 and 8.36(C)) in which he emphasised that *"LBG was not willing to support any scenario of 'partial exit'"*; and

(B) before the TSB CIO told us in interview that conversations had taken place with LBG in 2015 in which LBG had *"clearly stated [a phased migration] was not within [its] appetite"*.

8.31 LBG informed us in the course of our Review that it *"would have been prepared to support phased migration had that been sought by TSB/Sabadell"*. While we cannot be certain whether or not LBG would have supported a phased migration had it been asked at the time (or of the terms it might have required in exchange for that support), the fact is that TSB did not ask.

8.32 In relation to the second justification, certain members of the Executive told us that a migration phased by customer group or by product would have caused excessive customer detriment by splitting some customers across two platforms, which they considered UK regulators would have deemed unacceptable. These views appear to have been informed by these individuals' experience of Verde (see chapter 4), in which customers whose accounts were linked to multiple branches had been affected by being split across two platforms. We were also repeatedly told that the customer data and payments structure within LBG made it very difficult for the migration to be phased by customer group or by product.[5]

8.33 These were valid concerns. Phasing the migration by product or by customer group would have carried certain risks, one of which was the potential inconvenience caused by some customers' accounts or products being split between the source platform and the target platform. We also accept that phasing a migration in this way may have been more expensive and time-consuming, due to the complicated bridging software required.

8.34 However, TSB's customers (and regulators) might have understood a trade-off between, on the one hand, short-term disruption to a smaller group of customers participating in an early stage of a phased migration and, on the other hand, the risk of disruption to the entire customer base as a result of a single event migration. In addition to the fact that the former would have affected fewer customers, the specific complications arising from splitting the customer base (e.g. using different versions of the Mobile App for different products) can at least be anticipated and mitigated, unlike the disruption caused by issues

[5] This is because the customer data was structured by product or by sort code, rather than by individual customers.

manifesting unexpectedly at Go Live, as in fact happened. In the event, TSB did not discuss the possibility of a phased migration with its UK regulators.[6]

## Resistance Regarding the Validity of this Line of Enquiry

8.35 The Programme's implementation approach is a line of enquiry on which we have faced resistance from TSB. In particular, TSB has questioned the relevance of its chosen implementation approach to the issues it faced after Go Live.

8.36 However, a number of individuals within TSB acknowledged the importance of the Programme's implementation approach as a line of enquiry when considering the problems which arose after Go Live:

(A) At his interview, the Second TSB Board Adviser informed us that at the time he joined TSB he asked about the Programme's decision to adopt a largely single event approach *"right up front"*.[7]

(B) On 4 September 2017, the TSB CRO emailed the TSB CEO, TSB CIO and TSB COO suggesting the possibility of a two-step migration ('new to bank' followed by existing customers), explaining that in the Nationwide migration this had successfully *"enabled the new accounts opened on the new platform to exercise the new platform gradually, without putting the entire customer base at-risk"*.[8]

(C) In the TSB CIO's post-MME report on the causes of the issues faced by TSB, dated 20 November 2018, he pre-emptively addressed this issue with the statement: *"one of the criticisms that we will surely receive…will refer to the 'big bang' approach that we presumably adopted"*.

(D) In a WhatsApp message to the TSB CIO on 4 June 2018, the TSB COO wrote: *"…on Slaughter and May Questions on migration strategy. There are two angles of attack. One carve out versus migration which board papers deal with well. The second is why a product by product migration wasn't chosen which board papers are largely silent on..."* (emphasis added). It should be noted that this message was sent before we had conducted any interviews, and a number of weeks before we had had any engagement with either the TSB COO or the TSB CIO.

8.37 Other independent reviews have also identified the importance of this issue. A report by DELL EMC Consulting into SABIS' IT operations for TSB, dated 25 January 2019, stated:

> *"We find two relevant strategic decisions (the 'big bang' migration strategy and brand new reengineering of middleware platform) in conjunction with the contractual deadline of Nov 2017 as relevant factors that derive the logical succession of facts."*

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6 TSB has argued, on the basis of two documents, that the PRA expressed support for a single event migration. However, we have reviewed these documents and we do not consider that they support TSB's contention.

7 The Second TSB Board Adviser told us that he was informed that a phased migration was *"never an option from Lloyds, it was never an option for [the] programme"*.

8 The TSB CIO dismissed the TSB CRO's suggestion for technical and operational reasons. The Nationwide migration was not a direct parallel, in that Nationwide (unlike TSB) was in control of its source code. However, this email demonstrates that the concept of phasing was deemed to be worthy of further consideration by at least one member of the Executive.

The report also noted: *"The situation produced at MME (Main Migration Event) is reasonably expected based on the strategy, operations and technology scenario involved and the business and contractual agreements context."*

## FURTHER OBSERVATIONS

8.38 The risks of migrating all of TSB's c.5 million customers to the Proteo4UK Platform at once were significant, given the newness of the Platform and the scope and complexity of the work required to build it. In light of this:

(A) The implementation approach of the Programme was a critical decision that should have been afforded serious consideration by the Executive, and fully debated at TSB Board level.

(B) Once a predominantly single event migration approach had been chosen, the associated risks should have been clearly recorded so that the Programme could keep track of them and then develop and execute the appropriate mitigants.

(C) In order to mitigate the risks of a largely single event migration and ensure readiness for Go Live, TSB needed to be fully confident that:

(i) the Platform had been rigorously tested and proven; and

(ii) SABIS, as its service provider, had been comprehensively assessed.

As discussed further in chapters 10, 11 and 14, TSB appears to have lost sight of the importance of these mitigants as the Programme progressed.

# CHAPTER 9: MANAGEMENT OF SABIS

## KEY POINTS

- The design, build and testing of the Proteo4UK Platform was a major undertaking, involving the management and coordination of services from over 70 third party suppliers and the efforts of over 1,400 people.
- TSB engaged SABIS, the Sabadell Group IT services provider, as its prime contractor and systems integrator on the Programme. Given the Sabadell Group's acquisition of TSB and its experience of its Proteo platform, the use of SABIS to build the Proteo4UK Platform was a natural starting point for TSB. Nevertheless, given the scope and complexity of the Programme and how critical it was to TSB, TSB should have taken proper steps to assess SABIS' capabilities, and to manage SABIS on an ongoing basis, in the same way it would have dealt with third party suppliers providing comparable services.
- Notwithstanding this, TSB did not manage SABIS as an arm's length supplier in respect of its design, build and testing of the Proteo4UK Platform. For example:
  - TSB did not conduct a comprehensive due diligence exercise to understand SABIS' capability to deliver the Proteo4UK Platform;
  - the TSB CIO, who was responsible for managing TSB's relationship with SABIS as a supplier, also had de-facto responsibility within SABIS for directing its development of the Proteo4UK Platform;
  - TSB did not adequately exercise its audit rights to understand the quality and completeness of the Proteo4UK Platform being designed, built and tested by SABIS; and
  - although much of the development of the Proteo4UK Platform was completed by SABIS' sub-contractors, TSB did not ensure that SABIS' management of those sub-contractors was robust.
- In the event, SABIS' performance on the Programme contributed to the issues TSB experienced after Go Live. In particular, SABIS failed to:
  - develop (or fix Defects in respect of) Application software in accordance with agreed timetables;
  - satisfy agreed exit criteria in respect of System Integration Testing;
  - conduct adequate Non-functional Testing (as discussed in chapter 14); and
  - produce adequate architecture documentation in respect of the Proteo4UK Platform.
- We consider SABIS' readiness to operate the Proteo4UK Platform in chapter 15.

## INTRODUCTION

9.1 As discussed in chapter 6, the TSB Board agreed in December 2015 that it was *"minded to consider migration to Proteo4UK to be [its] preferred solution"*.

9.2 TSB used two Sabadell Group companies, SABIS Spain[1] and SABIS UK[2] (together "**SABIS**"), for the development of the Proteo4UK Platform and its subsequent operation. SABIS was engaged pursuant to two agreements:

(A) the Migration Services Agreement (the "**MSA**"), which governed the development of the Proteo4UK Platform, including Application development, the implementation of new Infrastructure and the new Network, and development of the data migration software; and

(B) the Outsourced Services Agreement (the "**OSA**"), which governed the long-term provision of IT services to TSB going forward.

9.3 Although the Programme commenced in 2015 and the Platform build began in early 2016, TSB and SABIS Spain did not enter into the MSA until 19 April 2017.[3] SABIS UK later acceded as a party to the MSA on 22 May 2018 (notwithstanding that Go Live had taken place during the previous month). All three parties entered into the OSA on 19 April 2017.

9.4 Given the context of the acquisition and the Sabadell Group's experience of its Proteo platform, the use of Sabadell Group IT service providers to build the Proteo4UK Platform was a natural starting point for TSB. We would not, for example, have expected TSB to have insisted on carrying out a competitive tender process in the circumstances. However, it was necessary for TSB, as a regulated financial institution, to assess the capacity and capabilities of SABIS before engaging it as a key supplier, and to continue to manage and oversee SABIS as the Programme progressed.

9.5 We assess TSB's oversight of SABIS' development of the Proteo4UK Platform under the MSA in this chapter, and SABIS' readiness to operate the Proteo4UK Platform in accordance with the OSA in chapter 15.

## SABIS' ROLE IN BUILDING THE PROTEO4UK PLATFORM

9.6 SABIS' responsibilities under the MSA included:

(A) the design, build and testing of the Proteo4UK Platform, which included the Application software and the new Infrastructure and Network; and

(B) the design, build and testing of the data migration software.

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1 In a presentation to the TSB Board in July 2015, the incoming TSB CIO described SABIS Spain as *"the technology subsidiary of [the] Sabadell Group in Spain"*. The Sabadell Group COO also explained to us that, before the acquisition of TSB, SABIS Spain was *"not a real company"* and was *"just a way to avoid some of the limitations"* of the Spanish labour market by placing the internal IT department of Sabadell within *"an organisational container"*.

2 SABIS UK was incorporated on 19 July 2016 as a subsidiary of SABIS Spain.

3 The TSB Procurement and Property Director told us that the MSA and OSA were *"ready and signed off by the board in November 2016"*, notwithstanding that they were not executed until April 2017.

9.7 SABIS had overall responsibility for these workstreams and acted as the systems integrator under the MSA. This was a major undertaking, which involved:

(A) SABIS managing and coordinating the delivery of services by over 70 third party suppliers;

(B) SABIS spending £305 million (i.e. nearly 70% of Sabadell/SABIS' total Programme budget) on its nine most significant sub-contractors alone;[4] and

(C) SABIS' major sub-contractors providing 1,400 people to design, build and test the Proteo4UK Platform at the peak of the Programme.

## Application Software

9.8 The design, build and testing of the Application software was a significant undertaking in its own right, involving considerable work across the Proteo4UK Platform's Applications. As discussed in chapter 7, these comprised the Back-end Applications, Middleware and Front-end Applications. SABIS' role involved:

(A) modifying Applications already in use as part of Sabadell's existing Proteo3 platform, including the incorporation of new Middleware and significant redevelopment of the Channel Applications;

(B) acquiring, and then integrating, new Applications not used as part of Sabadell's platform in Spain; and

(C) conducting Unit Testing ("**UT**") and System Integration Testing ("**SIT**") of the Application software.

9.9 There were, however, a number of significant shortcomings in SABIS' design, build and testing of the Application software. For example, as discussed in chapter 11:

(A) SABIS continually missed deadlines for the delivery of functionality to TSB for User Acceptance Testing ("**UAT**");

(B) a large number of Defects was discovered during UAT; and

(C) SABIS consistently failed to meet targets in respect of Defect turnaround time.

9.10 As discussed further at paragraph 9.72, the effectiveness of the UAT performed by TSB was also dependent on SABIS' earlier SIT having been performed to agreed specifications, including contractually defined exit criteria.

9.11 Schedule 2 of the MSA provided that the exit criteria for each test phase would be set out in the Programme Test Strategy, which is discussed further in chapter 11. In respect of the SIT phase, the Programme Test Strategy specified that there would be 75,000 test cases, of which 95% would need to be executed.

9.12 Notwithstanding these requirements, the EY Root Cause Analysis Report, which sought to determine which controls in the Programme should have identified the technical causes of the events during and following Go Live, noted that:

[4] Based on March 2018 revised budget for the Programme.

(A) "*only circa 59% of the 75K SIT [test cases] were executed*";[5] and

(B) 44% of coding Defects and 33% of Application design flaws from the sample of 201 incidents reviewed by EY could have been detected during SIT.

## Infrastructure and Network

9.13 The implementation of the new Infrastructure and Network was also a significant undertaking. As described in chapter 7, this involved establishing two new data centres. As systems integrator under the MSA, SABIS was responsible for managing and coordinating the design and delivery of data centre components from a number of different vendors, and for configuring and integrating those components so that they worked together.

9.14 Given the scope and complexity of the Programme, there should have been integrated, end-to-end architecture documentation covering all core elements of the Proteo4UK Platform, including detailed information on Applications, data, Infrastructure, security, and both internal and third party interfaces. No such end-to-end architecture documentation was produced. As discussed further at paragraphs 9.63 to 9.70, detailed architecture documentation assists customers in validating a supplier's work, and is typically produced by the supplier in this context.

9.15 The TSB CTO told us that the "*design documents never materialised or were inaccurate, didn't reflect the infrastructure that went in*", and that the issue "*never got addressed satisfactorily*". He explained to us that the practical consequence of this issue was that:

> *"if you don't have the design document then what you can't do is link back the original business requirements to the design document and prove that it's been built to that".*

9.16 We also understand that SABIS' third party Infrastructure and Network suppliers were given specific instructions as to the tasks they were to carry out and often had limited visibility as to how their products and services would be used in the Proteo4UK Platform.

9.17 For example, BT described to us that it had configured Network components, specifically firewalls: *"in accordance with specific instructions received from Sabis"*. BT also recounted that:

> *"Sabis would request BT to implement specific firewall rules and/or network configurations changes without establishing a context or expected outcome relating to applications."*

9.18 These firewalls, as configured, caused issues with TSB's Web On Behalf Of ("**WOBO**") Application in its contact centres after Go Live,[6] therefore blocking one of the means through which TSB's contact centre personnel could complete telephone banking transactions. BT told us that the specific feature of the WOBO Application that resulted in the issues occurring *"could not have been known to BT unless raised by Sabis"*.

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[5] The EY Root Cause Analysis Report references a report prepared by Sabadell/TSB as evidence for this observation.

[6] WOBO refers to the functionality that allows contact centre agents to act on behalf of customers during service calls.

9.19 Similarly, IBM, a key Infrastructure supplier on the Programme, told us that: *"[b]ecause of the nature of our contracts, we [didn't] have visibility of the application side"*.

9.20 TSB has suggested that SABIS' siloed approach to managing its sub-contractors was *"normal industry practice"*, and that a number of the issues experienced with the Infrastructure and Network delivery, including some of the problems experienced after Go Live, resulted from failures on the part of SABIS' third party suppliers to comply with their contractual obligations. While our Review has focused on the conduct of TSB rather than on the conduct of third parties, we put a number of these allegations to SABIS' third party suppliers during our Review and have received plausible rebuttals. It is outside the scope of our Review to analyse these claims and responses any further.

9.21 In its report dated 20 November 2018 (seven months after Go Live), IBM observed that both BT and SABIS had privileged access to, and were able to change the configuration of, many security and Network devices. IBM's recommendations included the immediate restriction of both facility and systems access to BT alone, and the documentation of a clear demarcation between the respective responsibilities of BT and SABIS. This suggests that issues arising from the Active/Active configuration and the load balancer (which contributed significantly to the problems TSB faced immediately after Go Live) may have been due in part to a lack of clarity as to the respective roles of BT and SABIS.

### Data Migration Software

9.22 SABIS was also responsible for developing the software to transfer TSB's data from the LBG IT Platform to the Proteo4UK Platform.

9.23 LBG was responsible for providing information about the data stored by the LBG IT Platform at the request of TSB or SABIS. Using this information, SABIS was responsible for selecting the data to be migrated and mapping the data across to the data structures used by the Proteo4UK Platform. Software also needed to be developed in order to perform each of the three stages of the data migration (Extract, Transform and Load or "**ETL**"), and to validate the data after each stage of the ETL process.

9.24 LBG was responsible for developing the software for the 'Extract' stage of the ETL process, and SABIS was responsible for developing the software for the 'Transform' and 'Load' stages.

9.25 Following its development, the data migration software would undergo SIT, which was conducted by the party responsible for building the relevant software (either LBG or SABIS). The combined ETL software was then tested as a whole through the Migration Acceptance Cycles ("**MACs**") and Dress Rehearsals ("**DRs**"), as discussed in chapter 11.

## TSB'S OVERSIGHT OF SABIS

9.26 In view of the scale and complexity of SABIS' work on the Programme, and notwithstanding the intra-group nature of the arrangements, TSB should have managed SABIS on an arm's length basis. However, we have observed a number of aspects of the relationship between TSB and SABIS that indicate that TSB did not manage SABIS with the same rigour that we would expect it to have applied to a typical third party supplier providing comparable services. In particular:

(A) TSB did not conduct a comprehensive due diligence exercise to understand SABIS' capability to deliver the Proteo4UK Platform;

(B) SABIS was not viewed as a 'critical' supplier for the purposes of TSB's procurement policies in respect of the design, build and testing services provided under the MSA;

(C) the TSB CIO, who was the 'accountable executive' responsible for managing SABIS as a supplier, was also integral to delivering the services being provided to TSB by SABIS, with de-facto responsibility within SABIS for directing the design, build and testing of the Proteo4UK Platform;

(D) although much of the development of the Proteo4UK Platform was completed by SABIS' sub-contractors, TSB did not ensure that SABIS' management of those sub-contractors was robust;

(E) SABIS provided its services to TSB under a fixed-price contract, and TSB had very little visibility of SABIS' costs on the Programme;

(F) TSB did not adequately exercise its audit rights to understand the quality and completeness of SABIS' work;

(G) TSB did not insist on obtaining adequate architecture documentation in respect of the Proteo4UK Platform from SABIS, despite a number of internal and external reviews having highlighted the risks of proceeding without such documentation; and

(H) TSB failed to ensure that SABIS had satisfied contractually agreed exit criteria for SIT, which, if performed properly, could have identified many of the problems TSB experienced after Go Live.

## TSB's Failure to Conduct a Comprehensive Due Diligence Exercise

9.27 Although TSB took steps, in the early stages of the Programme, to improve its understanding of the Proteo4UK Platform and the changes needed to meet TSB's requirements (for example, the 2015 TSB Board Deep Dives and the Dossier structure, as discussed in chapter 6), less attention seems to have been given to assessing SABIS and its capabilities as a supplier, and our Review has not identified evidence to suggest that a comprehensive due diligence review of SABIS was carried out by TSB.

9.28 While we understand that TSB took into account SABIS' lack of experience in the UK, and that it identified and considered various gaps between Spanish and UK service delivery in the banking sector, it was also necessary for TSB to consider whether SABIS' previous experience would have enabled it to design, build and test the Proteo4UK Platform to TSB's specifications.

9.29 The TSB Procurement and Property Director told us that TSB's typical supplier due diligence process was not followed in respect of SABIS, as the broader decision to migrate to the Proteo4UK Platform had been taken by the TSB Board. He acknowledged that the relevant TSB Board papers did not focus on SABIS' capability as a supplier. He explained that the TSB procurement team's role was *"restricted…to delivering a robust framework for [SABIS] to deliver"* the Proteo4UK Platform, and did not include any assessment as to whether SABIS was competent to do so.

9.30 According to TSB, the statements of the TSB Procurement and Property Director do not suggest that the process was flawed or lacking in rigour. In particular TSB noted that it *"completed additional external due diligence to ensure compliance with relevant UK legal and regulatory requirements"*. However, from the evidence we have seen, this *"external*

*due diligence"* was limited to reviews of the relevant contracts, rather than an assessment of SABIS' ability to meet its obligations under them. We asked TSB to identify any external due diligence which went further than a review of the contracts, but it declined to respond to our question.[7]

9.31 In addition, the interviews we conducted indicated that there was a widespread confidence in the Sabadell Group's capability, based largely on the number of previous migrations Sabadell had done. For example:

(A) The TSB COO explained (in the context of a discussion on the accelerated timing of the Programme) that *"we were acquired by a parent company with an expertise at having done this 13 times before, who were saying to us that 'we have done this 13 times before, we understand the complexity of what we are doing'"*. She added that Sabadell *"had great confidence in their IT capability to build at pace"*.

(B) When asked whether TSB had done any due diligence on SABIS, the Former TSB Chairman explained that they had not, and that *"the due diligence was Sabis' past performance in terms of integrating and migrating…other banks"*.

(C) The Current TSB Chairman explained to us that: *"What do I know about Sabis? They have built and run, they have done thirteen or fourteen migrations before. Now, with hindsight you say, yes, but they were Spanish regional banks, they were not known for [their] complexity…[but] they had world class developers behind them…their historic experience, all looked fine [and] I didn't think to ask whether, actually, there was a vulnerability in here from that"*.

9.32 TSB did not consider whether SABIS had equivalent experience of carrying out a programme comparable in size, scope and complexity to that required for the Programme. Although SABIS had carried out a number of previous migrations and had experience of dealing with many of the individual challenges it faced on the Programme, it did not have experience of the combined challenge of simultaneously:

(A) upgrading the Platform architecture (from Proteo3 to Proteo4);

(B) modifying the Application software to meet the requirements of a bank in a new country;

(C) implementing new Infrastructure in new data centres, and then operating that Infrastructure in a new country; and

(D) migrating data from a source platform it did not control.

9.33 TSB has since commented that *"it is unclear who would have the directly equivalent experience"* of building and operating a new platform similar to Proteo4UK, and that *"SABIS did not present itself as having directly equivalent experience"*. While this may have been the case, it was nevertheless important for TSB to have made appropriate enquiries of SABIS' experience at the outset in the same way that it would have dealt with a supplier from outside of the Sabadell Group.

9.34 It has also been suggested to us that it would have been unrealistic for TSB to have sought to review SABIS' capability. We disagree. While it might have been difficult or uncomfortable to do so, it was necessary and appropriate for TSB, as a ring-fenced UK bank, to seek to understand properly the capabilities (and limitations) of its key suppliers,

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[7] See further chapter 23, paragraph 23.12(A) and Figure 23.1.

including those within the Sabadell Group. This was particularly the case where TSB had only been a member of the Sabadell Group for a short period of time before key decisions were taken and SABIS commenced developing the Proteo4UK Platform.

## TSB's Management of SABIS' Performance under the MSA

9.35 Supplier management within UK banks is typically risk-based and the approach to on-boarding, contracting and oversight of any particular supplier depends on the importance of the service being provided by that supplier.

9.36 Despite the rigorous oversight required for 'critical' suppliers under TSB's supplier management framework, we were told that this was not applied to SABIS in respect of the Platform build under the MSA. Although we understand that TSB classified SABIS as a 'critical' supplier for the purposes of the OSA (which governed SABIS' operation of the Proteo4UK Platform in respect of live services), the TSB Procurement and Property Director explained to us that SABIS was not treated as a 'critical' supplier for the purposes of TSB's procurement policy in respect of the services it provided to TSB under the MSA, as TSB did not consider the build of the Proteo4UK Platform to constitute delivery of a 'service' for these purposes.

9.37 In our view, given the complexity of the Programme and the importance of the Proteo4UK Platform to TSB, TSB should have regarded the development of the Proteo4UK Platform under the MSA as the delivery of a critical service and, in any event, should have managed SABIS with the same rigour that it would have applied to its most important arm's length suppliers.

9.38 However, the Sabadell Group CIO told us that he could not recall the MSA ever being used or referred to during the Programme. This was a view shared by the TSB CIO, who confirmed that the MSA was *"signed and put in a drawer."* The SABIS UK Managing Director similarly confirmed that, in his view, Sabadell had viewed the contractual framework as a necessary evil required by the UK regulatory environment and that the MSA was *"meant to go in a drawer and not be taken out ever again"*. This was despite the fact that the MSA afforded TSB various rights of oversight, including contractual audit rights (as discussed at paragraph 9.58) and 'step-in' rights (which allowed the Migration Delivery Committee (the **"MDC"**),[8] following a material or persistent breach by SABIS of its obligations under the MSA, to authorise TSB to appoint another third party to perform SABIS' role).

9.39 The MDC, which met weekly and included representatives from TSB and SABIS, was the key forum for assessing SABIS' progress in respect of the design, build and testing of the Proteo4UK Platform. The MDC was chaired by the TSB CIO and its other members included the TSB COO, the TSB Migration Director, the Sabadell Group Data Migration Officer and the SABIS UK Managing Director. It is notable, however, that the Sabadell Group CIO, who was designated as SABIS' *"accountable executive"* under the MSA, was not a member of the MDC. The Sabadell Group CIO's role on the Programme is discussed further at paragraphs 9.44 to 9.46.

9.40 Despite the formality suggested by these arrangements, the TSB Migration Director explained to us that the relationship did not feel like a typical supplier relationship at the outset, but rather as if TSB and SABIS comprised a *"single programme team"*.

9.41 Likewise, the Sabadell Group COO told us that the customer and supplier relationship was intended to apply in respect of services provided once the Proteo4UK Platform was live, and

[8] See Appendix 3 for further information on the Programme committee structure.

not in respect of the design, build and testing of the Proteo4UK Platform under the MSA. It appears to us that, from Sabadell's perspective, the design, build and testing of the Proteo4UK Platform was viewed instead as a Sabadell Group project led by the TSB CIO.

## Role of the TSB CIO

9.42 The TSB CIO, who was the *"accountable executive"* with responsibility for managing TSB's relationship with SABIS as a supplier, had been involved in nine of Sabadell's previous migrations before moving to the UK to take up his role within TSB. He had also served as a director of SABIS Spain until 19 August 2016.

9.43 The Sabadell Group COO and SABIS UK Managing Director both explained to us that, although there were individuals with considerable knowledge of particular aspects of the Proteo4UK Platform development (for example, the Sabadell Group CTO in relation to the Infrastructure), there was no one within SABIS or Sabadell whose technical knowledge of the overall build matched that of the TSB CIO. TSB does not appear to have considered the gap that may have been left within SABIS following the departure of the TSB CIO from SABIS, and the effect that this might have on SABIS' capability to design, build and test the Proteo4UK Platform.

9.44 The Sabadell Group CIO was SABIS' *"accountable executive"* under the MSA. When we asked the Sabadell Group COO whether there was any intention at the outset that the Sabadell Group CIO would be the TSB CIO's *"opposite number"* on the Programme, with the TSB CIO acting as customer and the Sabadell Group CIO acting as supplier, he explained that this had not been envisaged, and that the TSB CIO *"[had] to do everything in terms of management"*.

9.45 The SABIS UK Managing Director also told us that, although the Sabadell Group CIO became more involved in the Programme as time went on, this had not been the intention at the outset. He explained to us that:

> *"…there's clearly an issue there in terms of roles and responsibilities. Clearly I was told by [the Sabadell Group CIO] when I arrived that he had been ordered not to get involved in the migration project. That was a [TSB CIO] project and that it was for [the TSB CIO] to run. And he would not get involved."*

9.46 The Sabadell Group CIO himself explained to us that the TSB CIO, as *"group integration manager"*, had responsibility for the Programme *"within the group"*, and that *"there was no one other above him to be responsible for that, because group delegated that responsibility to TSB"*.

9.47 This appears to have been Sabadell's intention from the outset. For example, in its April 2015 Change in Control Application, Sabadell noted that:

> *"In the short term, Sabadell intends to name a new CIO for TSB and segregate TSB's IT function from its Operations function. The appointed CIO will be responsible for the implementation of Proteo at TSB and the proposed IT migration project."*

9.48 In practice, we understand that the TSB CIO travelled to Spain frequently, engaging with the SABIS development teams and architecture and infrastructure teams. The Former TSB Chairman explained to us that the TSB CIO had an *"intimate knowledge of… how to pull the strings in SABIS"*.

9.49 It therefore appears to us that the TSB CIO was not only responsible on TSB's behalf for managing SABIS as a supplier, but was also integral to delivering the services being provided to TSB by SABIS, with de-facto responsibility within the Sabadell Group for directing the design, build and testing of the Proteo4UK Platform.

9.50 TSB and the TSB CEO have challenged our view that the TSB CIO had a role within SABIS and effectively was responsible for directing the SABIS teams. However, while the TSB CIO may not have had a formal role or title within SABIS after August 2016, the documentary and interview evidence gathered as part of our Review demonstrates that the TSB CIO's involvement in directing SABIS' work to develop the Proteo4UK Platform was extensive. For example, the SABIS UK Managing Director told us that, although his formal reporting line was to the Sabadell Group CIO, in practice he reported to the TSB CIO on a day-to-day basis, and that he viewed the TSB CIO *"much more as a boss"* than as a customer.

9.51 For an intra-group programme of this kind, we would have expected there to be greater consideration of the potential risks involved in concentrating so much responsibility in a single individual, thereby losing the contractual and commercial clarity typical of an arm's length customer and supplier relationship (see insight box below).

## Risks arising in a non-arm's length relationship

In paragraph 9.51 we note that the role of the TSB CIO, in the context of the intra-group nature of the MSA and OSA, limited the extent to which SABIS (as supplier) and TSB (as customer) could benefit from the contractual and commercial clarity that is typical of an arm's length customer and supplier relationship. We explain here in more detail the risks for the Programme from TSB and SABIS not having an arm's length relationship.

The nature of a normal, arm's length relationship produces clarity for the customer and supplier around their formal roles and responsibilities within the programme. Without that clarity and formality there is a risk that the parties will not explore or interrogate the detail around key questions. For example, questions can remain unasked about the extent to which either party has responsibility and liability for key decisions, and without asking those questions, a party may proceed on the incorrect assumption that the other party is taking full responsibility and liability without carrying out appropriate checks to confirm this. Without those checks there is a risk that neither party will actually take on that responsibility and the relevant action will not be completed.

The impact of these risks is best understood by regarding three points in the Programme where, if there had been a formal arm's length customer and supplier relationship, important issues and risks might have been managed differently:

- During the planning stage. If TSB had carried out a full due diligence review of SABIS (which it would have done had TSB been about to enter into an arm's length commercial relationship with SABIS), TSB would have sought clarity on the version of the Platform that SABIS was proposing to use as the starting point for meeting TSB's requirements (for Proteo 4), and full detail on any differences between that and the platform SABIS was currently operating in Spain (Proteo 3). Through this due diligence, TSB would likely have identified the extent of software change required. TSB would also have carried out full diligence of SABIS' experience in carrying out a programme of this size and scale, and how it intended to complete the work required for this Programme. This would have allowed the full assessment, understanding, and mitigation of the associated risks.
- When making the Single Data Centre Decision. Chapter 14 explains that the decision to carry out Performance Testing in a single data centre made it difficult to identify the issues with the Active/Active configuration, which was a key cause of problems with the Channels after Go

Live. This decision was reached after discussion between the TSB CIO and SABIS, but was not recorded at the Testing Delivery Forum or any other Programme fora. Had TSB been operating with its supplier on an arm's length basis, it is likely that the TSB CIO would have, as part of this discussion, sought formal assurance from SABIS that limiting Performance Testing in this way would not impact on SABIS' ability to meet its service obligations under the OSA. This request for formal assurance might then have prompted SABIS to reconsider carefully the risks associated with this decision.

- When seeking confirmations from SABIS prior to Go Live. Chapter 18 explains that, ahead of Go Live, the TSB CIO received a letter from the SABIS UK Managing Director regarding SABIS' ability to meet its obligations under the OSA. This letter provided only a limited confirmation, with little supporting evidence. Had this been a more robust request from a customer to a supplier (that is, typical of an arm's length relationship), it is likely that TSB would have requested:
  - a more senior level Sabadell Group confirmation, for example from the Sabadell Group CIO or the Sabadell Group COO; and
  - that the confirmation clearly state that the Platform was ready to meet TSB's functional and Non-functional Requirements, and that SABIS was ready to operate the Platform.

  A request from TSB for this senior level confirmation would likely have ensured that SABIS reviewed supporting evidence regarding (i) the Platform's ability to meet TSB's Non-functional Requirements and (ii) SABIS' readiness, including the reviews carried out by KPMG Spain and Deloitte Spain (see chapter 15). A review of that evidence might have prompted a more balanced discussion of the risks between TSB, Sabadell and SABIS ahead of the decision to Go Live.

## TSB's Oversight of SABIS' Management of its Sub-Contractors

9.52 TSB appeared to recognise at an early stage the importance of SABIS' sub-contractors to the success of the Programme. The TSB Procurement and Property Director explained that TSB had pressed to achieve visibility of SABIS' agreements with sub-contractors, and to ensure transparency (and in some cases control) over any changes to the list of sub-contractors identified in the MSA. Where a new sub-contract was being negotiated by SABIS, TSB's procurement team and an external law firm were asked to ensure that particular oversight provisions were included in accordance with the level of risk presented by the agreement. Once the parties were satisfied that negotiations were complete and the contract was in agreed form, a risk report was provided to both TSB and SABIS.

9.53 However, the TSB Procurement and Property Director also explained to us that, in the months leading up to Go Live, he had observed SABIS *"struggling to have the sort of control"* over its sub-contractors that the contractual arrangements required. This was raised as a finding by Internal Audit and resulted in the secondment of a supplier manager from TSB to SABIS in February 2018. TSB has asserted that, as this issue was raised in relation to a review of SABIS' readiness to operate the Proteo4UK Platform under the OSA, it does not suggest that SABIS' supplier management controls were insufficient in respect of the MSA services. We in turn asked TSB to explain how it had obtained comfort in respect of SABIS' management of its suppliers under the MSA, but it declined to respond to our question.[9]

[9] See further chapter 23, paragraph 23.12(A) and Figure 23.1.

## TSB's Visibility of Costs

9.54 Under the MSA, SABIS was required to develop the Proteo4UK Platform in return for a fixed payment of £232 million (£325 million, minus a provision for TSB's costs of £93 million).[10]

9.55 As discussed in chapter 6, achieving costs protection was a benefit to TSB on the Programme. However, it was important for TSB to recognise that its lack of visibility of SABIS' costs would limit its awareness of cost overruns. Cost overruns can help to alert a customer to unexpected issues or challenges, and a clearer understanding of SABIS' costs may have signalled to TSB the difficulties SABIS was experiencing with particular aspects of the Proteo4UK Platform development and potential issues with the quality of what SABIS was delivering.

9.56 However, TSB Board members and Executives told us that they had little or no visibility of the financial impact of the Programme on the Sabadell Group.

9.57 TSB should have realised that its lack of visibility of SABIS' costs made it more important to consider whether and how to exercise the other rights of oversight available to it on the Programme in order to ensure the quality of what it was receiving from SABIS. These included its audit rights under the MSA.

## TSB's Exercise of Audit Rights under the MSA

9.58 In addition to other monitoring and oversight provisions, the MSA granted TSB rights to undertake both *"routine"* and *"exceptional"* audits of SABIS.

9.59 Given the repeated delays to numerous aspects of the design, build and testing of the Proteo4UK Platform, we would have expected TSB to have exercised its contractual rights to audit SABIS' performance of its MSA obligations. This might have involved, for example, performing or commissioning specialist technical deep dives to assess the quality and completeness of the Proteo4UK Platform during the build phase.

9.60 TSB engaged Deloitte to perform a number of design reviews in 2016, including a December 2016 coding review which assessed the *"software delivery tools and processes…with 'deep dive' quality assessment of sample Java code"*. However, our Review has identified no evidence to suggest that TSB exercised its audit rights to assess SABIS' progress in this area after 2016, or that TSB engaged directly with any of the four major sub-contractors responsible for Application development, notwithstanding the fact that £198.7 million was spent on these four providers alone. Given the importance and extent of Application development work on the Programme, we would have expected TSB to have overseen this more closely. If TSB had been aware of the high level of SABIS' spend on this aspect of the Programme, it might have applied more scrutiny to the work of SABIS and its sub-contractors in this area.[11]

9.61 TSB initially suggested to us that it had exercised its contractual rights to audit SABIS' performance under the MSA through reviews carried out by Internal Audit. Although Internal

[10] In the week preceding Go Live, the price charged by SABIS to TSB under the MSA was increased from £232 million to £249 million. This was due to the increase in SABIS' costs stemming from the delay to the Go Live date from November 2017, and the consequent need to demonstrate to the Spanish and UK tax authorities that the terms of the MSA were on an arm's length basis.

[11] The TSB CIO acknowledged after Go Live that source code quality issues contributed to the instability of the Platform and that *"the responsibility in terms of inefficient code quality controls is with SABIS and its Software Development suppliers"*.

Audit conducted eight reviews relating to SABIS during the Programme, only five of these related to build activity under the MSA. TSB has since explained to us that, *"in its review of the delivery and Build, the Internal Audit function focused on TSB oversight of SABIS, rather than auditing SABIS itself"*.

9.62 Similarly, while Risk Oversight also performed reviews of various aspects of the Platform build, including, in particular, the Infrastructure implementation, it did not assess SABIS directly, but focused instead on TSB's management of SABIS as a supplier.

## TSB's Failure to Obtain Adequate Architecture Documentation

9.63 As discussed at paragraph 9.14, TSB's ability to oversee SABIS' design, build and testing of the Proteo4UK Platform may also have been impacted by a lack of adequate architecture documentation.

9.64 Without adequate architectural designs, it is difficult to see how TSB could effectively supervise and assure the delivery of the Infrastructure and Network or oversee the design and execution of the Non-functional Testing carried out by SABIS.

9.65 For example, Internal Audit noted in September 2017 that the *"TSB CIO team [did] not have a formal, complete and verified architectural design of the IT infrastructure and systems to support oversight and validation of the IT…build received from SABIS."*

9.66 In response to this issue, Internal Audit required the TSB CIO team to obtain evidence that SABIS was populating and maintaining a fully documented, accurate and proven Configuration Management Database (a "**CMDB**").[12] However, it also required the TSB CIO team itself to "*develop and implement IT architectural principles to support current and future IT developments*" and to "*develop and maintain the high level architectural service views*". This is difficult to understand, given that SABIS had end-to-end responsibility for the architecture and delivery of the Infrastructure under the MSA. We would expect that SABIS would have been responsible for producing comprehensive architecture documentation at the start of the build, but it is apparent that it did not do so.

9.67 When one of the resulting management actions issued by Internal Audit was eventually closed on 14 February 2018, the TSB CTO and the TSB Head of Infrastructure both considered that Internal Audit had prematurely closed the action and that they should not *"congratulate [themselves] too enthusiastically"* as they still did not have architectural Infrastructure designs for all of the services provided by SABIS to TSB. The TSB Head of Infrastructure noted that he would *"stay quiet with audit"* but stressed that the team needed to continue to push to have the right level of information to be able to support the business and satisfy regulation.

9.68 TSB's experience after Go Live illustrates the importance of Internal Audit's findings. For example, when an IBM team was brought in to help resolve some of the issues in the days immediately following Go Live, a significant problem the team faced was the lack of accurate architecture documentation. We were told that, at the height of the issues following Go Live, the TSB CIO hand-drew a number of detailed diagrams to illustrate the overall architecture, as such diagrams of the architecture were inevitably required to aid

[12] A CMDB should contain all relevant information about the hardware and software components used in an organisation's IT services and the relationships between those components.

problem diagnosis and reporting and no other versions of such diagrams were apparently available.

9.69 A report by DELL EMC Consulting into SABIS' IT operations, dated 25 January 2019, also noted a "*lack of essential documentation*" and that "*Operational documentation handover to IT Ops was fairly poor*".

9.70 As discussed in chapter 15, deficiencies in Infrastructure documentation were also identified by KPMG Spain and Deloitte Spain in the course of assessments commissioned by SABIS itself.

### TSB's Management of SABIS' Testing

9.71 Functional Testing was an important means of oversight for TSB. The TSB CEO explained to us that *"the TSB Board was confident SABIS could and would deliver"* under the MSA because, amongst other things, *"TSB had direct visibility of the functional output of SABIS' work through TSB's functional testing"*. The TSB CEO's reference to Functional Testing includes the UAT performed by TSB on the Programme.

9.72 However, the effectiveness of TSB's Functional Testing was dependent on earlier SIT having been completed to agreed specifications. This is because the party responsible for conducting UAT (in this case, TSB) does not typically repeat all of the tests performed as part of the earlier SIT phase, instead relying on agreed levels of SIT having been completed in advance.

9.73 SABIS was responsible for conducting SIT on the Programme before delivering Application software to TSB for UAT. It was therefore necessary for TSB to ensure that the SIT performed by SABIS had satisfied agreed exit criteria.

9.74 However, as described at paragraph 9.12, SABIS failed to satisfy the exit criteria agreed in the MSA, and the EY Root Cause Analysis Report concluded that a significant proportion of the coding Defects and Application design flaws included in the sample for its review could have been detected as part of SIT.

9.75 Although regular SIT updates were provided to the MDC, it is not clear to us whether TSB was fully aware of the limitations of SABIS' SIT or its failure to satisfy the agreed exit criteria. However, providing proper assurance and oversight of SABIS' testing should have been a priority for TSB, and the findings of the EY Root Cause Analysis Report suggest that the inadequacy of SABIS' testing contributed to the issues TSB experienced after Go Live.

## FURTHER OBSERVATIONS

9.76 Many of the problems TSB experienced after Go Live can be attributed to deficiencies in SABIS' design, build and testing of the Proteo4UK Platform. Given the importance of the Programme to TSB, and notwithstanding the fact that both TSB and SABIS were members of the Sabadell Group, it was necessary for TSB to manage SABIS as an arm's length critical supplier.

9.77 As discussed at paragraph 9.60, TSB commissioned independent technical reviews of code quality in 2016. TSB was able to take these steps in part because it had secured rights of oversight in respect of SABIS under the MSA. Given the repeated Programme delays caused

by SABIS' failure to meet agreed milestones, TSB should have sought to exercise these rights after 2016 as SABIS' design, build and testing of the Proteo4UK Platform progressed.

9.78 This was particularly important given SABIS' role as systems integrator, managing the delivery of services from a large number of sub-contractors. The fact that SABIS had engaged experienced sub-contractors to build the Proteo4UK Platform was not, in our view, an adequate substitute for TSB ensuring that SABIS' management of these suppliers was robust, or that adequate documentation was available to enable TSB effectively to oversee SABIS' integration of their services.

9.79 TSB's failure to conduct a comprehensive due diligence exercise and to make appropriate use of its contractual audit rights, together with the absence on the Programme of a proper customer/supplier relationship, indicate to us that TSB did not manage SABIS on an arm's length basis despite having detailed contracts in place to govern SABIS' delivery of the Proteo4UK Platform. In our view, the contractual and commercial clarity inherent in an arm's length relationship might have prompted a more robust assessment of the risks TSB faced on the Programme, thereby increasing the likelihood that these risks would be mitigated.

# CHAPTER 10: THE TRANSITION EVENTS

## KEY POINTS

- TSB sought to de-risk the Main Migration Event through the Transition Events. These were:
  - the Early Cutovers, in which certain functionality, such as the Mobile App and the ATMs, was put into live use ahead of the MME; and
  - Live Proving, in which material parts of the Proteo4UK Platform were piloted with a limited number of TSB employees as customers.
- While the Early Cutovers allowed some problems with the Proteo4UK Platform to be identified and resolved, the functionality put into live use constituted only a small part of the Proteo4UK Platform, and therefore did not significantly de-risk the MME.
- Live Proving was designed to prove a broader range of the Proteo4UK Platform functionality than the Early Cutovers but using much smaller customer volumes. For that reason, it did not offer an opportunity to understand how the Proteo4UK Platform would perform at scale. In the event, the Live Proving that was carried out was more limited in duration, size and scope than originally planned, which further reduced its utility in identifying the significant problems that arose after Go Live.
- The limitations of the Transition Events meant that they did not significantly reduce the risk of the Programme's predominantly single event implementation approach, and this risk would instead need to be mitigated through testing.
- Overall, given their limitations, the T3 Memo placed too much value on the Transition Events. They gave only limited assurance as to how the newest and most critical parts of the Proteo4UK Platform would perform after Go Live.

## INTRODUCTION

10.1 In July 2017, the TSB CIO explained to the Audit Committee the strategy for proving the Proteo4UK Platform as follows:

> *"taken together proving, early cutovers and Non-function[al] testing ('NFT') were sufficient to prove that each critical IT component had been effectively tested. Early cutovers were particularly important from an IT perspective to prove the platform was fit for purpose."*

10.2 The "**Transition Events**" (i.e. the *"early cutovers" and "proving"* referred to by the TSB CIO) comprised:

(A) seven "**Early Cutovers**", i.e. specific services which were taken live to all of TSB's customers before the rest of the Proteo4UK Platform; and

(B) "**Live Proving**", i.e. validating the Proteo4UK Platform for live service using a limited number of customers, that is, at a scale such that failures could be managed relatively safely.

10.3 Figure 10.1 lists the periods in which each Transition Event took place.

### Figure 10.1: The Transition Events

| Transition Event | Dates |
|---|---|
| Mobile App transition (also referred to as T0) | March 2017 to April 2017 |
| Payment schemes transition | April 2017 to April 2018 |
| Public Website transition | June 2017 to September 2017 |
| Mortgage sales and origination transition (also referred to as T2a) | Mortgage sales and origination proving (internal live):<br>August 2017<br>Mortgage sales and origination proving (external live):<br>November 2017<br>Rollout to brokers:<br>January 2018<br>Rollout to TSB branches:<br>February 2018 |
| ATM transition | August 2017 to March 2018 |
| Telephone Channel transition (Non-IVR) | October 2017 to April 2018 |
| Corporate core transition (including HR, payroll, email, and office telephone systems) | November 2016 to April 2018 |
| Live Proving (also referred to as 'the friends and family pilot' or T1) | |
| • Scripted phase | April 2017 to March 2018 |
| • Unscripted phase (TSB Beta) | November 2017 to April 2018 |

10.4 As part of the Programme, TSB planned to use the Transition Events to de-risk what would otherwise be a wholly single event migration at Go Live.[1] Given the scope and complexity of the Proteo4UK Platform, TSB considered the Transition Events to be an important means of proving the Proteo4UK Platform, as well as the ability of TSB and SABIS to operate it.[2]

10.5 This chapter describes the Transition Events and considers the extent to which each of them actually de-risked the Main Migration Event ("**MME**").

1 See paragraph 8.23 of chapter 8.

2 SABIS' ability to operate the Proteo4UK Platform is discussed in chapter 15.

10.6 The Early Cutovers involved migrating certain functionality onto the Proteo4UK Platform before Go Live. This served to benefit the Programme as there would be fewer services to migrate at the MME, thereby reducing the risk of customer impact. The Early Cutovers would also serve to prove the new functionality in live service and allow TSB and SABIS to address any issues with these services prior to Go Live. The remainder of this section describes the seven Early Cutovers in greater detail.

## The Mobile App Transition (T0)

10.7 The first customer-facing Transition Event was the launch of TSB's new Mobile App. The Mobile App included new functionality for standing order payments, access via fingerprint or memorable information, and mobile sales of key products. It also enabled access to a TSB branch locator, currency converter, and messenger conversations with TSB's social media team.

10.8 Prior to the MME, the Mobile App used Amazon Web Services to connect to the LBG IT Platform, as all transactions using the Mobile App were being processed by the LBG IT Platform. During the MME, this was re-configured so that the Mobile App connected, via the new Middleware, to the Back-end Applications of the Proteo4UK Platform. Before the MME, therefore, the only elements of the Proteo4UK Platform that were being proved by the Mobile App transition were:

(A) the Mobile App itself; and

(B) the ability of the SABIS and TSB teams to operate and support the Mobile App.

10.9 The Mobile App transition therefore did not prove any of the new Infrastructure or Network being established for TSB or other elements of the Proteo4UK Platform (such as the Middleware). While launching the Mobile App in advance of the MME undoubtedly had several benefits, including testing of the Mobile App itself and minimising the level of change experienced by customers at Go Live, its utility in proving the Proteo4UK Platform was limited.

## Payment Schemes Transition

10.10 The payment schemes transition involved TSB transitioning from participating in various UK banking industry schemes for payments (Faster Payments,[3] Bankers' Automated Clearing Services ("**BACS**"),[4] Clearing House Automated Payment System ("**CHAPS**")[5] and cheque clearance (including Single Euro Payments Area ("**SEPA**"))[6] indirectly via LBG, to participating in those schemes either directly or indirectly via another bank as an agent.

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[3] The Faster Payments service is a UK banking initiative designed to reduce the time taken to make electronic payments between customer accounts at different banks. Payments arrive within two hours (normally almost immediately).

[4] BACS is the central payment system used in the UK to process several different types of electronic payments, predominantly direct debits and direct credits. TSB introduced the 'Bi-lateral Clearing System bridge' which allowed them to test the payment gateway clearing and settlement for Faster Payments and BACS at full volume.

[5] CHAPS is a same-day automated high-value payment system used for wholesale and retail payments within the UK (sterling only).

[6] The Image Clearing System is a new system for cheque clearance in the UK that began rolling out in 2017. The new system aims to speed up the cheque clearing process significantly.

This involved developing functionality which would allow the Proteo4UK Platform to access these schemes, testing that functionality, and achieving certification with the scheme and/or the agent bank. The transition also involved coordinating with the relevant scheme to effect payment routing changes so that the Proteo4UK Platform would start sending, receiving, and settling payment files with the relevant scheme for TSB's sort codes. In addition to the UK payment schemes, TSB also joined the Current Account Switch Service ("**CASS**"), the UK scheme for interbank current account switching.[7]

10.11 The payment schemes transition was a complex and challenging aspect of the Programme, and the decision to complete the transition early helped in an important way to de-risk the MME. Achieving the certifications required to join the various schemes also served to prove the interfaces between the Proteo4UK Platform and the schemes. Additionally, completing the payment routing changes before the MME meant that the interfaces between the Proteo4UK Platform and the Faster Payments and BACS schemes were proved at full scale.

10.12 However, the payment schemes transition only served to prove these interfaces with the relevant schemes. It did not prove the end-to-end completion of transactions by TSB customers on the Proteo4UK Platform. In particular, it did not prove the Channels through which TSB customers access their accounts and complete transactions.

## Public Website Transition

10.13 The Public Website transition involved rebuilding TSB's public website as a replica of the original website to be hosted by the Proteo4UK Platform. The "**Public Website**" consists of the parts of TSB's website (accessible at www.tsb.co.uk) which provide general information about TSB and its products and that do not require a user to log in.

10.14 The Public Website transition did prove some aspects of the Proteo4UK Platform including, in particular, some components of the new Network. However, the Public Website transition did not include Internet Banking, which was migrated separately as part of the MME. While the Proteo4UK Platform was handling all traffic to the Public Website by the MME, the load on the Network and Infrastructure from this type of traffic is substantially different to the load generated by Internet Banking traffic.[8]

10.15 The Public Website transition was therefore of limited value in proving the Proteo4UK Platform. It was however a sensible decision by TSB to migrate the Public Website in advance of the MME to help reduce the risk of issues for customers who wanted to look at the Public Website following the MME.

## Mortgage Sales and Origination Transition (T2a)

10.16 The mortgage sales and origination transition involved an early launch of the Proteo4UK Platform's functionality for the processing of new mortgage applications, which used an Application provided by IRESS (the "**MSO Application**"). The administration of mortgages (both new and existing) would continue to be supported by the Unisys Financial Services System ("**UFSS**") Application on the LBG IT Platform until the MME. This would allow TSB's

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7 CASS is the UK service designed to assist customers to switch their current accounts to an alternative bank.

8 In particular, the traffic generated by the Public Website is predominantly read-only, whereas Internet Banking traffic, for example, involves users interacting with the Proteo4UK Platform in an authenticated environment and completing transactions that generate traffic on the Proteo4UK Platform's mainframe Infrastructure.

entire portfolio of mortgages to be migrated together to the Proteo4UK Platform's implementation of UFSS at the MME.

10.17 Mortgage sales and origination is a complicated area of product sales in retail banking. The migration of this functionality alone would be a significant undertaking for most retail banks. TSB therefore sensibly undertook this project separate from the MME and launched the functionality in stages. The mortgage sales and origination transition taking place in advance of the MME also allowed TSB employees and brokers to become familiar with the Proteo4UK Platform, before broader change was introduced at the MME.

10.18 In terms of proving the Proteo4UK Platform, this Transition Event principally served to prove the integration of the MSO Application with the Proteo4UK Platform. It also helped to prove, to a limited extent, the supporting Infrastructure and Networks. This proving of the Infrastructure and Networks was limited because the volume of transactions using the Proteo4UK Platform (for example, decisions in principle and mortgage applications) is fairly low when compared to, for example, the volume of transactions passing through the Digital Channels. Further, while the MSO Application was being used in TSB's branches, this functionality was relatively discrete. It therefore did not serve to prove, in a significant way, the use by TSB branch personnel of the broader Proteo4UK Platform. Overall, the usefulness of the mortgage sales and origination transition in proving the Proteo4UK Platform was limited.

## ATM Transition

10.19 The ATM transition involved the phased migration of TSB's ATMs (automated teller machines or cashpoints) to the Proteo4UK Platform.

10.20 The ATM Channel was one of the principal customer Channels which did not experience significant issues following Go Live. Despite the issues affecting TSB's Digital, Telephone and branch Channels in the days following Go Live, ATM availability was generally high. Most unavailability was due to a limited number of ATMs temporarily running out of cash, rather than technical issues.

10.21 By migrating the ATMs to the Proteo4UK Platform significantly in advance of the MME, and doing so in a phased way, TSB was able to (i) pause the rollout when issues arose in order to limit customer impacts and correct the most critical issues, and (ii) achieve a period of stability in advance of the MME. Had some of the issues experienced when the first ATMs were migrated arisen alongside the other issues following Go Live, the situation could have been significantly worse for many TSB customers.

## Telephone Channel Transition (Non-IVR)

10.22 This Transition Event involved the migration to the Proteo4UK Platform of TSB's Telephone Channel systems that did not rely on the Intelligent/Interactive Voice Recognition ("**IVR**") system (i.e. the interactive voice response system where callers would connect using automated voice and tone recognition). The telephone lines that were migrated in advance of the MME included those used by TSB's human resources contact centre, account maintenance services, and the fraud, lending decisions, and mortgages teams. It did not include telephone lines for significant functions including telephone banking, collections and recoveries, customer relations, or business banking, which would each migrate to the Proteo4UK Platform at the MME.

10.23 A key aim of this transition was to help de-risk the MME by migrating these services in advance of the MME, so that support after Go Live could focus on the Telephone Channel functionality that made use of the IVR. This Transition Event served this purpose. In particular, it served to prove some of the new Telephone Channel functionality of the Proteo4UK Platform and the Infrastructure and Network supporting it, and allowed TSB employees to become familiar with the non-IVR Telephone Channel systems before the remainder of the services were rolled out.

10.24 Critically, this transition did not prove the IVR system or the systems that allowed contact centre agents to complete banking transactions for customers (such as Web On Behalf Of). As explained further in paragraphs 19.12(C) and 19.21 to 19.24 of chapter 19, these systems encountered significant issues after Go Live.

### Corporate Core Transition

10.25 TSB's corporate core transition involved the migration of much of TSB's non-customer-facing back office functionality onto the Proteo4UK Platform.

10.26 As the corporate core systems are predominantly separate from the customer-facing functionality of the Proteo4UK Platform, they have not been a significant focus of our Review.

10.27 It is clear that a lot of work was undertaken to achieve the migration of these systems prior to the MME and we consider that it was a sensible decision to migrate these functions early to avoid disruption to the business at Go Live.

## LIVE PROVING

10.28 TSB sought to conduct a Live Proving exercise that would validate the Proteo4UK Platform using real users and live data in two stages: a scripted phase followed by an unscripted phase.[9] The unscripted phase became known as "**TSB Beta**".

10.29 TSB Beta was intended to prove much of the end-to-end customer-facing functionality of the Proteo4UK Platform across multiple Channels (including Digital, telephone and some pilot branches) and multiple services. The revised Programme plan produced in October 2017 (known as the Defender Plan) contemplated that TSB Beta would run from the end of November 2017 to the point of 'migration readiness' in mid-March, and would include up to 2,000 TSB employees as customers by January 2018. However, the delays in Functional Testing meant that: (i) the delivery of functionality into TSB Beta was delayed; and (ii) TSB Beta was carried out in parallel with User Acceptance Testing ("**UAT**") rather than after UAT (as contemplated by the Defender Plan).[10] As a result:

(A) Reduced scope of TSB Beta - fewer processes were included within the scope of TSB Beta (341 business processes instead of the 459 that had been planned).

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[9] The scripted phase of Live Proving was a small scale proving phase in which all interactions with the Proteo4UK Platform were specified in detail and carried out using an internal branch, Digital, and Telephone Channel set up for this purpose. The unscripted phase involved a larger community of TSB employees *"opening and servicing new accounts…in branches (and other new channels)"*.

[10] See paragraph 10.29(B) and Figure 11.2 of chapter 11.

(B) Duration and late launch of functionality - most of the functionality of the Proteo4UK Platform for TSB Beta only became available to TSB Beta participants over January to March 2018.[11] This meant that most functionality was only being proved in live service for between one and three months immediately prior to the MME. For example, the IVR system was only available in TSB Beta from March 2018.

(C) Issues with Environments - there were differences in the code and configuration between the Environments used to support Functional Testing and live service and this was acknowledged in the T3 Memo. It would therefore have been difficult to discern whether Live Proving was finding Defects in the code or whether these were simply a result of the differences in the Environments.

10.30 In addition to the limitations caused by the late delivery of functionality, there were additional limitations in the way TSB Beta was designed, namely:

(A) Volumes - TSB Beta involved only approximately 1,689 participants. Further, at least five of TSB's products had only undergone Live Proving by fewer than 10 participants. While TSB Beta did facilitate live proving of payments to some degree, many transactions had been completed at very low volumes. In many cases, the volumes were simply too small to have effectively proved the relevant functionality of the Proteo4UK Platform (see Figure 10.2).

(B) Selection of participants - TSB Beta was only open to TSB employees. TSB employees would, on the whole, be significantly more familiar with the functionality and customer journeys of the bank than members of the general public. Although TSB has told us that employees were told to test the Proteo4UK Platform and use it in unusual ways, it is unlikely that the participants in TSB Beta would be representative of TSB's diverse customer base. A consequence of this was that the Proteo4UK Platform's ability to handle unexpected inputs and behaviour was not sufficiently tested in advance of the MME.

(C) Use of TSB Beta branches - TSB faced numerous issues in its branches after Go Live that we would expect to have been identified before Go Live. This view is shared by the TSB CIO who said there were some Defects *"that should have been identified before Migration…[including] the voucher reader operating model…or some of the obvious banking peripherals defects"*. The fact that these issues were not identified through TSB Beta suggests that the TSB Beta branches set up at TSB's offices may not have used peripherals (printers, voucher readers, and other devices) that reflected those used by TSB's broader network of branches. When we put this to TSB, TSB told us that the TSB Beta branches did in fact have the peripherals. We therefore do not understand how incidents involving the branch peripherals after Go Live went undetected during TSB Beta.[12]

[11] Over the course of January 2018, it became possible to use TSB Beta Personal Current Accounts to complete debit card transactions, CHAPS/BACS payments, and Faster Payments. It also became possible for TSB employees to open TSB Beta savings accounts. Over the course of February 2018, the Digital Channel, Apple Pay and Android Pay, credit card opening functionality, business banking and loan applications were launched as part of TSB Beta. Over the course of March 2018, further functionality was launched into TSB Beta, including IVR, credit card transactions and Digital Channel savings account opening.

[12] See paragraphs 19.12 and 19.25 to 19.27 of chapter 19 for more detail on the incidents in TSB branches following the MME.

### Figure 10.2: Volumes of Products and Transactions in TSB Beta as at 5 April 2018[13]

| Examples of products used in TSB Beta |
|---|
| • 1,544 open Personal Current Accounts;<br>• 28 closed Personal Current Accounts;<br>• 261 open savings accounts;<br>• 10 closed savings accounts;<br>• seven open business banking current accounts;<br>• three open business banking savings accounts;<br>• three open loans;<br>• three planned overdrafts; and<br>• three issued credit cards. |
| **Examples of transactions exercised in TSB Beta** |
| 21,248 transactions with an average transaction value of £19.03, including:<br>• 11,133 debit card transactions totalling £83,306.04;<br>• 2,122 inbound Faster Payments transactions totalling £103,224.37;<br>• 754 outbound Faster Payments transactions totalling £8,190.12; and<br>• 27 credit card transactions totalling £392.47.<br>By 5 April 2018, there were at least 21 types of transactions which had only been completed once. |

## FURTHER OBSERVATIONS

10.31 While the Transition Events had the potential to de-risk the MME and prove some elements of the Proteo4UK Platform, they were ultimately of limited value.

10.32 The T3 Memo suggests that the TSB CEO and the TSB Board took substantial comfort from both the Early Cutovers and Live Proving in supporting the decision to Go Live. For example, the T3 Memo stated that:

(A) *"Typically, after the inevitable short-term snags, we have seen good stability for those services which we have already been moved onto the new platform."*;

(B) *"In reaching my conclusion on the likely stability of the platform post MME I have taken into account…the results we have seen from our various test phases, ranging from UAT and MDT to NFT and TSB Beta"*; and

(C) *"Clearly we have attempted to mitigate this risk [that the Proteo4UK Platform will not perform as expected] through the design and execution of the various test phases associated with the migration programme. For instance, the inclusion of the TSB Beta phase has enabled us to identify and address issues and defects in the live environment, some of which had previously been passed in the UAT or MDT phases, and to understand the root cause of these"*.

[13] This is the latest contemporaneous report of the figures from TSB Beta that we have been provided.

10.33 The TSB Board should not have taken material comfort from the Transition Events because:

(A) while migrating some functionality of the Proteo4UK Platform early served to de-risk the MME and reduce customer impact to some extent, these Early Cutovers did not make significant use of the new parts of the Proteo4UK Platform supporting TSB's Channels. The Channels were the parts of the Proteo4UK Platform where the majority of incidents occurred following Go Live;[14] and

(B) while Live Proving in TSB Beta did exercise the new Middleware, Infrastructure, and Channel Applications, it provided very little effective proving for the Programme due to its size and was further limited by the differences between what was planned and what was actually executed.

10.34 The limitations of the Early Cutovers and Live Proving meant that they did not significantly reduce the risks of the single event implementation approach chosen by TSB. Consequently, these risks should have been mitigated by defining and executing a robust testing strategy with a particular focus on the ability of the Proteo4UK Platform to support customer volumes. This did not happen (see chapter 14).

[14] See paragraphs 19.8 to 19.27 of chapter 19.

# CHAPTER 11: FUNCTIONAL TESTING AND THE TESTING OF DATA MIGRATION

## KEY POINTS

- Following the build phase, two activities were undertaken to ensure the Proteo4UK Platform's readiness to support TSB's customers. These were the Transition Events and testing. The limitations of the Transition Events are discussed in chapter 10.
- Testing following the build phase consisted of Functional Testing, Non-functional Testing (NFT) and Testing of Data Migration. There were significant issues with both Functional Testing (which is discussed in this chapter) and NFT (which is discussed in chapter 14). This meant that the Proteo4UK Platform was not adequately tested nor proved prior to Go Live.
- Functional Testing was used to confirm that the Proteo4UK Platform's functionality worked as intended (for example, whether customers could make payments via the Mobile App). This was originally SABIS' responsibility but TSB took over both test case design and execution in September 2016. SABIS remained in charge of fixing any Defects (including implementing any Change Requests) that were detected by Functional Testing.
- Following completion of Functional Testing (i.e. when the code was stabilised), TSB had planned for an approximately seven month period prior to Go Live when Live Proving and NFT would be carried out. However, the delays in Functional Testing meant that it ran in parallel with other forms of testing and did not finish until shortly before Go Live.
- Functional Testing took 17 months, which was much longer than anticipated and there were four major amendments to, or replans of, the Functional Testing timetable. Delays were mainly due to the volume of Defects found and the pace at which SABIS could fix them. In addition, SABIS continually missed deadlines for the delivery of functionality into Functional Testing. As a result, significant amounts of functionality started Functional Testing late.
- Despite the duration of the Functional Testing phase, it was only brought to a close by deferring and de-scoping significant elements of functionality to be completed after Go Live.
- It is not in itself unreasonable to extend testing, or to de-scope or defer non-core functionality, and to go live with suitable workarounds. However, the continued extension of the Functional Testing phase right up to the week of Go Live and the approach that the Executive adopted for the deferral of functionality, taken together, had the following implications:
  - substantially less Functional Testing was executed than planned;
  - in the time available before Go Live, NFT was inadequate and compressed;
  - Live Proving was significantly limited in scope; and
  - a specific regression testing phase was never performed.

## INTRODUCTION

11.1 The Proteo4UK Platform was complex and brought together a number of new or modified elements for the first time. Given the limitations of the Transition Events described in chapter 10, effective testing of the Proteo4UK Platform was critical to ensure its quality and completeness before TSB's c.5 million customers were transferred onto the Proteo4UK Platform.

11.2 To achieve this, it was crucial for TSB and SABIS to ensure there was sufficient time to complete Functional Testing and that there was a period of stability before Go Live, during which Non-functional Testing ("**NFT**") and Live Proving could be conducted. This was provided for in the Integrated Master Plan (for Live Proving) and in the Defender Plan (for both NFT and Live Proving) which replaced the Integrated Master Plan in October 2017.[1] However, the testing was not conducted in this way during the Programme and, as a result, there were a number of important shortcomings in the Programme's testing workstreams.

11.3 In this chapter we give a high level introduction to the Programme's approach to testing. We will then look in turn at each of Functional Testing and Testing of Data Migration and describe the issues that the Programme encountered in each. NFT and its shortcomings became a significant focus of our Review and therefore the conduct of NFT is discussed separately in chapter 14.

## TESTING OVERVIEW

### Types of Testing

11.4 Paragraphs 9.8 to 9.12 and 9.71 to 9.74 of chapter 9 explained that System Integration Testing ("**SIT**"),[2] was conducted by SABIS as part of their build of the Proteo4UK Platform. The testing conducted by the Programme after SIT can be divided into three groups:

(A) Functional Testing - testing intended to validate whether functionality delivered during the build phase satisfied the business requirements for the software that had been developed (for example, whether customers could make payments on the Mobile App).

(B) Non-functional Testing - testing conducted on a system to ensure its operational readiness outside of functional parameters. That is, testing the non-functional aspects of a platform (i.e. how the platform performs), rather than its functional aspects (i.e. what the platform does), to ensure that it is performing correctly. This was necessary to confirm that the Proteo4UK Platform as a whole could operate at the service levels expected by TSB and its customers from Go Live.

(C) Testing of Data Migration - testing intended to validate that data could be safely transferred from the legacy LBG IT Platform to the Proteo4UK Platform.

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1 See Figure 11.2.

2 See paragraphs 9.8 to 9.12 and 9.71 to 9.74 of chapter 9.

## Testing Responsibilities

11.5 Figure 11.1 lists, for each type of testing, the parties responsible for:

(A) compiling the business requirements to be proved through testing;

(B) test design;

(C) test execution; and

(D) the reporting of test results.

### Figure 11.1: Overview of Responsibilities by Type of Testing[3]

| Testing group | Test requirements | Test design | Test execution | Test reporting[4] |
|---|---|---|---|---|
| **Functional Testing** | TSB | TSB | TSB | TSB |
| **Non-functional Testing** | TSB | SABIS | SABIS | SABIS[5] and TSB |
| **Testing of Data Migration** | SABIS and TSB | SABIS and TSB | SABIS and TSB[6] | SABIS and TSB |

11.6 SABIS carried out the following activities for all of the Programme's testing:

(A) Defect fixing;

(B) provision of testing Environments; and

(C) provision of tools to support testing, including:

(i) JIRA - a tool used to log and track Defects in the Proteo4UK Platform identified during testing ("**JIRA**").

(ii) HP Quality Centre - a tool used to store test cases and track test case execution.

## Testing Environments

11.7 Different Environments were used for testing as follows:

(A) UAT Environment - the Environment used for conducting User Acceptance Testing ("**UAT**").

(B) Production Environment ("**Production Environment**") - the Environment used to deliver live services, including the services put live through the Transition Events. The Production Environment was also used for most of the NFT.

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[3] This is intended to show the parties who were primarily responsible for each of the testing groups shown. There are some exceptions, for example, some of the Branch NFT was executed by TSB.

[4] Test reporting includes the collation of test results and their presentation to the relevant governance fora including the Testing Delivery Forum, the Migration Delivery Committee ("**MDC**") and the Bank Executive Committee Design Executive ("**BEC DE**").

[5] TSB and SABIS were assisted by Accenture resources in the conduct of NFT.

[6] LBG assisted with the Testing of Data Migration performed on the LBG IT Platform and the extraction of data from it.

(C) GOS Environment ("**GOS Environment**") - an Environment that did not fully replicate the Production Environment used for some Functional Testing (Migrated Data Testing ("**MDT**")), some NFT and all Testing of Data Migration (the Migration Acceptance Cycles ("**MACs**"), Dress Rehearsals ("**DRs**") and Production-like Assurance ("**PLA**")).

11.8 In an IT transformation programme, a separate Pre-production Environment (which mirrors the Production Environment) may also be used to carry out a final test of changes, before they are loaded into the Production Environment for live service. However, no separate Pre-production Environment was used on the Programme. As described in paragraph 14.18 of chapter 14, the build of a Pre-production Environment was postponed until after Go Live. The issues with this approach are also discussed in paragraphs 14.17 to 14.22 of chapter 14.

## Testing Governance and Assurance

11.9 The Testing Delivery Forum (also known as the Migration Testing Steerco) was the Programme body that oversaw the effective delivery of testing. This was chaired by the TSB CIO and was attended by representatives of TSB and SABIS. The Testing Delivery Forum reported into the Migration Delivery Committee ("**MDC**"), which itself reported into the Bank Executive Committee Design Executive ("**BEC DE**"). Aspects of the Programme's testing activities were also reviewed by Internal Audit and Risk Oversight.[7]

## Testing Strategy and Plan

11.10 The Integrated Master Plan presented to the TSB Board in March 2016 outlined a high-level plan for each of the testing phases (other than NFT) and a number of testing activities were due to commence in 2016. A testing strategy paper covering the full scope of testing activities for the Programme was approved by the Executive on 17 January 2017 (the "**Programme Test Strategy**"). Figure 11.2 summarises the timeline for the key types of testing.

# FUNCTIONAL TESTING

11.11 The Programme planned to conduct the following types of Functional Testing on the Proteo4UK Platform:

(A) UAT - testing to confirm that TSB's functional business requirements had been met, that the users within the TSB business were satisfied with the functionality of the Proteo4UK Platform, and that TSB's end-to-end business processes had been tested.

(B) MDT - UAT of functionality that required the use of real data that had been migrated from the LBG IT Platform in order to confirm whether TSB's functional requirements had been satisfied.

(C) Regression testing - a testing phase involving the re-execution of UAT and MDT tests, following the UAT and MDT test phases, to ensure that functionality that had already been successfully tested still performed as intended, despite interacting with new code which had been deployed subsequently into the Proteo4UK Platform.

7 A diagram showing TSB's governance structure appears in Appendix 3.

### Figure 11.2: Timeline of Key Testing Execution Dates

| | Planned start date and end date<br>(All dates are from the Integrated Master Plan unless stated otherwise) | Actual start and end dates |
|---|---|---|
| **Functional Testing** | | |
| UAT | October 2016 - March 2017 | October 2016 - April 2018[8] |
| MDT | July 2017 - October 2017<br>(dates from the Programme Testing Strategy) | July 2017 - April 2018[9] |
| **Non-functional Testing** | | |
| NFT | August 2016 - November 2017<br>(dates from the Programme Testing Strategy) | April 2017 - April 2018[10] |
| **Testing of Data Migration** | | |
| MACs | April 2017 - September 2017 | June 2017 - January 2018 |
| DRs | April 2017 - September 2017 | January 2018 - April 2018 |
| PLA | N/A<br>(dates not specified in either the Integrated Master Plan or the Programme Testing Strategy) | February 2018 - April 2018 |

11.12 According to the Integrated Master Plan, Functional Testing would be conducted over a six month period. The completion of Functional Testing (i.e. when the code was stabilised) would be followed by an approximately seven month period prior to the Main Migration Event (the "**MME**") when Live Proving and NFT would be carried out.[11] This was a typical pattern for large IT transformation programmes. However, Functional Testing took almost three times longer than anticipated and did not finish until shortly before the MME Weekend.[12] As a result, Functional Testing:

(A) ran in parallel with other forms of testing;[13] and

(B) did not allow for an extended period of Platform stability during which NFT and Live Proving could be conducted.[14]

[8] See paragraphs 11.15 and 11.34.

[9] For the completion of MDT, see paragraph 11.34.

[10] For the completion of NFT, see chapter 14, paragraphs 14.45 to 14.50.

[11] Given there was no mention of NFT in the Integrated Master Plan, we have relied on a combination of the Integrated Master Plan and the later dated Programme Test Strategy for evidence of the early plan for testing following UAT.

[12] See paragraphs 11.19 and 11.34.

[13] See Figure 11.2.

[14] See paragraphs 11.37 to 11.38.

11.13 Unlike other forms of testing discussed in this report, TSB was responsible for most Functional Testing design and execution.[15] This responsibility shifted from SABIS to TSB in September 2016 due to concerns relating to the quality of the test cases being produced by SABIS' sub-contractors and TSB's desire to provide its business subject matter experts (i.e. the TSB employees who would be the end-users of the Proteo4UK Platform) with the opportunity to learn how to use the Proteo4UK Platform.

## UAT Design

11.14 The UAT test design phase involved the design of test cases setting out the conditions, scenarios, and requirements for, and the expected outcomes of, each test, which the tester would then use to determine whether the relevant piece of functionality worked as required.

11.15 The Integrated Master Plan envisaged that the UAT design phase would be completed before the start of the UAT execution phase in October 2016. However, the test case design was not completed and finally signed off until 17 May 2017. As a result, test execution commenced in October 2016 and ran in parallel with test case design. The significant delay in the completion of the UAT test case design phase appears to have been primarily caused by competing demands for the time of TSB's business subject matter experts, following the decision to reassign responsibility for test case design and test case execution to TSB.

11.16 Despite test case design running for longer than the time contemplated by the Integrated Master Plan, a number of functional requirements were missed. Given TSB did not have access to the level of functional detail required from the LBG IT Platform, this was expected. Many of these functional gaps were detected as Defects throughout the Programme (see the process described in paragraph 11.18). However, the EY Root Cause Analysis Report found that a number of issues following Go Live were caused by gaps in the requirements definition and that:

> *"an insufficient level of granularity in functional requirements led to a cascading impact on delivery quality from functional and solution design phases".*

That is, TSB's description of its functional requirements was insufficient and this in turn caused issues in the quality of the Proteo4UK Platform designed by SABIS.

## UAT Test Execution

11.17 UAT execution involved SABIS delivering functionality, TSB executing UAT test cases and SABIS fixing any Defects identified during testing. The Programme therefore required a comprehensive Defect management process to facilitate efficient UAT test case execution and Defect resolution.

11.18 If a test case failed, TSB testers were required to raise a Defect in JIRA (the tool used to log and track Defects in the Proteo4UK Platform). SABIS was responsible for reviewing and fixing the Defects. TSB testers used the term 'defect' to describe *"something in the system that doesn't work how we expect it to work. A defect may be something that is not yet working correctly, a missed requirement, a data problem or an environment problem"* (**"Defect"**). The term 'defect' therefore included both (i) deviations from requested

[15] SABIS retained responsibility for some UAT test design and strategy, including functional areas such as treasury and some aspects of fraud.

functionality i.e. where SABIS had failed to deliver functionality that TSB requested (also referred to as "**IT Defects**") as well as (ii) changes to TSB's requirements i.e. Change Requests for missing functionality or technical improvements to functionality previously requested.

11.19 UAT execution was intended to take six months and ended up lasting 17 months.[16] This was due to the volume of Defects found and the pace at which SABIS could fix them.[17] This required TSB and SABIS frequently to amend and adapt the approach to UAT and replan UAT timetables. There were four instances of major amendments to or replans of the UAT programme:

(A) October 2016 amendment to UAT strategy - SABIS' failure to meet the original planned delivery of Applications code into UAT by September 2016 led to a change in UAT strategy where SABIS would stagger the deployment of code and TSB would conduct UAT on functional tranches.

(B) The May 2017 UAT Replan - to accommodate delays in delivery of functionality, TSB and SABIS replanned the UAT test execution schedule. This time, the UAT plan interlocked with the delivery of code from the build. This replan forecast UAT completion by the end of August 2017, followed by a one month 'buffer period' before the start of the DRs in October 2017.

(C) The October 2017 Programme-wide replan (the "**Replan**") - only five months after the May 2017 UAT Replan, TSB and SABIS were still struggling to meet testing milestones. This Replan (which is discussed in greater detail in chapters 12 and 13) envisaged that the majority of UAT and MDT would be completed by the end of December 2017, followed by a specific regression test phase in January 2018.

(D) 'Migration ready testing' approach (February 2018) - only four months after the Replan, a revised approach to outstanding UAT and MDT (test cases, Change Requests and IT Defects raised) was planned whereby the testing and/or delivery of any functionality that was not considered 'must have' functionality was deferred until after Go Live (discussed in paragraph 11.30).

11.20 We will now describe in more detail the progress of UAT in the period prior to the Replan (paragraph 11.21), and then the execution of UAT following the Replan (paragraphs 11.22 to 11.38).

## UAT Execution Prior to the Replan (October 2016-October 2017)

11.21 UAT execution was delayed to the point where, as at the Replan, there were 40,492 test cases, of which only 26,569 test cases (or 66%) had successfully passed. Our Review identified five primary reasons why the UAT workstream suffered delay before the Replan:

(A) Delays in the build of the Proteo4UK Platform - SABIS continually missed deadlines for the delivery of functionality into UAT. As a result, a significant amount of functionality entered UAT late under the schedule outlined in the Integrated Master Plan, late following the adoption of the staggered approach in October 2016 and late under the replanned schedule outlined in the May 2017 UAT Replan.

[16] See Figure 11.2.

[17] See paragraphs 11.21(D) and 11.21(E).

(B) Insufficient interlock between the build of the Proteo4UK Platform and the UAT plan - the impact of the late delivery of functionality was exacerbated by TSB's delay in adjusting the UAT test execution plan following the decision to stagger the deployment of code into UAT.[18] The UAT test cases were based on end-to-end business processes spanning a number of Applications. This meant that the full functionality required to test a business process end-to-end was often delivered over a number of code releases. While the decision to test staggered code releases was made in October 2016, the consequences of that decision for UAT were only reflected in the May 2017 UAT Replan.[19]

(C) The ongoing change to the Platform design - TSB made a significant number of Change Requests. Each time missing or additional functionality was identified by TSB, this required additional testing (both testing of the new functionality itself and the end-to-end processes that incorporated it). These Change Requests would therefore have expanded the scope of and time required to conduct UAT. TSB told us that a large number of Change Requests were anticipated as TSB did not own nor have access to the source platform (the LBG IT Platform), and therefore needed to design its functional requirements based on what it knew about the functionality it received from the LBG IT Platform at the time. Given that this was anticipated, more time should have been built into the each of the UAT plans.

(D) The volume of Defects discovered during UAT - the backlog of open functional Defects during the UAT phase grew consistently during the period from the start of UAT execution in October 2016 to April 2017 and then remained steady until January 2018. The backlog of open Defects is a function of the number of Defects being opened less the number being closed. The pace of closure is a function of the Defect turnaround time (see paragraph 11.21(E)). The number of Defects opened may have been in part caused by the issues that had occurred in SIT (see chapter 9).

(E) Defect resolution turnaround time - as part of the May 2017 UAT Replan, a target IT Defect turnaround time[20] of five days was adopted for the top three most severe Defect categories. TSB reporting at the MDC following the May 2017 UAT Replan shows that this target was not achieved in any of the months leading up to the Replan in October 2017. In the last week of September 2017, the average IT Defect turnaround time was reported to the MDC as 23 days. This long turnaround time combined with a high volume of Defects would have caused further delays to UAT.

## UAT Execution after the Replan (October 2017-April 2018)

11.22 The Defender Plan forecast completion of UAT at the end of January 2018 to allow for a period of stability of at least six weeks before Go Live. However, by the end of January 2018 only 92% of the UAT test cases had passed.

11.23 Our analysis of the assumptions underpinning the UAT schedule in the Defender Plan found that none of those assumptions were actually met (see Figure 11.3).

[18] See paragraph 11.19(A).

[19] See paragraph 11.19(B).

[20] This is the time taken for an IT Defect to be closed after being raised.

### Figure 11.3: Analysis of UAT Assumptions in the Defender Plan

| Defender Plan assumption | | Met? | Commentary |
|---|---|---|---|
| 1. | *"There is sufficient IT capacity to fix all high and urgent Defects/[Change Requests] and regulatory change[s] in time to be tested by Christmas [2017]"* | No | • This was the most important assumption underpinning the planning of UAT.<br>• It would be reasonable to expect that, as TSB approached completion of UAT, the backlog of open Defects would reduce from the 2,350 Defects in October 2017 as the quality and completeness of the code improved (i.e. fewer Defects would be raised than were being closed). However, this reduction did not materialise and the backlog had only decreased marginally (to 2,305 Defects) by the end of January 2018. |
| 2. | *"No new [Change Requests] are identified by testing"* | No | • The total number of Change Requests approved for implementation prior to Go Live increased from 310 as of 2 November 2017 to 640 as of 9 April 2018. |
| 3. | *"We can deliver new regulatory change[s] now in scope [(such as changes related to the General Data Protection Regulation)] and this can be delivered to be tested by Christmas [2017]"* | No | • Regulatory changes were implemented through Change Requests. Twelve of the regulatory Change Requests were scheduled to be delivered in either the release due on 26 January 2018 or the release due in June 2018 (after Go Live). |
| 4. | *"Remaining outlying Dossiers can increase the pace of delivery and close out UAT within the allotted time"* | No | • By 2 February 2018, TSB and SABIS had only completed the Functional Testing for 31 of the 64 Dossiers. |
| 5. | *"There is a separate regression testing phase in January 2018"* | No | • There was no separate UAT regression phase. |
| 6. | *"[The] letters Dossier is completed [within] 2/3/4 weeks following the close of other dossiers depending on complexity"* | No | • Dossier 450 (*Document composition & Library*) was not completed by the end of January 2018 and accounted for 420 outstanding test cases as at 2 February 2018. |

## MDT PLAN IN THE DEFENDER PLAN

11.24 Some Functional Testing required the use of migrated data rather than synthetic data. This testing was known as MDT which was split into partial volume MDT (for functionality that required a low volume of migrated customer and product data) and full volume MDT (for TSB's downstream finance and risk reporting systems that supported its statutory, regulatory and management reporting and risk models and required a complete set of migrated data).

11.25 The Defender Plan forecast that all MDT would be completed by the end of January 2018.

## MDT Progress Against the Defender Plan

11.26 The Programme fell well short of the Defender Plan's projected MDT completion date of 31 January 2018. As at 6 February 2018, the following had been achieved in relation to MDT:

(A) partial volume MDT was 44% complete; and

(B) only 211 (8%) of the 2,745 full volume MDT test cases had passed.

11.27 The key assumptions underpinning the completion of MDT within the timeframe outlined in the Defender Plan were that:

(A) full volume MDT would be completed by MAC 7 (the seventh Migration Acceptance Cycle in the Testing of Data Migration (Testing of Data Migration is discussed in paragraphs 11.39 to 11.44)); and

(B) functionality for partial volume MDT that had not been tested during UAT would be delivered before Christmas 2017.

11.28 In relation to the first assumption, only 1% of full volume MDT test cases had been passed when MAC 7 completed on 22 December 2017.

11.29 In relation to the second assumption, we have not found any evidence that the delivery of the new functionality experienced significant delays. However, as with UAT, a large number of Defects were generated during the partial volume MDT of this new functionality which delayed progress. In February 2018 there were still 531 outstanding Defects linked to partial volume MDT test cases, including 189 categorised as IT Defects and a further 52 categorised as *"Software functionality not delivered"*.

## Functional Testing After January 2018

11.30 After the Programme had failed to meet the UAT completion date in the Defender Plan, TSB adopted a new approach to UAT (referred to as the 'migration ready testing' approach) in which only 'must have' functionality would be delivered and tested prior to Go Live. All other functionality would be deferred. The deferral process was supported by a governance forum known as the Migration Deferred Defects Forum ("**MDDF**").

11.31 The MDDF was established in June 2017 to manage the risk of further delays to completion of UAT caused by Change Requests for new or improved functionality. The MDDF attendees included at least one representative from each Executive area and 'lens owners' who would assess the cumulative impact of the proposed deferred Defect or functionality, and its workaround on different elements of TSB's business, such as customer or financial impacts. Once the BEC DE had decided that a particular Defect or piece of functionality could be deferred, it was referred to the MDDF for a more detailed consideration. The MDDF would then either approve its deferral proposal, require more work to address the Defect raised, or decline the deferral proposal, at which point it would be escalated back to the BEC DE. For the 'migration ready testing' approach, the MDDF's role was expanded to include identification and operationalisation of workarounds for functionality selected for deferral.

11.32 As part of the assessment to identify and understand what was to be deferred through the MDDF, the outstanding Defects were grouped and categorised as "**Items of Functionality**"

and these Items of Functionality were reviewed by each business area to determine what was required to be 'migration ready'.[21]

11.33 The Items of Functionality ultimately deferred by TSB (i.e. functionality not deployed into the Proteo4UK Platform prior to the MME and therefore not available to customers from Go Live) included important elements of TSB's ability to take on new business. For example, the deferral meant that, following Go Live, it would not be possible to:

(A) apply for loans and credit cards using the Digital Channels;

(B) apply for loans without a TSB current account;

(C) apply for loans via the Telephone Channel;

(D) upgrade added value accounts (unless an existing customer applied online);

(E) grant further advances on customers' mortgages and effect mortgage product transfers;

(F) apply for business banking accounts; and

(G) open e-savings accounts on the Mobile App.

11.34 Of the 3,420 outstanding 'must have' test cases as at 15 February 2018 there were none outstanding by 18 April 2018. TSB told us that this was achieved in the following way:

(A) 50% passed testing;

(B) 27% were de-scoped; and

(C) 23% were downgraded to a lower category and were either passed, deferred or de-scoped.

11.35 It is clear therefore that TSB was only able to reach the point of having no 'must have' test cases at Go Live by de-scoping and downgrading around 50% of the outstanding 'must have' Items of Functionality.

11.36 TSB told us that the deferral of functionality in this way was mitigating the risk of a single event migration and prioritising the quality of the Proteo4UK Platform by giving the Programme more time to roll out and test functionality after Go Live. However, the particular process of deferral in this Programme had its own risks as the approach did not involve branching the code and instead, code remained live but dormant.[22] In fact, in some instances code that was classified as 'deferred' was not switched off and caused issues after Go Live.

## The Period of Stability Prior to the MME

11.37 In early March 2018, the MDC set the target completion date for 'migration ready testing' as 2 April 2018. It was acknowledged in the BEC DE that "*The Programme required a fixed code [base] by 6 April in order to have a stable environment for the last 2 weeks prior to MME.*" We note that originally the Defender Plan had provided that the code would be fixed

[21] TSB used a number of terms interchangeably to refer to this, including 'Defects', 'Business Defects', 'functionality', 'functional capabilities', 'functional blocks' and 'items of functionality'. For the sake of consistency, we will refer to 'Items of Functionality' throughout the remainder of this chapter.

[22] Branching is a type of version control in programming where a parallel copy of code is created: a 'branch'. Changes and fixes are applied to the replica code without impacting the stability of the core code. Once the issue is fixed, the branch code is integrated back into the original line of code and released in production.

for a period of at least six weeks prior to the MME. Despite this plan to have a stable Platform for two weeks prior to the MME, 'migration ready testing' was not complete by the 2 April 2018 target completion date.

11.38 Further, one of the assumptions in the October 2017 Programme Replan was that there would be a specific regression testing phase in January 2018 following the completion of UAT. However, after the substantial delays in UAT, a dedicated regression testing phase was never performed. The implications of this are discussed in chapter 13.

## TESTING OF DATA MIGRATION

11.39 TSB planned to conduct Testing of Data Migration to examine the effectiveness of the software tools and processes that would be used to transfer data from the LBG IT Platform to the Proteo4UK Platform. This testing followed the design and build by SABIS of the Programme's data migration tools and processes. The Testing of Data Migration was an important process designed to ensure that the migration of TSB data from the LBG IT Platform to the Proteo4UK Platform ran smoothly on the MME Weekend. While our Review has not found that this process contributed in a significant way to any of the issues that occurred following Go Live, the Testing of Data Migration was compromised by delays in the Programme and in particular, delays in the Platform build.

11.40 Testing of Data Migration included two different types of testing:

(A) Migration Acceptance Cycles (MACs) - these events tested the migrated data at each stage of the Extract, Transform and Load ("**ETL**") process, to confirm, for example, the quality of the migrated data and the ability to meet the required timescales.

(B) Dress Rehearsals (DRs) - a version of MACs carried out in 'real time' (i.e. within the timeframe anticipated for the MME) to confirm that the combination of software, people and processes could achieve the migration on the MME Weekend.

11.41 Originally, TSB and SABIS planned to conduct eight cycles of MACs and DRs between April 2017 and September 2017. However, due to delays and issues with the data migration build, the original Testing of Data Migration programme was delayed and the inability to complete planned Testing of Data Migration became a key factor in support of the decision to delay the MME.

11.42 The Programme Replan in October 2017 expanded the MAC testing strategy to include four additional MACs (resulting in eight in total throughout the Programme), with MAC 8 being intended for final regression testing of the Proteo4UK Platform. In addition to the MACs and DRs, a Production-like Assurance (PLA) phase was to be implemented to provide technical assurance for the Batch Processing elements of the Proteo4UK Platform in conjunction with migrated data.[23] This phase consisted of three PLA events, which were scheduled to take place between January and March 2018.

11.43 The Defender Plan forecast improvements in the MACs so that the Programme could achieve a clean MAC 8 prior to starting the DRs in late January 2018. In the event, TSB and SABIS were unable to achieve a clean MAC 8 cycle as planned before moving on to the DRs. As a consequence, the TSB CIO and TSB COO presented an amended DR strategy, which scheduled

[23] Batch Processing includes Platform functionality such as interest calculations on accounts, some payments, and extracts for finance and risk reporting.

four DRs to take place in February and March 2018. The first two DRs would act as MAC regression cycles, and only the final two DRs would be conducted in 'real time'.

11.44 Ultimately, despite the plan to conduct the further DRs in 'real time' before the MME, by the time of the MME, TSB and SABIS only conducted one full 'real time' ETL event. While it was risky to proceed with the MME having conducted only one DR in 'real time', TSB has told us that there were no issues with the data migration during the MME.[24]

## FURTHER OBERVATIONS

11.45 The Defender Plan had said that Functional Testing would be complete by the end of January 2018 and would subsequently include a dedicated phase of regression testing, followed by a period of at least six weeks of stability during which NFT could be conducted. However instead, Functional Testing finished only shortly before Go Live and only by deferring significant functionality and by removing the dedicated regression testing phase altogether from the Programme.[25]

11.46 The delays in Functional Testing also meant that NFT was inadequate and compressed and Live Proving was significantly limited in scope. We have already addressed the limitations of Live Proving in chapter 10 and we will examine how NFT was compromised during the Programme in chapter 14.

[24] The EY Root Cause Analysis Report shows that some incidents relating to data migration issues occurred following the MME Weekend, but we acknowledge that these issues only accounted for a small number of incidents in the sample reviewed.

[25] See paragraphs 11.34 to 11.35 and 11.37 to 11.38

# CHAPTER 12: THE DECISION TO DELAY THE MME

## KEY POINTS

- In September 2017, as a result of material delays being faced in the Programme's testing workstreams, TSB made the decision to delay the MME Weekend (originally targeted for 3-5 November 2017) and to replan the Programme.
- However, TSB made certain decisions in respect of how it announced the decision to delay the MME to the public on 29 September 2017, which added unnecessary constraints to its ability to complete the Programme as safely and prudently as possible:
  - TSB imposed an unnecessary constraint on the time available to complete the Programme by choosing to announce that the MME would be replanned *"into Q1 2018"*. TSB did this without having completed the replanning process and therefore without having made any proper assessment of the volume of work remaining or when the Platform was likely to be ready.
  - TSB's announcement conveyed that the reason for delaying the MME was the anticipated Bank of England base rate rise on 2 November 2017. TSB was therefore not transparent about the real reasons behind the decision to delay the MME, namely that the Programme was months behind schedule.
  - Instead, it was suggested to the public that the Platform would be complete by November 2017. This curtailed TSB's ability to replan for a second time without facing the reputational consequences of having to admit that the Platform had not been as close to being completed as TSB had previously announced.
- There was tension among TSB Board members about the external messaging of both the reasons for the delay and the revised timescales for Go Live. In particular, the Sabadell NEDs were pushing to announce an earlier date for the MME, whilst certain TSB INEDs were reluctant to announce any date at all. The TSB CEO had to tread a careful line in his attempt to *"devise a message that satisfied all sides"*. However, in the end, the TSB Board approved the announcement that was made, which was not transparent in its messaging.

## THE DECISION TO DELAY THE MME IN SEPTEMBER 2017

12.1 It was apparent by the summer of 2017 that a number of the Programme's testing workstreams were several months behind schedule. In particular, the milestones for Functional Testing had slipped significantly, which had led to a need to re-baseline the User Acceptance Testing ("**UAT**") timetable in March 2017 and again in May 2017 (see paragraphs 11.17 to 11.21 of chapter 11).[1] In addition, the data migration workstream was not

[1] As discussed in chapter 11, the issues faced in Functional Testing were primarily due to delays in the delivery of functionality by SABIS, the volume of Defects being discovered, and the pace at which those Defects were being resolved.

progressing as hoped, and it was becoming clear that additional Migration Acceptance Cycles ("**MACs**") were likely to be needed after MAC 4. Having decided that TSB would formally reflect on the Programme's progress at the end of the summer, in September 2017 TSB concluded that it was no longer feasible for the Main Migration Event (the "**MME**") to occur in November 2017 and that the Programme in its entirety needed to be replanned.

12.2 On 1 September 2017, the TSB CEO informed the TSB Board that there was a possibility that he would recommend an alternative date for the MME to the scheduled slot of 3-5 November 2017. He wrote:

> *"Whilst I'm not in a position to recommend any T3 date to the Board at this stage, it is clear that the probability of my recommending [the original MME date] in late September is not 100%."*

The TSB CEO stated that it was *"quite possible"* that he would instead recommend migrating in early to mid-February 2018 or on another date chosen by the TSB COO and TSB CIO that was *"consistent with safe and effective delivery"* of the MME.

12.3 On 18 September 2017, the TSB COO and TSB CIO told the Audit Committee that:

> *"The November date was set two and a half years ago and was deliberately very ambitious; equally, it was based on very little information…When we forecast a new T3 migration date we will do so from a much more informed position. We want to re-plan the date for T3 once and with confidence."*

12.4 On 20 September 2017, the TSB CEO recommended that *"the Board ask the Executive to start taking now the steps necessary to re-plan"* the MME for February 2018 or for another date *"consistent with safe and effective delivery"* of the MME. The TSB Board resolved to accept this recommendation.

12.5 It is not uncommon for large and complex projects to face delays, and for a thorough replan to be undertaken. TSB's decision to delay the MME and replan the Programme was necessary, considering how much there was still left to achieve at this point.

## COMMUNICATION OF THE DECISION TO DELAY THE MME

12.6 The news of the delay was communicated to TSB's employees on 29 September 2017. The internal communications gave two broad reasons for the delay:

(A) the *"challenges"* faced in the UAT and data migration workstreams; and

(B) the anticipated Bank of England base rate rise on 2 November 2017.

12.7 The communications also stated that it was anticipated that the MME would move *"into Q1 next year"*, although TSB was still in the process of deciding upon the specific date.

12.8 On the same day, TSB also announced its decision to delay the MME to the wider public. The external announcement, which heralded the *"unveiling of the new banking platform in November"*, attributed the delay solely to the fact that TSB expected the Bank of England to increase the base rate on 2 November 2017:

*"TSB is re-planning the final phase of the roll-out of the platform, originally scheduled for 4/5 November, into Q1 2018 since this is just two days after the widely anticipated first base rate rise in the UK for over a decade. The re-planned roll-out will enable TSB to focus on communicating the effects of the widely anticipated base rate increase to its five million customers over the weekend of 4/5 November."*

12.9 Following TSB's announcement, on 29 September 2017 the *Financial Times* published an article (*"TSB blames IT delay on likely UK interest rate rise"*) about the delay to the MME. The article quoted the TSB CEO as stating that *"the main reason"* for the delay was the likely base rate rise.[2] The *Financial Times* also reported that the TSB CEO had said that there had been *"defects"* in the new Platform, but that he was still *"confident"* it would be completed by November 2017, even if customers were not moved across until 2018.[3]

12.10 In the days leading up to the public announcement, there were vigorous discussions between members of the TSB Board about the proposed content of the external communications, primarily focused on the issues of: (i) what (if anything) should be said about the new expected target date for the MME; and (ii) the justifications that would be provided for the delay. The broad spectrum of views among the TSB Board is captured by the minutes of the TSB Board meeting on 28 September 2017:

(A) The Former TSB Chairman focused on the importance of the messaging being straightforward and recognising the issues the Programme was facing. He also stressed that if they were going to announce a new target date of Q1 2018, then the Executive needed to be *"absolutely sure they could deliver in Q1"*.

(B) The Current TSB Chairman suggested softening the wording around unveiling a new Platform, as *"it would lead to customer questions around what they were getting"*. He also expressed concern that the base rate justification was being overplayed.

(C) The TSB Risk Committee Chair was concerned about referring to Q1 2018 and thought it would be better to refer to H1 2018, *"as she was not convinced the programme could achieve a Q1 delivery"*.

(D) The Sabadell Group COO noted the importance of being realistic in employee communications and of staying true to TSB's values, but also highlighted the need *"to protect [the] Group from a market perspective"* and *"avoid any speculation relating to some kind of failure of the programme"*.

12.11 The TSB CEO therefore had to *"tread an extremely thin line"* in his attempt to *"devise a message that satisfied all sides"*. Nonetheless, the TSB Board ultimately approved the announcement that was made.

12.12 In our view, there were two material issues with the announcement, described in the sections below, both of which were identified by certain TSB Board members at the time.

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[2] The *Financial Times* reported that the TSB CEO had explained that if there was a base rate rise, more customers would be in contact to ask about the impact of this on their mortgage payments. If TSB had migrated, *"our systems would've effectively been offline, so we wouldn't be able to give mortgage quotes, or do faster payments"*.

[3] The TSB CEO told us that he has no recollection of saying this, and a brief handwritten note of the interview taken by the TSB Head of External Communications does not contain the quotation. However, the TSB CEO confirmed to us that TSB did not request a correction following the publication of the article.

## Announcement of a Revised MME Target Date

12.13 TSB announced that the MME would be replanned *"into Q1 2018"* only nine days after deciding to replan the Programme, and therefore before it had made any proper assessment of the volume of work remaining or when the Proteo4UK Platform was likely to be ready. This was despite the fact that eleven days earlier, on 18 September 2017, the TSB COO and TSB CIO had written in their report to the Audit Committee that: "*When we forecast a new T3 migration date we will do so from a much more informed position. We want to re-plan the date for T3 once and with confidence.*"

12.14 The drive to include a target date in the announcement appears to have come from Sabadell. Despite the concerns of the TSB Risk Committee Chair (see paragraph 12.10(C)), the Sabadell NEDs had originally been pushing for an earlier date of 3-4 February 2018, and so announcing a target date of *"Q1 2018"* appears to have been a compromise.

12.15 TSB has argued that it was immaterial that it announced that it was replanning *"into Q1 2018"*, because TSB would have been willing to postpone the MME again if it was not ready and, in the event, the Platform did not Go Live until Q2 2018. The TSB CEO also informed us that there was a *"nuanced"* distinction between saying that TSB was replanning *"into Q1"*, as opposed to saying that Go Live would happen *"in Q1"*.[4] However, by announcing a revised target date before TSB had completed (or even substantively started) the replanning exercise, TSB gave itself little room to manoeuvre at a point when it had little basis for knowing what was realistic.

## Lack of Transparency Regarding the Reasons for the Delay

12.16 TSB was not transparent about the real reasons behind the decision to delay the MME, namely that the Programme was many months behind schedule (primarily due to issues in the Functional Testing and data migration workstreams). To the contrary, the communications implied that the Platform was largely complete, making it difficult to admit publicly to the need for a second delay several months down the line.

12.17 None of the public communications conveyed the material volume of work still left to achieve in the Programme. For example, a TSB media relations migration 'Q&A', which set out suggested responses to anticipated media questions, avoided any mention of delays in the Programme and instead emphasised the progress made to date and the base rate rise. Extracts of this document are shown in Figure 12.1. We note in particular the suggested response to the question "*Do you need to do more testing*?". As discussed in chapter 13, TSB still had an extensive volume of testing left to complete at this point in the Programme.

12.18 Several TSB Board members expressed discomfort with the use of the anticipated base rate rise as a justification for the decision to delay the MME. In an email to the Former TSB Chairman on 12 November 2017, the TSB Audit Committee Chair wrote that she:

> *"was uncomfortable with the very close association of the migration deferral with the base rate rise which I think was more politically expedient than factually correct".*

[4] We note, however, that a TSB media relations migration 'Q&A' (discussed further in paragraph 12.17 and shown in Figure 12.1) stated: *"We anticipate the migration event will occur in Q1 2018"* (emphasis added).

**Figure 12.1: Extracts From the TSB Media Relations Migration 'Q&A', Dated 29 September 2017**

| | |
|---|---|
| So the possibility of the base rate changing is why you are delaying the migration? So everything else was on track, it's just the base rate change? | • As you'd expect, we've experienced some challenges along the way and it was always our intention to make a call at the end of September as to whether we would fully migrate in November. With the market putting the probability of a base rate rise in November around 74 per cent - just two days before our planned migration date - the decision was made simple for us - we had to change the date.<br>• It's our priority to support our customers in the event of a rate change - we can't be unavailable when our customers need us most.<br>• Therefore we've taken the decision to fully migrate to our new platform once the outcome of the base rate announcement is known and 2017 reporting has completed. |
| When will you migrate to the new platform? | • We anticipate the migration event will occur in Q1 2018 - but we're yet to confirm this. Remember, there are three parties working on this - TSB, Sabis and Lloyds Banking Group. |
| How big is this piece of the puzzle (i.e. MME), is it the biggest piece, how significant is this? | • Look at it this way - we've built our house and we've put in the plumbing, the electrics and we'll soon be able to move the furniture in. |
| A number of IT executives have said that the timeline was too ambitious - would you now agree? | • No!<br>• We will be showcasing the new platform in November where you will have the opportunity to meet frontline TSB partners who have been involved in the design and build of the new platform - and to experience the capability of the platform for yourself. Technical experts involved in the design and build will also be on-hand to explain the thinking behind the state-of-the-art design and construction. |
| Do you need to do more testing? | • No. But, of course, we'll make good use of the extension in the timetable and will do further testing as required. |

12.19 Delaying an IT transformation programme more than once is unappealing in any circumstances. As the Former TSB Chairman accepted in his interview, *"the second deferral is a lot more difficult than the first"*. However, in TSB's case, the external communications made it especially difficult to delay the MME for a second time, even if (as, in our view, proved to be the case) it were necessary. A second delay would have revealed that the Platform had not, in fact, been completed by November 2017 and was still not complete by the end of Q1 2018.

# CHAPTER 13: THE REPLAN

## KEY POINTS

- Following the decision to delay the MME on 20 September 2017 (see chapter 12), TSB replanned the entire Programme during late September and October 2017 and agreed a new Programme plan, the Defender Plan, on 24 October 2017.
- The Replan presented an opportunity for TSB to take a realistic view of the status of the Programme, and to consider: (i) how far behind schedule the Programme was; (ii) what outstanding tasks remained to be achieved before TSB was 'migration ready'; and (iii) how long this would realistically take. It was also an opportunity to learn from the first 18 months of the Programme.
- This opportunity was missed. The Replan was not a comprehensive, 'bottom-up' process and there was little attempt to investigate and address the reasons for the delays the Programme had faced to date, such as SABIS' inability to deliver the correct functionality on time.
- The Programme quickly fell behind schedule once again, and by January 2018 it was clear that the Programme had deviated materially from the Defender Plan in a number of ways. The intention had been to deliver and test the Platform's functionality by the end of 2017 to allow three months for additional assurance testing and Live Proving. In fact, the reality was very different: Functional Testing continued on into April 2018, no dedicated regression testing phase took place, and the majority of Non-functional Testing was conducted in an inadequate and compressed period shortly before Go Live.
- Although the Programme's progress was tracked and monitored after the Replan, this had material limitations. As the Programme strayed further from the principles, assumptions, dependencies and milestones set out in the Defender Plan, TSB did not interrogate these deviations from the plan, or what they meant for the overall risk profile of the Programme, or how they impacted TSB's understanding of the readiness of the Platform and of SABIS to operate it.

## INTRODUCTION

13.1 Following the TSB Board's decision to delay the Main Migration Event (the "**MME**") on 20 September 2017, the Executive worked to replan the Programme throughout late September and October 2017 (the "**Replan**"). The Replan culminated in an updated Programme plan (which TSB called the "**Defender Plan**").[1]

[1] In this chapter, we use the term "Replan" to refer to the process by which the Programme was replanned and the term "Defender Plan" to refer to the new Programme plan that was the output of that process (though TSB at times used these two terms interchangeably).

13.2 Figure 13.1 illustrates how many months behind schedule the Programme was in various key workstreams as at September 2017 (as compared to the Integrated Master Plan of March 2016).

### Figure 13.1: Programme Milestone Progress as at September 2017

| Milestone | Planned completion date (per Integrated Master Plan, March 2016) | Actual or forecast completion date (as at September 2017) | Months behind schedule (as at September 2017) |
|---|---|---|---|
| Completion of User Acceptance Testing | March 2017 | October 2017 | 7 |
| Completion of Migration Acceptance Cycles and Dress Rehearsals | September 2017 | November 2017 | 2 |
| Completion of second data centre | March 2017 | September 2017 | 6 |

13.3 Despite the fact that the Programme was a number of months behind schedule, the Replan (which, unlike previous workstream-specific replans, spanned the entire Programme) was done extremely quickly (in four to five weeks), and without attempting sufficiently to analyse why the Programme was running so far behind.

## A NEW PROGRAMME PLAN

13.4 The Defender Plan was presented to the TSB Board on 24 October 2017. This plan aimed to enable TSB to become *"migration ready"* by 15 March 2018 *"at the earliest"*, and was accompanied by a memorandum from the TSB CEO to the TSB Board summarising the approach taken by the Executive to the Replan (the "**Replan Memo**").

13.5 In order to achieve this objective to become *"migration ready"*, it was intended that the replanned Programme would:

(A) identify and schedule a new 'landing slot'[2] for the MME Weekend;

(B) complete four additional Migration Acceptance Cycles ("**MACs**") between October 2017 and January 2018, with the final one (MAC 8) to serve as a 'regression' MAC;

(C) complete three Dress Rehearsals ("**DRs**") in February and March 2018;

(D) complete Migrated Data Testing ("**MDT**") and User Acceptance Testing ("**UAT**") by the end of 2017, with the exception of 10 Dossiers forecast to complete UAT by the end of January 2018;[3]

(E) complete MDT and UAT prior to MAC 8 and prior to a dedicated regression testing phase;

[2] The 'landing slot' was the weekend selected by TSB for the MME to take place (having liaised with various industry participants).

[3] The 10 Dossiers were Personal Current Accounts, cards, mortgages, management reporting, assets and liability management, securitisation, access and security, application fraud, non-plastic fraud, and documents.

(F) deliver all Infrastructure and complete Non-functional Testing ("**NFT**") by the end of November 2017 (although *"additional assurance"* NFT would continue until February 2018); and

(G) recruit up to 2,000 TSB employees to take part in TSB Beta by early January 2018.

13.6 In addition to these objectives, the Defender Plan also set out:

(A) 15 'guiding principles' (the "**Guiding Principles**"), designed to guide and test the Replan, based on the original principles of the Programme and supplemented by new principles *"based on key learnings to date"*. For example, Guiding Principle 3 was that the Defender Plan would *"have reduced levels of parallel work streams to decrease regression risk and resourcing schedule contention"*;

(B) the eight risks of the Replan, which were described as *"a number of key areas requir[ing] further detailed work including the delivery of a number of Proof Points to fully assure the plan"*; and

(C) a number of assumptions and dependencies to which the Defender Plan was subject.

13.7 Separately, the TSB CEO also identified what he considered to be *"the three most significant risks"* to the Defender Plan in the Replan Memo, as follows:

(A) Technology delivery - i.e. SABIS' ability to deliver required Defect fixes and Change Requests ("**CRs**") in a timeframe consistent with the plan and to achieve Environment stability.

(B) Testing timeframes - i.e. the Executive's ability to complete UAT by the end of 2017, except for the 10 Dossiers forecasted to complete UAT in January 2018.

(C) Management strain - i.e. the ability of the Executive and the wider Programme Team to maintain its intense workload into 2018.

13.8 The Defender Plan did not clearly articulate, however:

(A) a summary of the delays that the Programme had faced to date;

(B) the reasons for, or any explanation of, those delays; or

(C) the particular lessons learned that had informed the new Guiding Principles.

13.9 TSB had made an effort to construct a new plan that had clear objectives and a detailed framework, including Guiding Principles, risks, assumptions, and dependencies. However, TSB did not allow itself sufficient time to interrogate fully the issues that had led to the Programme becoming delayed, and what changes would be required to conduct a robust replan. In any event, it became apparent very quickly that the Programme was not progressing in accordance with the Defender Plan.

13.10 Moreover, TSB failed critically to assess this deviation from the Defender Plan - why it had happened and what that meant for readiness to Go Live in April 2018 – by reference to the framework that it had put into place.

## HOW DID THE PROGRAMME PROGRESS?

13.11 Having outlined the key features of the Defender Plan that was put into place following the Replan, this section will examine how the Programme actually progressed against that plan in the months that followed.

13.12 At the 20 November 2017 Audit Committee meeting, less than one month after the Defender Plan was presented to the TSB Board, the Current TSB Chairman (who was a TSB INED at the time[4]) *"expressed concern…over the degree of parallelisation, the volume of matters flagging red and amber and there being no contingency apart from the proposed landing slots"*. The minutes record that he was *"sceptical, given various conversations he had had with BEC members that a landing slot in March was…possible"*.

13.13 These comments were prescient. By the end of 2017, it was clear that a number of workstreams were not progressing in accordance with the Defender Plan. A key aim of the Defender Plan had been to reduce the degree to which the Programme's workstreams needed to work in parallel, by completing the vast majority of 'core' Functional Testing by the end of 2017, leaving the first three months of 2018 clear to focus on the Testing of Data Migration, the dedicated regression testing phase, NFT and Live Proving.

13.14 However, this did not happen:

(A) Although the Programme completed four additional MACs between October 2017 and January 2018, there was never a clean 'regression' MAC (in January, or otherwise).

(B) The DRs were planned to complete in February 2018, but ultimately were only completed in the second week of April (less than two weeks before Go Live).

(C) MDT and UAT did not complete by the end of January 2018, but continued into April 2018.

(D) No MDT or UAT regression testing phase was carried out.

(E) Live Proving was conducted in parallel with UAT, and as a consequence experienced significant difficulties due to differences in code versions and configuration across the two Environments.

(F) Rather than completing at the end of February 2018, NFT continued into April 2018 and the majority of NFT was conducted in an inadequate manner and in a compressed period shortly before Go Live.

13.15 A number of the assumptions and dependencies underlying the Defender Plan were therefore not satisfied, and this was apparent as early as January 2018. We have provided more detailed information about the extent to which TSB failed to meet specific assumptions and dependencies relating to Functional Testing in chapter 11, paragraphs 11.22 to 11.29 and in Figure 11.3.

[4] The Current TSB Chairman was formally appointed as a TSB INED on 20 September 2017, but he attended TSB Board meetings as an observer from July 2017.

13.16 The Defender Plan included a diagram of the revised Programme plan, showing the intended timetable and milestones for each of the workstreams (Figure 13.2). In order to demonstrate how the Programme actually proceeded in the months following the Replan, we have reproduced a version of this diagram showing the actual progress of each of these workstreams (Figure 13.3).

Figure 13.2: The Revised Programme Plan (From the Defender Plan, Dated 24 October 2017)

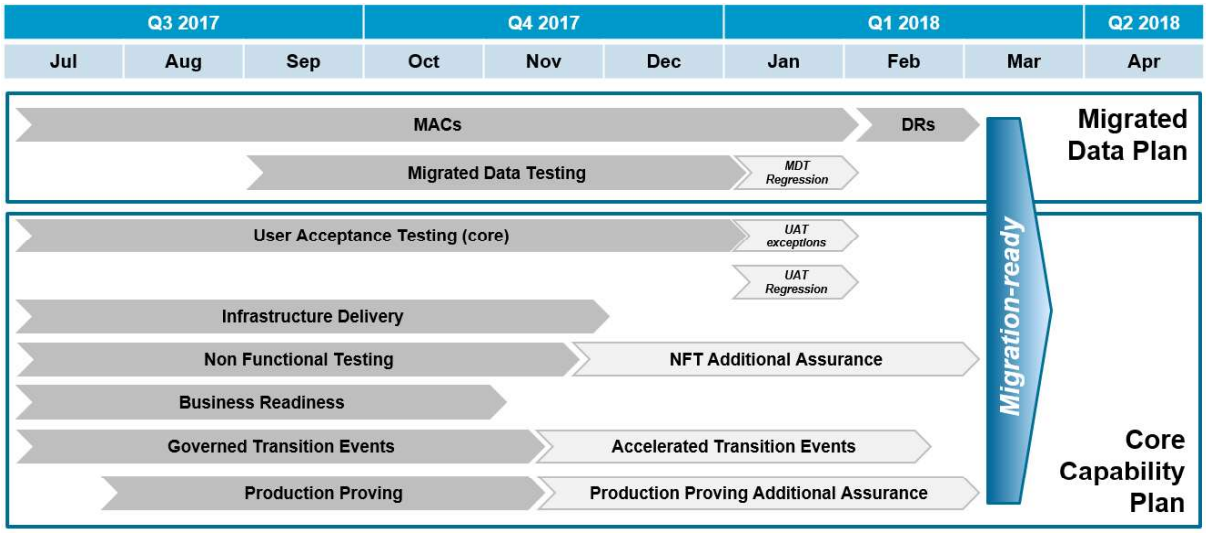
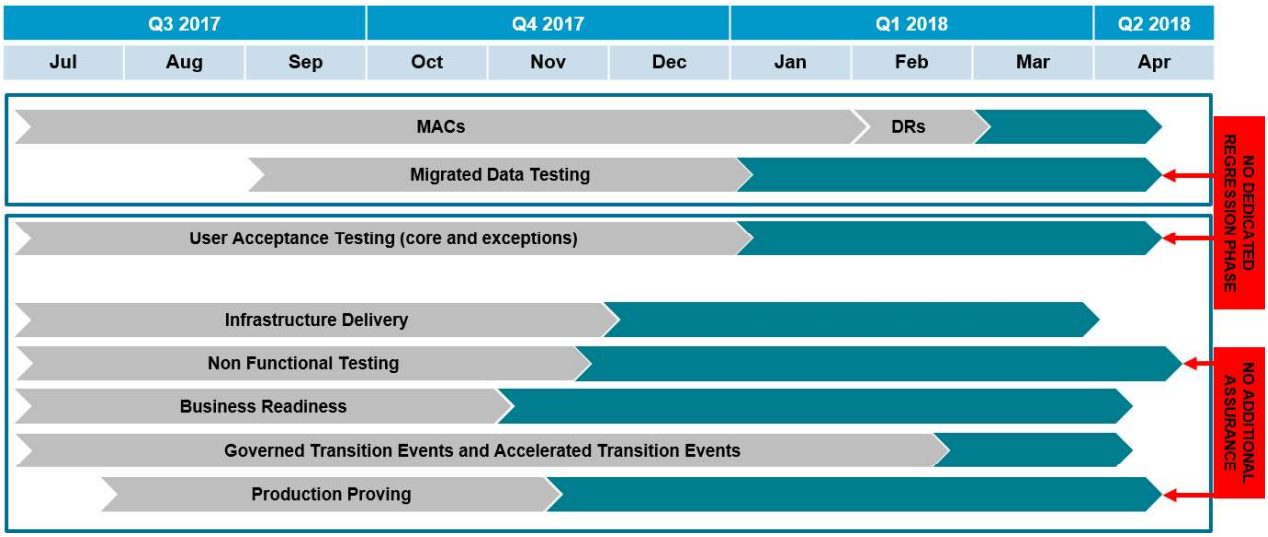



Figure 13.3: The Actual Progress of the Programme (Shown in Dark Teal)



13.17 In addition, as discussed further in chapter 17, a noticeable reduction in the backlog of Defects to be fixed in the Proteo4UK Platform would typically be expected as Functional Testing was nearing completion. However, the backlog of Defects in the Platform did not decline materially between October 2017 and January 2018, and only began to fall once TSB started deferring significant numbers of Items of Functionality, and the related Defects (i.e. the Defects were only 'closed' because the actions required to fix those Defects were postponed until after Go Live).

13.18 This problem was identified by Risk Oversight at the time. For example, an assessment of the Guiding Principles produced by the TSB Head of Operational Risk Oversight in January 2018 noted that the issue of creating IT capacity to deal with code fixes and quality assurance had become *"the perennial issue"* of the Programme, and that *"Defect resolution and IT capacity has not improved in line with expectations set in October"*. In an email on 6 March 2018, the TSB CRO also expressed concern about the deferral of Defects:

> *"From the deferral debates I've participated in, it's simply not true that all defects have been 'appropriately mitigated'. We've chosen to accept a number of reasonably unpalatable impacts because they are less unpalatable than deferring migration."*

13.19 TSB has argued that *"[p]rogression against the Replan is not relevant - what is relevant is whether any corners were cut to get to MME"*. As Figure 13.3 demonstrates, the key testing workstreams proceeded right up until Go Live. As a result, corners were indeed cut, and in particular:

(A) the NFT carried out was inadequate and compressed (see chapter 14);

(B) no dedicated regression testing phase took place; and

(C) there was insufficient time for the *"additional assurance"* testing or Live Proving, which the plan had originally contemplated, and which would have helped to demonstrate whether or not the Proteo4UK Platform was sufficiently stable and complete to Go Live (which was of particular importance given the predominantly single event approach that TSB had chosen).

## WHY WAS THE REPLAN FLAWED?

13.20 In order to determine why the Programme strayed so far from the Defender Plan, we have looked at the Replan itself and assessed what might have been done differently.

13.21 In an email to the TSB CEO on 20 September 2017, a TSB INED with extensive experience of IT programmes noted that the Replan was an opportunity to *"take a hard look at"* the Programme's approach to date:

> *"Thinking back over a career (sadly) dotted with big replans…an observation is that most of the successful ones involved a defining moment when board, executives and suppliers took a fresh look at approach; acted boldly; exposed and dealt ruthlessly with any 'sacred cows'; and moved forward more solidly as a result."*[5]

[5] This TSB INED later clarified that this email was intended as a *"common-sense suggestion"* to the TSB CEO to stand back and think afresh, and was not intended as a criticism of the Programme or the Replan.

13.22 In the event, this opportunity was missed. TSB did not:

(A) realistically assess the volume of work remaining to build, test, and prove the Platform to ensure it was complete and stable;

(B) take the opportunity to reflect substantively on the pace of the Programme's progress to date, in order to identify and address the reasons for the delays that the Programme had experienced to date; or

(C) build sufficient contingency into the Defender Plan.

13.23 The Replan, as described to the TSB Board, may have appeared to the TSB Board as comprehensive and rigorous, with input from the Executive, the Programme Team, Risk Oversight, Internal Audit, and representatives of SABIS and Sabadell. However, both the Replan and the Defender Plan that it produced had clear flaws which should have been challenged at the time by Risk Oversight, Internal Audit, the Second TSB Board Adviser, and the TSB Board. We have identified the following five key flaws (which are set out in the sections below):

(A) TSB failed to investigate and address the reasons for the delays to date;

(B) the Replan was not a 'bottom-up' exercise, and consequently the Defender Plan was not a 'left-to-right' plan;

(C) the Defender Plan was based on unrealistic assumptions;

(D) the Defender Plan lacked any contingency; and

(E) the Defender Plan was not subjected to sufficient challenge.

## TSB Failed to Investigate and Address the Reasons for the Delays to Date

13.24 During the Replan, TSB did not adequately address the reasons for the delays, and in particular the delays to Functional Testing, that the Programme had faced to date. This is particularly surprising given the extensive and repeated delays TSB had faced in relation to the UAT workstream, which had already been re-baselined twice prior to the Replan (see further chapter 11).

13.25 The assumption that SABIS' ability to deliver would improve, without attempting to identify and address why it had been delayed in the first place, was unrealistic. Although there were efforts to increase resources within SABIS,[6] additional resource alone cannot necessarily be expected to resolve an issue without proper investigation (and remediation) of the causes of that issue. It takes time for new team members to be brought up to speed and to become useful, and there are issues that additional resource will not necessarily address. Indeed, the continued slow pace of UAT following the Replan (see further paragraph 13.33) evidenced the fact that the actions taken at the time of the Replan did not address the reasons for the delays that had been faced in the Programme to date.

[6] For example, 30 additional employees were added to the IT teams in Spain following the summer break and a decision was made by Sabadell to delay other Group projects, if necessary, to allow resource to focus on the Programme.

## The Replan Was Not a 'Bottom-Up' Exercise, and Consequently the Defender Plan Was Not a 'Left to Right' Plan

13.26 TSB took only four to five weeks to replan the Programme, which is a short amount of time to carry out a 'bottom-up' replan of a large and complex programme engaging over 1,000 people. Aligning multiple, interdependent testing plans and delivery timetables would have been a complicated and difficult exercise.

13.27 TSB informed us that it had in fact started replanning the Programme before the Replan was announced on 20 September 2017, though it declined to specify exactly when this work commenced or to provide any contemporaneous evidence.[7] However, discussions about a potential replan were contained to a small group of senior individuals within the Programme. It is not clear therefore how any substantive bottom-up replanning of such a complex Programme (as opposed to high-level discussions about the possibility of a replan, which took place before September 2017) could have been conducted. As a member of the TSB CRO's team wrote in an email to the TSB CRO on 13 October 2017:

> *"[T]he culture of presenting a positive face meant that corrective actions were not taken early enough in August/September. I think we wasted a lot of time in September, knowing that 5th November wasn't going to happen but with many people pretending it was, thus leaving us unable to re-plan."*

13.28 Further, there is evidence which contradicts the notion of a comprehensive, bottom-up replan and instead suggests that the parameters of the Defender Plan were restricted from the outset by the motivation to be ready to migrate before the end of *"Q1 2018"*:

(A) A member of the TSB CRO's team wrote in an email to the TSB CRO on 13 October 2017:

> *"We appear to be repeating the previous approach of setting an end date and then fitting to it… I also feel that the planning process so far has been pretty opaque - obviously there is a need for some confidentiality, but it feels rather as though the whole thing is being cooked up and then done to us, rather than us participating in it fully."*

In his interview, the TSB CRO told us that this employee was not the only person who had raised this type of concern to him; he had had several conversations with colleagues and contractors on the Programme who had made similar observations.

(B) On 10 October 2017, the TSB CIO sent an email to the SABIS team requesting that they revise the dates that they had provided for the delivery of functionality, as the dates previously provided did not fit within the planned timeframe for the Replan. He instructed the SABIS UK Managing Director to email the IT teams with *"a 'reminder' of which framework we are planning, and that anyone who has a problem in delivering on time must move it up the chain immediately and call an urgent meeting to review this information"*.

13.29 We have concluded therefore that the Defender Plan was not planned on a 'left to right' basis, particularly given that TSB had already announced the revised target date of *"Q1 2018"* on 29 September 2017, just one week after the Replan had commenced. It is

[7] See further chapter 23, paragraph 23.12(A) and Figure 23.1.

implausible to suggest that the publicly announced target date did not influence the development of the Defender Plan.

## The Defender Plan Was Based on Unrealistic Assumptions

13.30 The Defender Plan's timeframe was not a realistic reflection of the Programme's progress to date. A consequence of this was that a number of the assumptions and dependencies underlying the Defender Plan were too ambitious. As discussed at paragraph 13.15 and in chapter 11, it should have been apparent to TSB within a matter of weeks that certain of these assumptions and dependencies would not hold true. It is telling that two of the assumptions had already been challenged by the Former TSB Chairman at the TSB Board meeting on 24 October 2017 (see further paragraph 13.43(D)).

13.31 Two key examples of the over-ambitious nature of the Defender Plan are the plans for Functional Testing and Non-functional Testing (NFT), discussed in turn below.

### Functional Testing

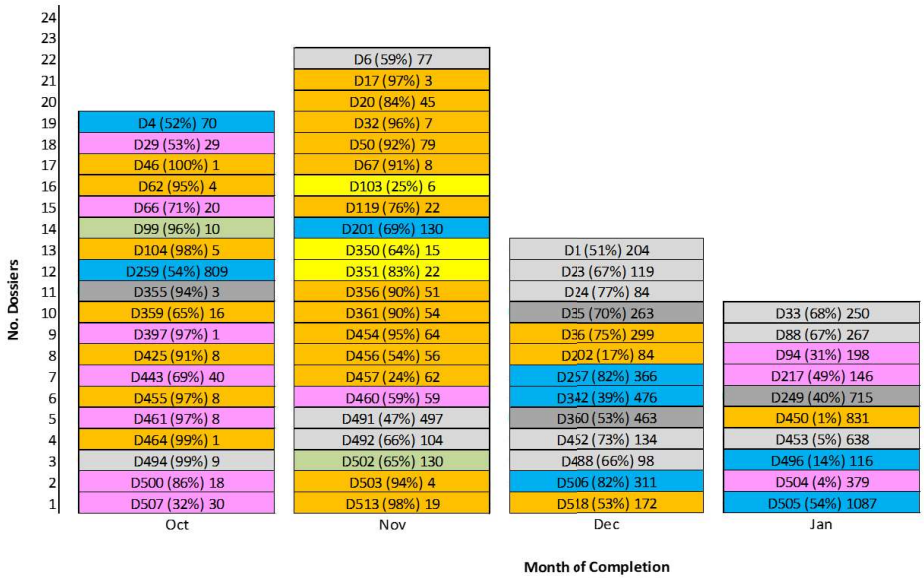
13.32 Despite the fact that UAT was seven months behind schedule in September 2017 (see Figure 13.1), the Defender Plan aimed to complete core Functional Testing by the end of 2017 (just over two months after the Replan). TSB has argued that it had valid reasons for expecting UAT progress to improve materially, namely that the execution of test cases reaches a *"tipping point"* near the end of a programme when most or all functionality is complete, meaning test cases can run end-to-end without failing. However, the final test cases are often the most complicated (as they are subject to a complex set of conditions that must be satisfied for the test case to pass), and consequently the rate of progress can often slow down in the final stages.

13.33 In any event, the rate of progress did not increase materially and UAT fell behind schedule again within only a few weeks, as shown by Figures 13.4 and 13.5. These Figures show that, at the time of the Replan, it was anticipated that 64 Dossiers would be completed by the end of January 2018 (19 in October, 22 in November, 13 in December and 10 in January). However, as of 2 February 2018, only 31 of the 68 Dossiers had completed UAT (those shown in dark grey in Figure 13.5). Moreover, of the 23 Dossiers scheduled to complete UAT in December and January, only one did so on schedule.

### Non-functional Testing

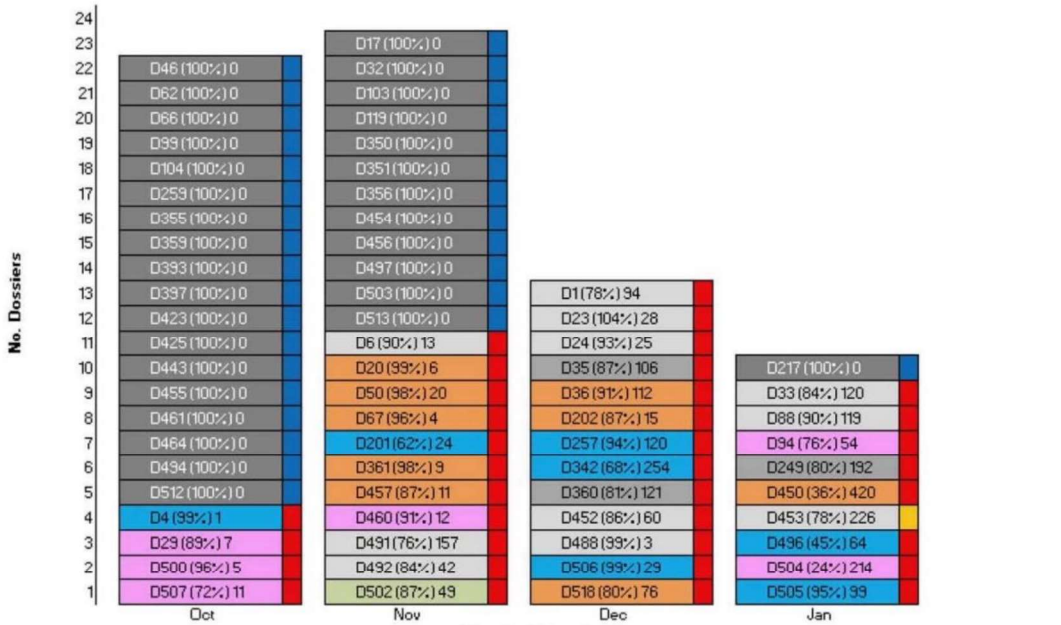
13.34 According to the Defender Plan, NFT was scheduled to complete by the end of November 2017, with only *"additional assurance"* NFT being conducted thereafter. However, as at October 2017, only a limited amount of NFT had actually taken place (see further chapter 14). The TSB CTO - who had been responsible for collecting the Non-functional Requirements ("**NFRs**") for the Platform - told us that he had warned the TSB CIO that it was *"not likely to be the case"* that they would be able to complete all Infrastructure-related tasks before November 2017. He said that, in reality, they had only done *"bits and pieces"* of NFT before that point but *"[n]ot very much"*.

## Figure 13.4: UAT Forecast Completion Dates by Dossier (From the Defender Plan, Dated 24 October 2017)




| | | | | |
|---|---|---|---|---|
| **Completed in month** | 19 | 22 | 13 | 10 |
| **Total completed** | 60 | 82 | 95 | 105 |

## Figure 13.5: UAT Forecast Completion Dates by Dossier as of 2 February 2018 (From BEC DE Papers, Dated 9 February 2018)[8]




| | | | | | |
|---|---|---|---|---|---|
| **Completed** | 18/22 | 12/23 | 0/13 | 1/10 | 68/105 |
| **TCs Outstanding** | 24 | 347 | 1043 | 1508 | 2922 |

8 Only Dossiers shaded dark grey had completed UAT.

13.35 One potential explanation for this failure to be realistic about how much NFT had taken place, and how much was still to be done, was that certain key individuals were not included in the replanning process and so did not have the opportunity to provide input on what was realistic. For example, the TSB CTO told us that, despite his role, he had *"virtually nothing"* to do with producing the Defender Plan. Neither he nor anybody in his team was involved in the Replan, and he told us that he believed with hindsight that he and his team should have had more input in relation to Infrastructure.

## The Defender Plan Lacked Any Contingency

13.36 Though IT transformation programmes will often work towards an ambitious target date in order to drive the programme forward, it is important that the plan contains some contingency in the event that key workstreams fall behind schedule.

13.37 The Replan Memo explained that *"the re-plan is not a plan focused on a single weekend, but rather a plan to be ready to migrate 'as soon as possible' and then to 'land' the migration weekend in one of the agreed slots"*. TSB confirmed its primary landing slot (20-22 April 2018) and its back-up landing slot (11-13 May 2018) in late February 2018.

13.38 TSB has argued that the contingency built into the Defender Plan was the time period between the *"migration ready"* date of 15 March 2018 and the 'landing slot' chosen for the MME Weekend. TSB has also suggested that additional contingency was provided by the existence of back-up landing slots.

13.39 We do not accept the argument that the landing slots constituted properly planned contingency. The landing slots had to be negotiated with a number of relevant industry participants and were therefore largely outside of TSB's control. This meant that TSB was not able to guarantee that it would have any material contingency in its plan, particularly as there were few landing slots to choose from and TSB was *"entering a particularly busy schedule for the industry, as structural reform and other items of regulatory change are implemented"*.

13.40 TSB did not factor any contingency into the most fundamental part of its plan - the path to becoming *"migration ready"* - which was within its control.[9] In the event, TSB was nowhere near *"migration ready"* by mid-March or indeed April 2018 (see Figure 13.3).

## The Defender Plan Was Not Subjected to Sufficient Challenge

### Risk Oversight and Internal Audit

13.41 Risk Oversight and Internal Audit both provided opinions on the Defender Plan. Risk Oversight identified that the Defender Plan would require *"improved performance in several areas"* (in particular UAT and MDT), but concluded *"there is a rationale for every improvement expected"* and that the key risks had been declared by the Programme

[9] The lack of contingency was recognised at the time, and has since been recognised in interviews. At the 20 November 2017 Audit Committee meeting, the Current TSB Chairman expressed concern about *"there being no contingency apart from the proposed landing slots"*. Further, the TSB Migration Director informed us that *"there wasn't really a concept of contingency within the programme. You didn't sort of say, well, I think it's going to take this long and I will give myself an extra couple of months, you know, you basically top down say, right, I'm going to try and hit that date"*, though he emphasised that they did have a fall-back date.

Team.[10] Similarly, one of the *"difficulties"* called out by Internal Audit was that some of the actions *"will need to prove their effectiveness"*.

13.42 Nevertheless, both Risk Oversight and Internal Audit broadly concluded that the assumptions underlying the Defender Plan were *"reasonable"* and *"satisfactory overall"*. In view of the flaws that we have identified, we find this surprising. The role of Risk Oversight and Internal Audit in the Replan is discussed further in chapter 21.

## The TSB Board

13.43 At the TSB Board meeting on 24 October 2017, the TSB Board asked the Executives present a number of pertinent questions about the Defender Plan, for example:

(A) The Former TSB Chairman asked if SABIS was comfortable with the Replan.

(B) One TSB INED asked whether contingency was needed in the Defender Plan to accommodate the additional functionality needed to reflect regulatory change.

(C) The Current TSB Chairman asked for greater visibility on the key milestones for the progression through the MACs.

(D) The Former TSB Chairman challenged two of the assumptions underlying the Defender Plan (that all CRs would be delivered before the start of MAC 8 and that there would be no new business Defects identified by testing).

13.44 However, there were certain additional, common sense challenges that we might have expected the TSB Board to raise with the Executive, for example:

(A) How could TSB be *"migration ready"* in four months when certain workstreams were as many as seven months behind schedule?

(B) Had the reasons for the delays faced to date been identified and addressed?

(C) What evidence was there to justify the crucial underlying assumption that the pace of testing progress would increase?

(D) In light of the lack of contingency, how would the Programme Team ensure that the Platform had undergone the level of testing and Live Proving required for a predominantly single event migration?

13.45 In the event, these questions were not asked. We note that it was the role of the Second TSB Board Adviser to help the TSB Board *"ask the right questions of the Executive"*. The role of TSB's external advisers, including the Second TSB Board Adviser, is addressed in chapter 22.

13.46 TSB has argued that these flaws did not matter, because TSB would not have migrated before it was ready to do so. We accept that the TSB Board and Executive would not have decided to Go Live had they known what would happen. Nevertheless, without a realistic plan in place there was a greater risk that compromises would be made, particularly in circumstances where it would have been awkward to announce publicly that a further replan was needed (see further chapter 12).

[10] In the minutes of the 24 October 2017 TSB Board meeting, the TSB CRO added that *"A lot of work remained to be completed successfully before Christmas, but the [Programme Team] had articulated how this would be achieved and the principles that would be followed in this regard"*.

13.47 In the event, as discussed in paragraph 13.19, corners were cut. The compromises made were not only a result of the fact that TSB missed the opportunity to replan its Programme prudently; after the Defender Plan had been put in place, TSB also failed to follow the principles and objectives set out in the new plan and to monitor its progress critically.

## TRACKING AND MONITORING THE PROGRAMME AFTER THE REPLAN

13.48 At the conclusion of the TSB Board meeting on 24 October 2017, the TSB Board requested regular updates on the Programme's progress. However, while tracking and monitoring did take place, these had material limitations. As the Programme strayed further from the Guiding Principles, assumptions, dependencies and milestones that had been set out in the Defender Plan, TSB failed to interrogate these deviations or what they meant for the overall risk profile of the Programme.

13.49 The Programme's progress against the Defender Plan was tracked and monitored by the Executive and the TSB Board in the period following the Replan. We have identified four key examples of this:

(A) An overview of the Programme's progress was presented at almost every TSB Board and Audit Committee meeting between 24 October 2017 and 22 April 2018, with particularly detailed updates provided in relation to: (i) the MACs and data migration; and (ii) Functional Testing. Material problems or delays were typically reported, although they were often considered in isolation and therefore presented as surmountable.

(B) The pack for each month's TSB Board and Audit Committee meetings between November 2017 and February 2018 set out the risks of the Replan alongside an update on the 'status' of each risk.[11] These status updates provided some factual information about each risk, and often cross-referred to other TSB Board papers.

(C) There were two occasions on which the TSB Board conducted a 'stock take' of the Programme's progress as against the Defender Plan. Both of these 'stock takes' focused on the Guiding Principles set out in the Defender Plan:

(i) The first 'stock take' was at the 22 January 2018 Audit Committee Migration Deep Dive, attended by the entire TSB Board. At this session, the TSB CIO and TSB COO presented a paper summarising what had been completed to date and the outstanding tasks still to be achieved before TSB became *"migration ready"*. This paper assessed how the Programme had performed against the Guiding Principles outlined in the Defender Plan.

(ii) The second 'stock take' took place at the TSB Board meeting on 10 April 2018, 12 days before Go Live. In response to a request from a TSB INED,[12] the TSB CIO and TSB COO presented a short paper looking at how the Programme had measured up against its Guiding Principles, with a particular focus on the failure to perform a specific regression testing phase.

[11] This was in addition to the reporting of the regular Programme risks (established at the outset of the Programme), though the status of these risks was not updated as there was considered no change to the risk status.

[12] The TSB INED requested a paper confirming that the Programme had followed its Guiding Principles, and where the Programme had diverged from those principles, confirming that the divergence was risk accepted, had been documented, and had gone through the appropriate governance.

(D) Risk Oversight also highlighted certain areas in which the Programme had departed from the Replan Guiding Principles in its reporting:

(i) The Risk Oversight opinion from December 2017 warned that *"[a]s a result of challenges in UAT and MDT, the replan guiding principles 4 and 10 are at risk"* and the Risk Oversight opinion from January 2018 stated:

> *"Reviewing the program as a whole I see some challenges in adhering to the guiding principles declared last year. If a main migration event in April is to be achieved, it will be difficult to avoid increased levels of parallel activity, to achieve a clean MAC cycle before commencement of dress rehearsals, or to allow an explicit regression phase after completion of UAT and MDT."*

(ii) The TSB Head of Operational Risk Oversight produced a RAG assessment of the Replan Guiding Principles to support the January 2018 TSB CRO opinion, reproduced at Figure 13.6. This assessment, dated 16 January 2018, marked only four of the 15 Guiding Principles as 'green'. We have not been able to determine who within TSB saw this document, but it is nonetheless indicative of the status of the Programme in Risk Oversight's eyes at that time.

13.50 However, these efforts to monitor and track the Programme's progress at TSB Board and Audit Committee level had limitations:

(A) Although an overview of the Programme's progress was presented at almost every Audit Committee meeting and TSB Board meeting up until Go Live, these meetings did not critically reflect on the Programme's overall progress or the fact that the Programme had strayed from a number of the Guiding Principles, assumptions, dependencies and milestones set out in the Defender Plan. This meant that it was easier to lose sight of how far the Programme as a whole had slipped.

(B) Certain areas – in particular NFT – received disproportionately less reporting than others.

(C) In relation to the status updates on the Replan risks, these updates lacked commentary explaining the significance of the facts being reported. As such, it was not clear from the descriptions provided whether a particular change in status reflected a material increase in risk, or how that change might affect the wider Programme.

(D) On the two occasions when the TSB Board conducted dedicated 'stock takes' of how the Programme was tracking against the Defender Plan, the focus was on the less precise Guiding Principles rather than on the concrete, objective assumptions, dependencies or milestones set out in the Defender Plan. Any breaches of the Guiding Principles that were acknowledged were justified by the Programme Team:

(i) Whilst the paper that the TSB CIO and TSB COO presented at the 22 January 2018 Audit Committee Migration Deep Dive noted that three Guiding Principles required qualification as a result of the failure to hold a 'clean' MAC 8 before the DRs, it stated that the Programme believed that it could *"flex the glidepath against these principles, without compromising the underlying intent"*. According to the minutes of the meeting, the TSB Audit Committee Chair noted that *"the Committee recognised that it was sensible*

*to have guiding principles but the Programme was now seeking to comply with them in a different way"*.

(ii) The 10 April 2018 paper that the TSB CIO and TSB COO presented to the TSB Board acknowledged that no explicit regression testing phase would be held, but justified this on the basis that *"regression activities have been enabled across a number of elements of the plan"*, including through the Transition Events, TSB Beta, the MACs, the DRs, Production-like Assurance and specific testing activities. The issue of regression testing is considered in detail in the insight box below. As explained, we do not accept TSB's justification for failing to carry out its planned regression testing phase.

(iii) There was very little analysis (either in the meeting pack, or in the minutes of the 10 April 2018 meeting) as to how the Programme's progress measured up to the Defender Plan on issues other than regression testing.

(E) Although we have not been able to determine conclusively whether any TSB Board members saw the TSB Head of Operational Risk Oversight's RAG assessment of the Replan Guiding Principles dated 16 January 2018 (see Figure 13.6), there was a notable discrepancy between this RAG assessment and the 22 January 2018 Audit Committee Migration Deep Dive paper that went before the TSB Board. In the latter paper, all of the Guiding Principles bar three were marked with a green 'tick'.

## Regression Testing Following the Replan

- TSB's tendency to justify deviations from the Guiding Principles was especially apparent in relation to the issue of regression testing.
- Regression testing is where certain tests are re-executed to ensure that functionality that has already been successfully tested is still performing as intended, despite interacting with new code that has been deployed subsequently into a platform. A dedicated regression phase is a typical part of most IT transformation programmes. It is commonly followed by a code lock-down and a period of NFT and Live Proving.
- Regression testing was a necessary and prudent element of the Defender Plan. TSB's inclusion in the Defender Plan of a specific regression phase following the completion of testing demonstrates TSB's acknowledgement of its importance.
- The Defender Plan contained two Guiding Principles relating to regression testing:
  - Guiding Principle 3 – *"The re-plan will have reduced levels of parallel work streams to decrease regression risk and resourcing schedule contention."*
  - Guiding Principle 10 – *"We will have an explicit Regression test phase once UAT and MDT are complete and stable."*
- However, despite these Guiding Principles, TSB did not effect a specific regression phase, and the code lock-down that was implemented came as late as 8 April 2018 (10 days before the decision to Go Live).
- At the 10 April 2018 TSB Board meeting, the TSB CEO acknowledged that: *"The approach to regression testing had been different to that intended at the time the programme assurance had originally been designed and the paper explained how the different components of the system had been tested."*

- The paper referred to by the TSB CEO (addressed in paragraphs 13.49(C)(ii) and 13.50(D)(ii)), prepared by the TSB CIO and TSB COO, explained that although Guiding Principle 10 had not been met: *"regression activities have been enabled across a number of elements of the plan, including through the Governed Transition Events, ('GTEs'), TSB Beta proving pilot, the proving during the MACs, Dress Rehearsals and Production-like assurance phases, as well as through the specific testing activities (such as UAT and Migrated Data Testing). These activities have been carried across the different components of the platform as required."*
- However, TSB's reliance on 'regression activities' across other *"elements of the plan"* as a means of justifying the decision not to do an explicit regression testing phase was misplaced for the following reasons:
  - Each of the other assurance elements relied on (the Transition Events, TSB Beta, the MACs, DRs, Production-like Assurance phases, UAT and MDT) were already part of the Defender Plan, and were intended in that plan to be completed in addition to, not in lieu of, a dedicated regression testing phase. We have not been able to identify any reason why the regression testing phase would no longer be required in addition to those existing elements of the Defender Plan.
  - There were significant limitations to each of these elements, as set out in further detail in chapters 10 and 11.
- In relation to TSB Beta in particular:
  - The Environment for TSB Beta (the Production Environment) was not the same as the Environments used for Functional Testing (the UAT Environment and the GOS Environment) because each Environment used a different version of code. Appendix 3 of the T3 Memo explained that there were elements of the Programme which were passed in UAT but which did not work in TSB Beta and that *"incidents are caused primarily by differences between the Test and Live environments"*. It also noted that the fix for this issue, the Environment levelling programme, was not complete. The misalignment of Environments at this late stage of the Programme did not allow for adequate comfort to be gained that the Platform would operate as required, even in respect of the parts which had passed UAT.
  - Whilst code was deployed into UAT every day, it was only deployed into the Production Environment (used for TSB Beta) every two weeks. We have not been able to validate whether the tests carried out in TSB Beta were completed using up-to-date code at the time of Go Live.
  - Unlike a dedicated regression testing phase, which is a structured process with a defined set of test cases that can be monitored, testing through TSB Beta involved users carrying out transactions as they saw fit, which it is not possible to monitor and replicate. It is impossible therefore to be sure what test cases will be executed.
  - Based on the minutes of TSB Board meetings, we have seen no discussion of these differences in Environment nor of the associated risks of relying on TSB Beta instead of a regression testing phase.
- In reality, the Programme ran out of time. Testing fell materially behind schedule and the Programme became parallelised, despite the intention to avoid this (as set out in Guiding Principle 3). This was not adequately explained to the TSB Board at the 10 April 2018 meeting, and therefore the TSB Board was not able to evaluate the risks associated with this approach.

## Figure 13.6: Extract From Risk Oversight Assessment of Replan Guiding Principles, Dated 16 January 2018

| | Guiding Principles - Reinforcements | Oversight Assessment | Oversight RAG |
|---|---|---|---|
| 1 | The delivery of the Migration Programme remains PCO1 and so will have intense focus and commitment from the Executive team to deliver this effectively and as quickly as practicably possible | Evidence suggests that this is still being achieved. TSBs number one 2018 objective and BEC DE continues | |
| 2 | The design and testing approach for the Migration programme is designed to minimise delivery risk in line with Assurance Matrix criteria but cannot eliminate all risks | This is true to date after the October replan, however is an April date is to be achieved then this principle may have to be compromised | |
| 3 | The re-plan will have reduced levels of parallel work streams to decrease regression risk and resourcing schedule contention | This was true before Christmas, but if an April date is to be achieved then this principle will have to be compromised | |
| 4 | The Migration Acceptance Cycle ("MAC") plan will satisfy business requirements for full volume Migrated Data Testing ("MDT") and have a clean cycle before the start of Dress Rehearsals | Unless a replan introduces another MAC cycle then this principle is compromised | |
| 5 | The scope for MDT will be sufficiently clear to understand the extra risks we are mitigating and additional assurance we are providing | We have raised a few actions in the course of our review on the subject of traceability of test to design, and the exit criteria needs to be formally defined, and planning workshops held, to maintain the focus on achieving sufficient quality in the optimum time | |
| 6 | We will take the opportunity to prove new functions and teams with the new platform to provide assurance ahead of the Main Migration Event | TSB Beta and T2A are examples where the principle is being achieved. The ongoing GTEs are additional evidence, albeit a number continue to move to the right in the plan | |

| | Guiding Principles based on key learnings to date | Oversight Assessment | Oversight RAG |
|---|---|---|---|
| 7 | We will find ways of creating IT capacity to deal with code fixes and quality assurance by removing inefficiencies in our delivery processes | This has become the perennial issue of the program. Defect resolution and IT capacity has not improved in line with expectations set in October | |
| 8 | We will ensure there is sufficient IT capacity to deliver Change Requests* in line with our plan, separate to the defect resolution activity | A number of change requests are unable to be completed in the MME and instead are fast followers post MME. This has resulted in additional risk toleration. | |
| 9 | The closure of User Acceptance Testing ("UAT") will be based on Dossier level experience to date and understanding of specific proof points rather than generic planning principles | The UAT1 plan has not held true. A number of dossiers are stuck behind defects which are long overdue | |
| 10 | We will have an explicit Regression test phase once UAT and MDT are complete and stable | Unless a replan introduces another MAC cycle then this principle is compromised | |
| 11 | The plan for MDT will enable us to deploy our expertise across TSB and Group to the best advantage on the most appropriate tasks | Difficult to measure? | |
| 12 | We will learn from our T2a experience to more fully prove our new capability in the Production environment at volume | TSB Beta is attempting to prove at volume, however is constrained by partner sign up | |
| 13 | We will take the opportunity to increase our Non Functional Testing ("NFT") to reduce risk of issues relating to environment stability and system performance | NFT has increased its scope since October, however there our review is ongoing | |
| 14 | We will not be bringing forward any additional scope into the Programme, except where we need to accommodate new Legal, Regulatory or Mandatory changes due to the changed timeframe | This has been adhered to. | |
| 15 | The plan will take the opportunity to accelerate the delivery of functionality and therefore de-risk the Main Migration Event ("MME") | A number of the ongoing GTEs continue to move to the right in the plan | |

## FURTHER OBSERVATIONS

13.51 In accordance with the Defender Plan, TSB was to finish the build and core testing of the Platform by the end of 2017, and to allow January, February and March 2018 for a dedicated regression testing phase, additional assurance testing, and Live Proving. As reflected by Guiding Principle 3, the stated intention was for the Defender Plan to have *"reduced levels of parallel work streams to decrease regression risk and resourcing schedule contention"*. This plan would have enabled TSB to have a high degree of confidence that the Platform was stable and reliable before taking it live to c.5 million customers.

13.52 Instead, and as shown by Figure 13.3, the reality was that the Programme became parallelised, testing was still being executed in the days leading up to the MME Weekend, and a large number of Defects had to be deferred because there was insufficient time to fix them. This compression of activities in the final months and weeks of the Programme meant that TSB was unable to focus as planned on Live Proving and NFT, two activities which were crucial to ensuring that the Platform was ready to Go Live to TSB's whole customer base.

13.53 There were some attempts to monitor the progress of the Programme against the Defender Plan, and individual issues were generally escalated.[13] However, the collective risk of the compromises that were being made in the final months and weeks of the Programme was not adequately highlighted to the TSB Board.

13.54 Although it was the Executive's and the Programme Team's responsibility to draw this to the TSB Board's attention, we would also have expected the TSB Board to have understood the importance of looking beyond the Guiding Principles and thinking more critically about:

(A) the information being presented to them;

(B) why key milestones were being missed; and

(C) what compromises were being made and the impact of those compromises on:

(i) the risk profile of the Programme; and

(ii) the readiness of both the Platform and of SABIS to Go Live in April 2018.

[13] A notable exception was the decision not to test the Active/Active configuration of the data centres in NFT - see paragraphs 14.11 to 14.19 of chapter 14.

# CHAPTER 14: NON-FUNCTIONAL TESTING

## KEY POINTS

- Non-functional Testing (NFT) was used to confirm that the Proteo4UK Platform as a whole could operate at the service levels expected by TSB and its customers from Go Live. The design, execution and reporting of Performance Testing (a type of NFT) was not sufficient to mitigate the risk of putting live, for c.5 million customers, a platform consisting of largely new Channel Applications and Middleware and entirely new Infrastructure.
- Since there was no dedicated Environment for Performance Testing, TSB and SABIS decided to conduct this type of NFT in the Production Environment, even though that Environment was also being used to support services which had gone live through the Transition Events. As these live services had to be protected, this decision constrained the kinds of testing that could be done in two important respects. First, transactions which updated the database, such as payment transactions, were not tested. Second, as one of the two data centres was reserved for live services, the complete Infrastructure was never tested at load, including for example, both data centres working in Active/Active mode.
- There were material shortcomings in the Performance Testing of the Digital Channel (the Mobile App and Internet Banking). The Performance Testing targets for the Digital Channel were lowered after tests were not passing at the original target load, and volumes following Go Live exceeded these lowered targets.
- The issues in design and execution of NFT were compounded by inaccurate reporting. Summary indicators of test status and progress (RAG statuses) were misused to present a more positive picture of NFT than was warranted by the results.
- The TSB Board (and indeed, many of the Executive) were not aware of these flaws in design, execution and reporting of NFT because:
  - the Executive were insufficiently engaged with the details of NFT, choosing instead to rely on the TSB CIO;
  - the issues with NFT were not identified by Internal Audit and Risk Oversight in the lead up to the decision to Go Live;
  - in contrast to Functional Testing, there was very little focus on NFT in the T3 Memo; and
  - the TSB Board did not challenge the lack of information provided to it about NFT (i.e. about the testing which would confirm that the Platform was ready to serve its whole customer base), and the Second TSB Board Adviser did not encourage TSB Board members to do so.
- As a result of these shortcomings, NFT did not identify important issues in the Proteo4UK Platform which caused some significant problems experienced after Go Live.

## INTRODUCTION

14.1 Given that (i) the Proteo4UK Platform was a complex and substantially new platform and, (ii) TSB had opted to go live with most of the Platform's functionality to its entire customer base in one single event, it was imperative to ensure that the Proteo4UK Platform was tested at volume and could support the entire TSB customer base following Go Live. Non-functional Testing ("**NFT**"), and in particular Performance Testing, was intended to provide comfort around the performance of the Proteo4UK Platform under load. However, the Performance Testing conducted was compromised by shortcomings in requirements, design, execution, and reporting.[1]

14.2 Important parts of the Proteo4UK Platform were unable to support customer volumes after Go Live, and there was severe degradation in service. TSB has told us that on its own analysis, up to 17 out of 38 non-functional incidents that occurred following Go Live *"may have been found by increasing the scope of NFT"*. The EY Root Cause Analysis Report shows that:

> *"Non-Functional testing (OAT, Performance testing and Security testing) could have identified issues that caused 33% of the weighted impact within the population reviewed"*.

14.3 NFT is conducted to ensure a system's operational readiness outside of functional parameters. The Programme's NFT comprised:

(A) Infrastructure Testing - to ensure that the Infrastructure had been installed and configured as designed, before carrying out Performance Testing or Continuity Testing.

(B) Performance Testing - to ensure that a combination of the Applications and Infrastructure would be able to deliver the required service to the expected volume of users.

(C) Continuity Testing - to test and confirm the resilience of the Proteo4UK Platform, and its ability to recover in response to a major incident disrupting facilities, systems, key personnel, or key suppliers.

(D) Security Testing - to reveal any security flaws in each Application's security mechanisms, and assess the functionality of security Applications.

(E) Operational Acceptance Testing on all new IT services - to test the processes required to deliver a reliable IT service, including management of IT events, incidents, requests, changes, problems, configuration, and back-up/capacity.

14.4 NFT is used to confirm that a platform satisfies its Non-functional Requirements ("**NFRs**"). Typical NFRs cover performance, efficiency, compatibility, usability, reliability, security, maintainability, and portability. For example, whereas the functional requirements of a platform would cover the system's ability to make and process customer Internet Banking payments, the NFRs of a platform would include:

(A) the response time for making a payment online;

(B) the number of concurrent users able to make payments at one time; and

[1] Figure 11.1 in chapter 11 describes which parties were responsible for compiling the requirements, test design, test execution and test reporting for NFT.

(C) the hours of available service for making payments.

14.5 The NFRs used as examples in 14.4(A)-14.4(C) all relate to the performance of the Proteo4UK Platform and would be tested during Performance Testing. While our Review covered all aspects of NFT, this chapter will focus on the design, execution and reporting of Performance Testing, as this testing was crucial to ensure that the customer-facing elements of the Proteo4UK Platform could support the expected volume of customers. It is clear from the customer experience following Go Live that the Proteo4UK Platform could not support the volumes experienced (see chapter 19).

## SETTING THE NON-FUNCTIONAL REQUIREMENTS

14.6 When developing a new platform, NFRs are usually defined early in the process to inform the design of the platform. This was particularly critical for those parts of the Proteo4UK Platform necessary for reliable delivery of customer service, such as the Digital Channel (that is, the Mobile App and Internet Banking), Telephone Channel and branches. However, TSB's NFRs were not available to SABIS at the start of the development process. The TSB CTO and members of the TSB CIO's team did not begin collecting the NFRs from the business until around July 2016. While SABIS was provided with a work-in-progress draft of the NFRs in late 2016, software development had been underway since early 2016.[2] The NFRs were not formally signed-off by the Executives until 9 April 2018, 13 days before Go Live.

14.7 Some of the NFRs provided to SABIS, and ultimately signed off by the Executives, lacked the precision and clarity required to design effective NFT. For example, when originally collected by the TSB CTO and his team, the NFR for the Mobile App (a key customer Channel) was 72,000 sessions/hour with a response time below 4 seconds. This was translated for testing purposes to 1,500 logins/minute. No one we interviewed could explain how the 'per minute' target volume was derived and we received inconsistent explanations as to whether it was intended to provide for volumes in excess of the usual peak (as will be discussed in paragraphs 14.31 to 14.41).

## DESIGN OF PERFORMANCE TESTING

14.8 When designing Performance Testing, TSB and SABIS made a number of key decisions that caused shortcomings in test coverage and limited their ability to discover the issues that occurred following Go Live. These included:

(A) decisions relating to NFT Environments;

(B) decisions on soak test duration; and

(C) TSB conducting its NFT oversight function without comprehensive Platform architecture documents.

These issues are discussed in more detail in paragraphs 14.9 to 14.25.

[2] For an in-depth discussion of the Programme's software development, see paragraphs 9.6 to 9.25 of chapter 9.

## Performance Testing Environments

14.9 TSB and SABIS decided to conduct the majority of Performance Testing in the Production Environment. One advantage of this approach was that (as Performance Testing would be conducted in the Environment where tested Applications would eventually run after Go Live) the test results could be more representative of how such Applications would behave once live.

14.10 However, because the Production Environment was already being used to support the services that had gone live during the Transition Events (for example, the ATMs), TSB needed to protect these live services. TSB and SABIS therefore made certain decisions that constrained the Performance Testing that was conducted. These decisions were:

(A) segregating the Production Environment so that Performance Testing did not impact live services (the "**Single Data Centre Decision**"); and

(B) limiting the types of transactions tested in the Production Environment so as not to affect any customer data in the live services (the "**Read-only Transactions Decision**").

## The Single Data Centre Decision

14.11 A decision was made to split the Production Environment so that Performance Testing would be run on one data centre while live services ran on the other. This decision meant that TSB and SABIS could not and did not run Performance Testing on the Active/Active configuration of the Proteo4UK Platform. TSB and SABIS were therefore not testing the Applications across the entire Infrastructure, including both data centres and the load balancer used to direct traffic between them.

14.12 One of the critical issues after Go Live was the difficulty in logging on to Internet Banking and the Mobile App due to the way these Applications behaved when interacting with the Active/Active configuration of the data centres (see chapter 19). TSB's own analysis has identified this as *"the main contributor to the problems experienced by TSB digital customers at [Go Live]"*. Conducting Performance Testing in only one data centre made it impossible to identify this problem before Go Live, and the risks associated with this decision were underestimated. TSB accept that, had they run Performance Testing across both data centres, they *"may have been able to identify the issue of timeouts and disconnects experienced in Online and Digital in Live caused by configuration inconsistencies [between the data centres]"*.

14.13 Despite the relevance of the Single Data Centre Decision to the issues following Go Live, the Single Data Centre Decision did not go through formal governance procedures. In fact, minutes of the Testing Delivery Forum meeting on 26 February 2018 indicate that the proposed use of a single data centre for Performance Testing was considered but *"[the TSB CIO] suggested keep[ing] the current configuration for the test to ensure the conditions are the same as the expected on [the Main Migration Event ("**MME**")]"* and a decision was made to communicate to users of live services that they may experience delays during the conduct of Performance Testing. We take this to mean that TSB and SABIS decided to conduct Performance Testing across both data centres. However, this decision was not implemented in practice.

14.14 When we asked the TSB CIO about the Single Data Centre Decision, he told us that subsequent to that Testing Delivery Forum meeting, SABIS had separately explained to him

that the Single Data Centre Decision was necessary, as conducting Performance Testing across both data centres would impact TSB's ATM service. This rationale was accepted by the TSB CIO and as a result, SABIS conducted Performance Testing on only one data centre. The TSB CIO's decision does not appear in any of the minutes of the Testing Delivery Forum (or in the minutes of any other TSB governance fora that we have reviewed).

14.15 Some TSB Board members told us that they were not aware of the Single Data Centre Decision until after Go Live. In addition, while the TSB CAO told us that Internal Audit was aware of the Single Data Centre Decision, the issues associated with the decision to conduct Performance Testing in one data centre were not specifically raised by Internal Audit. When we asked the TSB CIO whether or not the TSB Board would have been aware of the Single Data Centre Decision, he told us:

> *"This [was] not seen as [a] risk decision at that point in time. I mean, we were taking hundreds of decisions on a weekly basis and it was not the kind of decisions that we were sharing with the board."*

14.16 In our view, Internal Audit and Risk Oversight should have reviewed this decision and its conclusions should have been shared with the TSB Board. TSB told us that *"[w]ith the benefit of hindsight, [the key non-functional issue that occurred following Go Live] may have been detected if NFT had been executed in Active/Active mode"* (i.e. executed across the two data centres).

14.17 While TSB and SABIS needed to protect live services, they should have found a way to conduct testing across both data centres. This could have been done either by finding times of day to test with minimal impact to live services, or by having a dedicated Pre-production Environment for testing that mirrored the Production Environment.

14.18 TSB had in fact planned to build a separate Pre-production Environment, but not until after Go Live. Had it prioritised the build of this Pre-production Environment during the Programme, this Environment could have been used to ensure that code developed to fix post-Go Live issues was performing correctly before being released into the Production Environment. Instead, the EY Root Cause Analysis Report found that within their sample of 201 issues *"subject to detailed investigation"*, there were *"36 issues (18%)…identified as resulting from post-MME fixes executed in the Production Environment"*.

14.19 Given the newness of the Channel Applications and the Middleware, and their interaction with the new Active/Active Infrastructure, together with the decision to take substantially all of the Proteo4UK Platform live for the first time in one single event to c.5 million customers, TSB should have prioritised the build of a Pre-production Environment for both (i) conducting testing before Go Live, and (ii) testing changes to the Proteo4UK Platform following Go Live.[3]

## The Read-Only Transactions Decision

14.20 TSB and SABIS decided that any tests performed in the Production Environment would not modify data. They achieved this by ensuring that any transactions that involved the update of data were conducted in the separate and simplified GOS Environment. That is, only 'read' transactions would be tested in the Production Environment, and NFT Performance Testing in the Production Environment would not include 'update' transactions. As a result

[3] We understand from the TSB CIO that as at February 2019, the Pre-production Environment was yet to be delivered.

of this decision, SABIS did not execute performance tests for payment transactions on the Digital Channels (that is, Internet Banking and the Mobile App). The performance of the Mobile App payments functionality was a significant issue after Go Live, and this decision would have made it difficult for TSB to identify prior to Go Live the issues that led to these problems.[4]

14.21 Despite it being raised as a risk by both Deloitte and the TSB CRO, the decision not to test 'update' transactions does not appear to have been mitigated prior to Go Live. TSB told us that this decision was *"entirely appropriate"*. TSB's reasons for its decision and our response are listed as follows:

(A) TSB told us that the Read-only Transactions Decision avoided risks associated with modifying live data during testing. However, this would have been better addressed by building a dedicated Pre-production Environment for testing.

(B) TSB also told us that *"a significant number of transactions in a normal day (for example) for Digital would be 'read only'"*. Regardless of relative volume, payments are critical transactions and it was important for TSB to Go Live with some assurance that the Proteo4UK Platform could handle payments under load.

(C) Finally, TSB told us that payments *"were tested through the faster payments certification process"*. The Faster Payments certification process would not have tested payments end-to-end. For example, the Faster Payments certification process would not have tested the payment process starting from the Proteo4UK Front-end Applications such as Internet Banking or the Mobile App.

14.22 While it is outside the scope of this Review to draw a causal link between this decision and what occurred following Go Live, the decision not to conduct Performance Testing on payments at load increased the risk of going live with new payments functionality to TSB's customers in the MME. In our view, as with the Single Data Centre Decision, the TSB Board should have been notified of this decision and the associated risks.

## Soak Tests

14.23 Performance Testing designed for branches is another example of a design decision resulting in a material shortcoming in test coverage. One of the main issues experienced in branches following Go Live was crashes and freezes of the Proteo desktop. This was caused by a memory leak. The New TSB CTO told us that this issue could possibly have been identified in branch soak tests,[5] but later clarified that the soak tests executed (which ran for two hours) would have been insufficient to identify the issue that transpired after Go Live. Given the branch IT system was required to be available throughout the working day and had been substantially redeveloped, TSB and SABIS should have soak tested the system for at least the length of the working day.

## Lack of Architecture Design Documents

14.24 As is discussed in paragraphs 9.63 to 9.70 of chapter 9, SABIS did not deliver architecture design documents to the TSB CTO team during the Programme. This would have made it difficult for TSB to carry out its oversight function on NFT and to appreciate the impact of

[4] See chapter 19.

[5] Soak testing is a type of NFT where Infrastructure is tested under load for a long and continuous period.

the shortcomings in both test design (discussed in paragraphs 14.8 to 14.23) and execution (discussed in paragraphs 14.26 to 14.50).

14.25 TSB has told us that this conclusion is *"purely speculative"* as *"TSB was relying on SABIS to validate NFT results"*. This assertion by TSB is inconsistent with TSB's own readiness framework (the "**Assurance Matrix**"), in which the Executives were required to assess the capability of the Proteo4UK Platform Infrastructure to perform as required and in doing so, review evidence of NFT execution and results to support their conclusion.[6] TSB's assertion is also inconsistent with:

(A) the NFT-specific assurance ("**NFT Memo**") provided by the TSB CIO in which the TSB CIO appears to have validated the NFT results by reviewing them and concluding "*that the Proteo4UK platform, associated systems and infrastructure [would] be able to support the 21 IT services that Sabis [would] provide to TSB under the [OSA], at the appropriate levels of resilience and capacity required";* and

(B) the limited scope of the attestation provided by SABIS before the decision to Go Live, in which the SABIS UK Managing Director provided the TSB CIO with a summary of the NFT results and concluded, on the basis of these results, that *"within reason"* SABIS expected the Platform to perform as required, subject to a number of unspecified exceptions for which testing was still outstanding.

The NFT Memo and the assurance provided by SABIS are discussed in greater detail in chapters 16 and 18.[7]

## PERFORMANCE TESTING EXECUTION AND REPORTING

14.26 In addition to the shortcomings in the design of Performance Testing, there were also shortcomings in its execution. These were compounded by inaccurate reporting of Performance Testing.

14.27 Very little Performance Testing had been conducted prior to the Replan in October 2017. Testing following the Replan ran until at least 18 April 2018, the date of the last TSB Board meeting before Go Live. The TSB CTO told us that he would have expected there to be a period of two months to conduct NFT once User Acceptance Testing ("**UAT**") was complete. In other words, TSB and SABIS should have ensured that the Proteo4UK Platform was complete and stable before conducting Performance Testing. The Defender Plan was indeed structured so as to avoid risks associated with parallelisation (see chapter 13).[8] Despite this, both Functional Testing and NFT ran in parallel and continued until shortly before Go Live.[9]

14.28 The results of the Performance Testing were reported in a document titled *"TSB NFT Events - Final Report"* (the "**NFT Events Report**") which was prepared from the beginning of April 2018. The purpose of this report was to consolidate the evidence required to support the sign-off of the Assurance Matrix and the decision to Go Live.

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6 See paragraphs 16.10 to 16.12 of chapter 16.

7 See paragraphs 16.24 to 16.31 of chapter 16 and paragraphs 18.62 to 18.68 of chapter 18.

8 See paragraphs 13.4 to 13.6 of chapter 13.

9 See Figure 11.2 of chapter 11 for a comparison of actual testing execution end dates.

14.29 There were five iterations of the NFT Events Report. These were drafted by the TSB CTO's team, with input from SABIS, and were reviewed by the New TSB CTO and the TSB CIO, both of whom provided feedback and suggested amendments. The final version (version 5.0) (the "**NFT Final Report**"), dated 17 April 2018, was the version used as evidence for the sign-off of the relevant Assurance Matrix questions.

14.30 While our Review found a number of problems with the way Performance Testing was executed and reported, we have focused on the:

(A) execution and reporting of Performance Testing of the Digital Channel, because the Digital Channel experienced many issues following Go Live;[10] and

(B) use of summary indicators of test status and progress i.e. 'Red/Amber/Green' statuses ("**RAG**") across various drafts of the NFT Final Report, because that report was used to support the completion of the Assurance Matrix and therefore, indirectly, TSB's decision to Go Live.

## Execution and Reporting of Digital Performance Testing

14.31 Performance Testing of the Digital Channel involved test 'events' in which automated test scripts were run to generate volumes of synthetic users both logging in and performing a number of transactions using Internet Banking and the Mobile App in the Production Environment ("**Digital Events**"). The executive summary of the NFT Final Report recorded the Digital Events as 'pass' by 17 April 2018. This was misleading because the Programme changed the scope of Digital Event tests when tests were not passing at the original target load. This is described further in paragraphs 14.32 to 14.50.

14.32 For Digital Performance Testing, TSB set targets for Internet Banking and the Mobile App ("**NFR Targets**"), which included both:

(A) a volume component of concurrent logins or transactions; and

(B) a response time component for each login or transaction.

That is, there were four tests (Mobile App login, Mobile App transactions, Internet Banking login and Internet Banking transactions), each with volume and response time targets (see Figure 14.1).

**Figure 14.1: Results of Digital NFT before and after Reduced NFR Target for Digital NFT**

| | | Initial NFR Target | Tests passed against initial NFR Target? | Reduced NFR Target | Tests passed against reduced NFR Target? |
|---|---|---|---|---|---|
| **Mobile App** | **Logins/min** | 2,250 | Yes | 1,500 | Yes |
| | **Transactions/min** | 2,250 | No | 1,000 | Yes |
| **Internet Banking** | **Logins/min** | 2,250 | No | 1,500 | Yes |
| | **Transactions/min** | 2,250 | No | 1,000 | Yes |

[10] See, in particular, paragraphs 19.4 to 19.20 of chapter 19.

14.33 The original NFR Target load for both the Mobile App login and Internet Banking login tests was 2,250 logins/minute respectively, which was described as *"150% of 1500 login/min peak"*. Similarly, the transaction testing NFR Target load for the Mobile App and Internet Banking, respectively, was originally set at 2,250 transactions/minute. However, after Digital tests did not pass at the original NFR Target load, these NFR Target loads were reduced to 1,500 logins/minute for Digital login tests and 1,000 transactions/minute for Digital transaction tests. Ultimately, only the Mobile App logins test passed at the original NFR Target load of 2,250 logins/minute. The tests passed before and after the change in NFR Target is presented in Figure 14.1.

14.34 None of the versions of the NFT Events Report contained any results for login or transaction tests conducted with a load of 2,250 logins/minute or 2,250 transactions/minute for either the Mobile App or Internet Banking. While the NFT Final Report did record that Digital had been proven to 100% of peak volumes and that 150% of peak was *"pending"*, we note that the NFT Final Report did not report that tests carried out at 150% of peak had been executed and failed.

14.35 In response to these findings, TSB and individuals involved in testing have given us contradictory explanations including that the NFR Target of 2,250 logins/minute (150% of peak):

(A) was a (repeated) error;

(B) a typo; and

(C) was a break condition rather than the NFR Target.

TSB has also recently explained that the NFR Target load was always 100% of peak and any NFR Target above 100% *"was additional comfort and an ambition"*.

14.36 We have considered all of these conflicting assertions together with the contemporaneous documentation. In our view, there was a decision to lower the bar for testing in order to pass it. Even if 150% of peak was considered an ambitious target, the evidence still shows that the Programme abandoned this ambition in the lead up to Go Live when tests were not passing, thereby ignoring, rather than addressing, the issues that may have been causing these tests to fail.

14.37 It is normal practice to set an NFR Target above the average peak loads experienced by a platform, to allow an appropriate additional contingency for one-off peaks outside of the average (such as the additional customer volume to be expected following migrating to a new platform) and future growth in the number of users. Given this, regardless of whether or not the Programme changed the Digital test scope, it was not reasonable to rely on 100% of peak volumes alone (as the Programme ultimately did) to certify the readiness of the Proteo4UK Platform.[11]

## Customer Login Volumes Experienced Following Go Live

14.38 The EY Root Cause Analysis Report found that *"under the stressed circumstances that arose post-MME, post go-live volumes far exceeded those that had been used in testing"*.

14.39 TSB's own analysis shows that following Go Live and up until 6 May 2018, the average number of customers logging on to the Mobile App and Internet Banking exceeded the

[11] TSB has suggested that two data centres meant that the Proteo4UK Platform actually had double the capacity that had been tested in a single data centre. This confuses the role of the second data centre in an Active/Active configuration; it is intended to provide resilience and therefore not additional capacity.

reduced NFR Target load (1,500 logins/minute) which TSB and SABIS had used to certify the readiness of the Proteo4UK Platform. 1,500 logins/minute was exceeded on the Mobile App for 109 minutes and on Internet Banking for 25 minutes. When we put this evidence to TSB, TSB's response was that the time period during which the target load was exceeded for each Channel was not material.

14.40 Further, it is important to look not only at the individual volumes but rather to consider the combined volumes following Go Live across both Internet Banking and the Mobile App. This is because a login via the Internet Banking Channel and a login via the Mobile App Channel would have required use of the same Applications and supporting Infrastructure. Our analysis of the combined login volumes experienced by TSB shows that in the first three days following Go Live, the combined Digital Channel login volumes exceeded the 1,500 logins/minute for almost 12 hours (that is, approximately 16% of the time).

14.41 The Digital Events did not include tests of simultaneous logins on the Mobile App and Internet Banking.[12] In our view, the Performance Testing executed and passed was insufficient to ensure that the Proteo4UK Platform would perform as required when customers logged on through both Digital Channels at volume following Go Live.[13] We asked TSB to comment on our analysis of combined login volumes, but they have not responded.

## Reporting by RAG Status

14.42 The Programme used the common RAG signifiers to report on test status. In addition to the apparent amendment of Digital test scope (paragraphs 14.33 to 14.37), our Review found that RAG statuses were misused and commentary in reporting presented a more positive picture of Performance Testing than was warranted by the results. The RAG statuses in the NFT Events Report were defined as shown in Figure 14.2.

14.43 As is described in more detail in paragraphs 14.44 to 14.50, we found direct instructions to make the RAG status more favourable in the NFT Events Report for the Telephone Channel results, and for overall NFT readiness. The NFT Events Report was the document that consolidated the required evidence of the execution of Performance Testing to support the sign-off by the Executive of the Assurance Matrix and the decision to Go Live.

## Reporting on Overall NFT Readiness on 6 April 2018

14.44 In the version of the NFT Events Report dated 6 April 2018, the overall 'NFT Readiness' was originally marked as 'at risk' (red) but this was changed to 'TBC' (grey) on the TSB CIO's instructions. Grey was not a widely used RAG status except where something was not applicable. The fact that the status of the 'NFT Readiness' was still 'at risk' on 6 April 2018 meant that only two weeks prior to the MME Weekend, the Proteo4UK Platform was not capable of passing Performance Testing. This was a significant risk and should have been considered at the 10 April 2018 TSB Board meeting when the TSB Board decided to give up the Carve-out Exit Option.[14]

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[12] We have only seen evidence of simultaneous Mobile App and Internet Banking transactions tests (not logins) and soak tests.

[13] TSB conducted transaction tests across the Mobile App and Internet Banking simultaneously and passed these tests at 1,000 transactions/minute on each Channel. However, we note that the original NFR Target was 2,250 transactions per minute for each Channel tested individually. We asked for the post-Go Live transaction volume data (to supplement the login data provided) in order to assess the extent to which post-Go Live transaction volumes exceeded what had been tested. TSB declined to provide us with this data.

[14] There was no mention of NFT in the minutes of the 10 April 2018 TSB Board meeting (this meeting is discussed in paragraphs 18.3 to 18.13 of chapter 18).

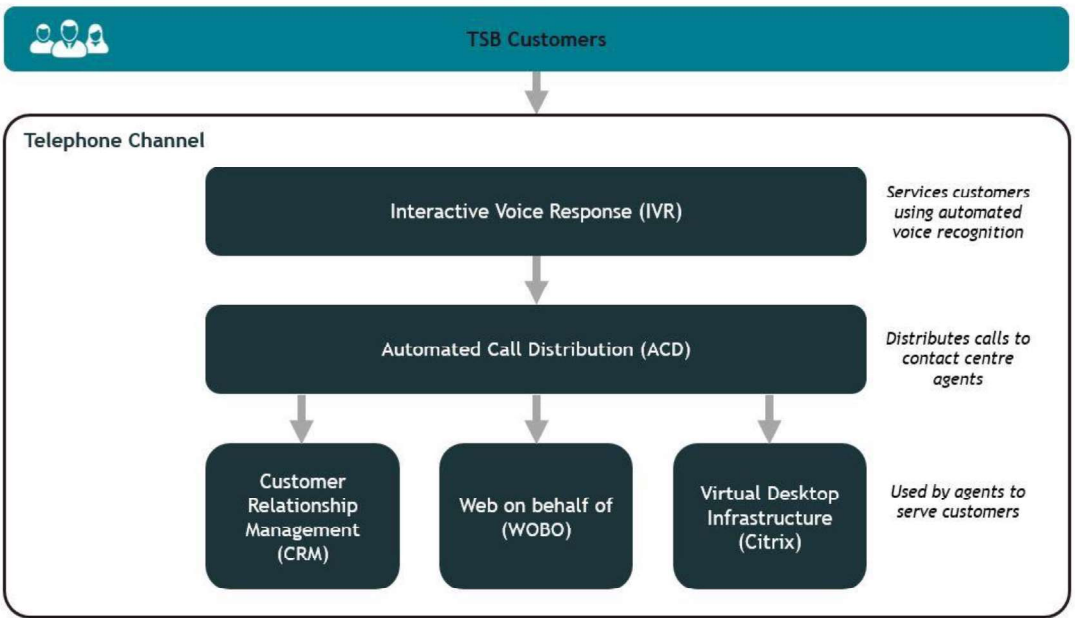
**Figure 14.2: Summary Indicators of Test Status and Progress ('RAG' statuses) in the NFT Events Report**

| Colour | NFT Events Report description |
|---|---|
| Green | **Pass**<br>• *"The full test scope has been completed*<br>• *No significant issues were identified by SABIS*<br>• *No significant issues were identified by TSB*<br>• *No significant risks remain for MME"* |
| Amber | **Pass with issues**<br>• *"The majority of the test scope has been completed*<br>• *Some issues were identified but are not assessed to be material*<br>• *No significant risks remain for MME*<br>• *There is a plan in place to resolve identified issues"* |
| Red | **Significant Risk**<br>• *"No results for assessment or tests have completed and show significant issues*<br>• *No clear plan to resolve pre-MME*<br>• *Significant risk to MME if issues left unresolved"* |

## Reporting on the Telephone Channel and Overall NFT Readiness on 17 April 2018

14.45 Due to challenges with the build, Performance Testing of the Telephone Channel was delayed until 6 April 2018 for Customer Relationship Management ("**CRM**") and 9 April 2018 for Intelligent/Interactive Voice Recognition ("**IVR**") (which was less than two weeks before Go Live) and continued until at least 18 April 2018 (four days before Go Live). As a reminder, Figure 14.3 illustrates the different components of the Telephone Channel.

**Figure 14.3: Components of the Telephone Channel in the Proteo4UK Platform**



14.46 As at 17 April 2018, while some Telephone Channel Performance Testing had been conducted, there were still a number of issues. Specifically, Telephone Channel tests were reported to the MDC on 17 April with the following RAG statuses:

(A) 'amber' for CRM, due to a number of issues and outstanding results from monitoring;

(B) 'amber' for IVR, due to issues causing time-outs during the 500 user test; and

(C) 'red' for combined Telephone Channel and Digital, because tests had not yet been executed.

14.47 To reflect these issues, the NFT Events Report circulated on 17 April 2018, reported the RAG status for the Telephone Channel as amber ('in progress'). However, after this was circulated, instructions were sent on the TSB CIO's behalf to the TSB CTO team to change the Telephone Channel status from 'in progress' (amber) to 'pass' (green). The TSB CIO made this decision despite an email from his team informing him that SABIS was still running its tests in this area, in particular, combined Telephone Channel and Digital tests and despite important caveats noted in the report.[15]

14.48 This 'pass' (green) status remained in the final version of the NFT Events Report (which was completed on the same day, 17 April 2018) despite the fact that testing of the Telephone Channel (specifically combined Digital/IVR) continued until at least 18 April, and continued to reveal issues in response times. As will be addressed in chapter 19, IVR incidents were one of the main technological failures in the Telephone Channel following Go Live.[16]

14.49 On that same day (17 April 2018), and despite having been informed by his team that TSB was awaiting results from SABIS and despite the caveats noted in the report, the TSB CIO instructed a member of the TSB CTO team to update the NFT Events Report and change the overall 'NFT Readiness' status from 'TBC' (grey) to 'pass' (green).[17]

14.50 The TSB CIO had switched the status 10 days earlier from 'at risk' (red) to 'TBC' (grey) (see paragraph 14.44). The TSB CIO now switched the status once again, from 'TBC' (grey) to 'passed' (green) even though there were more tests to complete.[18] That is, the status was misrepresented to enable the NFT Final Report (which recorded the Performance Testing results) to be used to support the TSB Board's decision to Go Live.

## TSB Board's Appreciation of Decisions Relating to Performance Testing and Performance Testing Progress

14.51 As we have emphasised throughout this chapter, Performance Testing was integral to confirming the readiness of the Proteo4UK Platform. Performance Testing was an especially important control in the Programme given the scope and complexity of the Proteo4UK Platform and given that the majority of the new functionality would be taken live on the MME Weekend to all of TSB's customers. Our Review found there were flaws in design, execution and reporting of NFT Performance Testing which were not brought to the attention of the TSB Board, or given sufficient attention within the Executive, as follows:

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[15] The NFT Final Report had a number of caveats including, *"Pending documentation of CRM results"*, *"Combined Digital/IVR NFT Test Pending"* and *"some functional defects to be resolved"*.

[16] See Figure 19.2 and paragraph 19.12 (C) of chapter 19.

[17] The report had a number of caveats including, *"[Batch] Full results pending"*, *"[Disaster Recovery:] IVR outstanding to be proven (due 06/04/18)"*, *"[Digital:] Issue resolution ongoing to meet NFRs"*, and *"[Telephony:] Combined Digital/IVR pending"*.

[18] See paragraph 14.49.

(A) The intention had been that each of the Executives would independently review and approve the evidence gathered for the Assurance Matrix questions falling within their areas of responsibility. This included each Executive independently confirming whether Performance Testing had demonstrated that the parts of the Proteo4UK Platform relevant to their business areas were ready to perform at full scale (i.e. ready to serve TSB's c.5 million customers). Instead, the Executives placed significant reliance on the NFT Memo produced by the TSB CIO when signing-off NFT-related questions for their functional areas (see chapter 16).[19] The NFT Memo presented a more positive picture of NFT than was warranted, omitted a number of relevant facts, and relied on caveated assurances from SABIS and SABIS' subcontractors'.

(B) The issues with NFT were not identified by Internal Audit in the lead up to the decision to Go Live (see paragraphs 18.42 to 18.48 of chapter 18).

(C) Risk Oversight also did not have sufficient time to assess the conduct of NFT in the lead up to the decision to Go Live (see paragraphs 18.37 to 18.41 of chapter 18).

(D) A Deloitte report commissioned by SABIS on 12 April 2018 identified that NFT was *"not performed on various services and was not tracked"*. So far as we can tell, this was not shared with TSB (see paragraphs 15.15 to 15.17 of chapter 15).

(E) There was almost no consideration of NFT in the T3 Memo (which contained the TSB CIO's recommendation to the TSB Board to Go Live) in contrast to the detailed reporting of Functional Testing (see paragraphs 18.31 to 18.36 of chapter 18).

14.52 For both the Executive and the TSB Board there was a lack of appreciation of the importance of NFT. In contrast to the detailed information about the deferral of functionality which brought Functional Testing to a close, the T3 Memo simply referred to NFT Performance Testing having been completed including specifically the test in the Telephone Channel that had been outstanding on 14 April 2018.[20]

14.53 It appears that the TSB Board did not query the information disparity between NFT and Functional Testing when the T3 Memo was presented. This may in part have been because the TSB Board did not understand that key elements of the Proteo4UK Platform were new and the importance, therefore, of ensuring that the new Platform could perform at the capacity needed. The Second TSB Board Adviser told us that *"[t]here was some new stuff that we didn't realise was new, that if we had known that, possibly management might have been asked some tougher questions about some of the non-functional testing"* (see chapter 18).

## FURTHER OBSERVATIONS

14.54 The Executives and the TSB Board should have taken NFT as seriously as Functional Testing. While the TSB Board may not have appreciated the extent to which important parts of the Proteo4UK Platform were new, the Executive was aware of this (see chapter 7) and we would have expected the TSB Board to have been provided with more information about NFT

[19] The Assurance Matrix process and related BEC member Attestations are described in detail in chapter 16 paragraphs 16.10 to 16.12.

[20] The CIO also noted some *"Residual Risks"* in his Attestation and in the final paragraph of the Risk Oversight Opinion contained in the appendices to the T3 Memo, it confirmed that NFT was included in a list of *"Items not covered within Oversight scope"*.

See paragraphs 18.30 to 18.41 of chapter 18.

than was in the T3 Memo. The Second TSB Board Adviser should have appreciated the importance of NFT and should have advised the TSB Board to challenge the Executive on the lack of information in the T3 Memo. Instead, the Second TSB Board Adviser told us that *"if Sabis and the CIO are saying that they are happy with the non-functional testing, and yes, albeit at the last minute, audit are saying they are happy with it, then why would the board not be happy?"*

14.55 While we would not have expected the TSB Board to be aware of the details of NFT in the way that the Executive should have been, at the very least, the TSB Board should have been keen to know whether the Proteo4UK Platform would be able to perform should a larger than normal number of customers attempt to access the Proteo4UK Platform at the same time following Go Live (as might have been predicted given the planned disruption to customer service in the 48 hours leading up to Go Live).

14.56 In light of the scope and complexity of the Proteo4UK Platform, NFT was a critical control in the Programme and should therefore have been under close scrutiny by the Executive and the TSB Board. The absence of scrutiny was a material shortcoming in the Programme which resulted in serious issues with the Proteo4UK Platform not being identified prior to Go Live.

# CHAPTER 15: SABIS' READINESS TO OPERATE THE PLATFORM

## KEY POINTS

- It is clear from statements made (and remediation work completed) after Go Live that SABIS was not ready to operate the Proteo4UK Platform. For example, a November 2018 report prepared by the TSB CIO stated that SABIS' *"insufficient ability to operate the new IT platform"* had exacerbated TSB's problems after Go Live.
- There was an internal handover process within SABIS ahead of Go Live. However, it is unclear to us the basis on which the SABIS operations team could have concluded that the Proteo4UK Platform had been properly designed, built and tested (and that it was ready to operate it), given:
  - the state of Non-functional Testing on the Programme; and
  - issues identified in reports by KPMG Spain and Deloitte Spain.
- The evidence requested and received by the TSB Board and the Executive from the Sabadell Group regarding SABIS' readiness to operate the Proteo4UK Platform ahead of Go Live was inadequate, and a report by Deloitte Spain which identified deficiencies in SABIS' internal controls was not shared with TSB.
- Nevertheless, SABIS' readiness should have been scrutinised more carefully by TSB, given:
  - the observations about SABIS' immaturity as a service provider made by [redacted] Redacted for Legal Professional Privilege the TSB CRO, KPMG and Internal Audit; and
  - SABIS' inability to meet TSB's service level requirements immediately after the Transition Events.

## INTRODUCTION

15.1 SABIS' responsibilities included both (i) the design, build and testing of the Proteo4UK Platform (under the Migration Services Agreement (the "**MSA**")) and (ii) the operation of the Proteo4UK Platform after services had been put live (under the Outsourced Services Agreement (the "**OSA**")). As detailed in the OSA, SABIS was responsible for providing three categories of IT services to TSB (the "**OSA Services**"). These comprised:

(A) management of the data centres and the Network (Infrastructure services);

(B) management of the desktops used by TSB employees (enterprise services); and

(C) management of the different combinations of Applications and Infrastructure used to support TSB's internal management and to provide services to TSB's customers (business services).

15.2 The OSA Services were to be delivered using a defined set of IT processes based on the ITIL framework.[1]

15.3 SABIS was required under the OSA to provide the OSA Services to standards *"which would reasonably be expected from a skilled and experienced operator engaged in the provision of a range of services comparable to the Services to major customers in the financial services industry"*.

## POST-GO LIVE EVIDENCE OF SABIS' STATE OF READINESS

15.4 In a report dated September 2018, the Sabadell Group COO acknowledged that *"SABIS did not have sufficient capacity to respond to and resolve the incidents"* that TSB experienced after Go Live, and that this *"resulted in a limited anticipation of issues and longer response times for incident resolution"*. His report confirmed that SABIS had since added capacity to its team and was in the process of implementing a number of improvements to its procedures, including in respect of business service level indicators and monitoring tools. Steps taken after Go Live involved the transfer of key employees from within Sabadell to SABIS and the receipt by TSB of additional external support, including from IBM.

15.5 The TSB CIO has also acknowledged SABIS' lack of readiness post-Go Live. In a report dated 20 November 2018, the TSB CIO noted that SABIS' *"insufficient ability to operate the new IT platform"* had exacerbated TSB's problems after Go Live. He acknowledged that this remained a *"major concern and one of the main issues yet to be fixed"*.

15.6 A report by DELL EMC Consulting into SABIS' IT operations, dated 25 January 2019, pointed to changes to the organisational structure of SABIS' IT operations and improvements to tools for monitoring certain of the services introduced as part of the Middleware. In our view, the changes made by SABIS after Go Live suggest that SABIS had underestimated the extent of change required to its operations as a result of the move from Proteo3 to Proteo4.

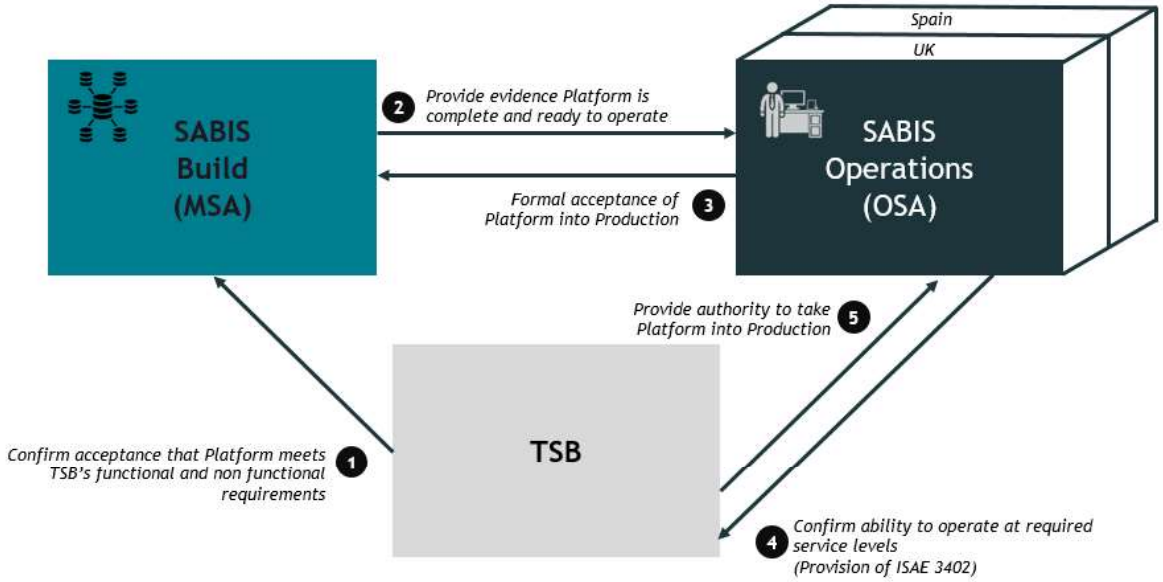
## HANDOVER OF THE PROTEO4UK PLATFORM INTO OPERATION

15.7 Whether or not done within a single organisation, developing and operating a platform are very different activities. They are undertaken by separate teams with differing processes, training and skillsets. Although it is not uncommon to have a single supplier supporting both development and operation, it is important that there is a clear and robust handover between the development team and the operations team, both to ensure that the platform is fit for purpose and stable before it is accepted for operation, and that the operations team is ready to operate it.

15.8 Figure 15.1 provides an example of how a formal and robust process for handover from the SABIS development team to the SABIS operations team might have worked.

[1] These processes included incident management, service continuity, back-up management, security, capacity management, problem management, change (including release) management, event management, configuration management and request management.

Figure 15.1: Example of a Robust Handover into Operation




15.9 We understand that SABIS determined operational readiness primarily through detailed progress reports submitted to the Command Centre, the SABIS team which provided sign-off to move into operation.

15.10 However, SABIS received information (including through the Command Centre) which, in our view, should have cast doubt on both its readiness to operate the Proteo4UK Platform and the readiness of the Proteo4UK Platform itself. This information included external reports from KPMG Spain and Deloitte Spain.

## EVIDENCE OF READINESS AVAILABLE TO SABIS BEFORE GO LIVE

### Reviews Conducted by KPMG Spain and Deloitte Spain

15.11 SABIS was required under the OSA to *"use the ISAE 3402 controls assurance framework for all IT Services and Processes to measure on an annual basis design and control effectiveness for key controls for IT Service Continuity"*.

15.12 ISAE[2] 3402 is a global assurance standard, titled *"Assurance Reports on Controls at a Service Organization"*. While boards cannot be expected to have detailed visibility of their service provider's IT security and controls, boards can rely on reports provided by independent firms that assess the IT service provider's processes and controls against standards such as ISAE 3402 to assure themselves that those processes and controls are operating safely and within the risk tolerances they have set.

15.13 Although a formal ISAE 3402 report was not obtained prior to Go Live, SABIS commissioned KPMG Spain to document and assess certain aspects of its control framework and to

2 International Standards for Assurance Engagements.

*"provide a readiness assessment ahead of an ISAE 3402 Report"*. In a report dated February 2018, KPMG Spain found:

(A) in relation to capacity management, that it was *"unable to evaluate controls related to capacity management"* as *"there were no controls operating"* at the time of its review. TSB has pointed out that this finding was rated *"Low"*, and that KPMG Spain had not been able to evaluate the design controls related to capacity management as at the time of the review the capacity management function was being created. In TSB's view, this was *"not a material risk"*;

(B) in relation to configuration management, that there were *"no baselines defined for the configuration items in [the] CMDB (including infrastructure and applications)"*. KPMG Spain recommended defining *"a configuration baseline and keep[ing] it up-to-date…in order to identify potential issues or deficiencies"*; and

(C) in respect of architecture documentation, that: *"Documentation related to Infrastructure and Applications (e.g. plans, manuals, etc.) [have not been] created yet. This lack of information could cause problems at the moment of recovery from an outage."*

15.14 It is notable that, as discussed in chapter 19, the key causes of non-functional issues after Go Live related to capacity and configuration. We discuss TSB's failure to obtain adequate architecture documentation from SABIS in further detail in chapter 9.

15.15 In addition to the KPMG Spain report, SABIS commissioned Deloitte Spain to produce a report, titled *"Production Readiness Assurance"*, which was dated 12 April 2018. While the KPMG Spain report mainly made findings and recommendations in relation to SABIS' IT services and security controls, the Deloitte Spain report focused on service readiness. The report's findings included that:

(A) in respect of monitoring for the Telephone Channels: *"Monitoring based on current probes does not provide a general view of the service. An analysis is being done to see which application will be used for it (If it is fit for purpose, it will be Cyara)"*. The proposed date for addressing this issue was 18 April 2018 (four days before Go Live);

(B) in respect of monitoring for the Digital Channels: *"Monitoring based on current probes does not provide a general view of the service. A third party solution (EVERIS) selected to have a complete monitoring system for Digital service (implementation WIP)"*. The proposed date for addressing this issue was *"Post-MME"*; and

(C) in respect of architecture documentation: *"A global Service architecture including associated [Infrastructure] and communications [was] not available for critical services"*, and while *"The content and steps to define the design documentation is defined… the initiative is [temporarily] on hold"*.

15.16 Deloitte Spain's findings on monitoring are significant, as a lack of proper monitoring tools makes it difficult to identify and address potential issues. It is notable that TSB has since acknowledged that:

> *"With hindsight, SABIS did not have sufficient capacity to respond to and resolve the unprecedented scale of the incidents which occurred during the MME which, along with insufficient monitoring procedures, heightened the impact and prolonged the duration of the incidents that occurred"*.

15.17 Although the Deloitte Spain report was shared with the SABIS Command Centre, it was not provided to TSB or reproduced in any Configuration Authority[3] papers. TSB has since confirmed that, although all of the recommendations in the Deloitte Spain report rated as *"high"* (and some of the recommendations rated as *"medium"* and *"low"*) were addressed before the decision to Go Live, the TSB Board *"considers that Deloitte Spain's findings, had they been known, would have been relevant to the decision making in the period leading up to the [Go Live]"*.

## State of Non-functional Testing

15.18 SABIS should also have considered the state of the Non-functional Testing ("**NFT**") it had performed prior to Go Live.

15.19 As discussed in chapter 18, the SABIS UK Managing Director provided a one page letter to the TSB CIO on 5 April 2018 explaining that SABIS had *"executed reasonable different tests in agreement with [TSB's] CTO team in order to prove resilience and performance"*. This reference to *"tests"* included the Non-functional Testing conducted by SABIS. The SABIS UK Managing Director noted that he hoped that the summary of the testing results provided alongside the letter would satisfy the TSB CIO's need for evidence that:

> *"within reason, [SABIS] expect the Platform to perform as required on both accounts [resilience and performance] for the current business volumes and system access behaviour patterns"*.

15.20 However, it should have been clear to SABIS that, as discussed in chapter 14:

(A) NFT had been constrained by the testing Environments, including the decision only to test on a single data centre; and

(B) NFT had been conducted at lower volumes than originally planned.

15.21 In view of the state of NFT and the issues highlighted by KPMG Spain and Deloitte Spain above, we find it difficult to understand how the SABIS Command Centre was nevertheless able to accept the Proteo4UK Platform into operation.

# AUTHORISATION OF HANDOVER BY TSB

15.22 We would also have expected to see evidence of a robust process by which TSB would authorise SABIS to take the Proteo4UK Platform live, once it had received confirmation from SABIS of its readiness to operate at the required service levels based on tests and checks carried out as part of the handover.

15.23 From the evidence we have seen, this appears to have occurred in relation to each of the Transition Events. TSB authorised SABIS to take services and Applications provided under the Transition Events live following receipt of:

(A) evidence in respect of SABIS' readiness, including information relating to configuration, testing and progress against milestones; and

[3] See Appendix 3 for further information on the Programme committee structure.

(B) sign-off from the SABIS Command Centre.

15.24 However, in the case of the Main Migration Event ("**MME**"), TSB provided its authorisation via a series of meetings of the TSB Board and the MME Board Sub-Committee, without having received sufficient evidence of SABIS' readiness to operate the Proteo4UK Platform or appropriate sign-off from SABIS or Sabadell. As discussed in chapter 18:

(A) the Assurance Matrix and the T3 Memo, which were two of TSB's key readiness controls, did not contain adequate consideration of whether SABIS would be able to operate the Proteo4UK Platform after Go Live; and

(B) TSB did not seek or receive adequate assurances from either SABIS or Sabadell as to SABIS' readiness.

## EVIDENCE OF SABIS' STATE OF READINESS AVAILABLE TO TSB

15.25 In his report dated 20 November 2018 (seven months after Go Live), the TSB CIO acknowledged that:

> *"With hindsight, someone could say that exercising our Audit rights with SABIS and reviewing in depth both processes and resourcing could have led [TSB] to anticipate the gaps in preparation."*

15.26 However, he also asserted that, before the decision to Go Live: *"the available information, the attestations and the pre-MME experience did not [lead TSB] to conclude that there were reasonable indications to be more inquisitive."* He did not specify what particular information, attestations or pre-MME experience he was referring to.

15.27 Notwithstanding the TSB CIO's views, there was evidence available to TSB ahead of the decision to Go Live which, in our view, should have caused TSB to scrutinise more carefully whether: (i) the Proteo4UK Platform was ready at the time of Go Live; and (ii) SABIS was ready to operate the Proteo4UK Platform in line with the service levels agreed under the OSA. This evidence included:

(A) internal and external observations of SABIS as an 'immature' service provider;

(B) several Internal Audit reports highlighting deficiencies in SABIS' IT general controls framework;

(C) the report on SABIS' IT general controls framework obtained from KPMG Spain; and

(D) SABIS' failure to achieve agreed service levels following the Transition Events.

### SABIS as an 'Immature' Service Provider

15.28 Redacted for Legal Professional Privilege

15.29 As part of a review of the OSA conducted in November 2016, KPMG also noted that *"TSB shouldn't underestimate the learning curve that SABIS will be on in providing services in the UK market"*.

15.30 When the TSB Board discussed this issue during its meeting of 23 November 2016, the TSB Risk Committee Chair noted that a risk for which mitigating factors had not been articulated in the relevant papers was that *"SABIS, as an immature service provider in the UK, failed or was otherwise found to be not fit for purpose"*.

15.31 The TSB CEO acknowledged at that meeting that this was a risk and explained that *"it would be mitigated by the fact that SABIS would have been used for 12 months before the data migration, through the mobile app launch and [TSB Beta]"*. However, the Mobile App was a very small part of the overall Proteo4UK Platform and, as discussed further below, SABIS consistently failed to meet agreed service levels in the period immediately following Transition Events.

15.32 Internal Audit also reported that *"SABIS is an immature third party supplier and TSB will need to effectively manage the relationship"*. TSB has explained to us that Internal Audit's comments were originally raised in a meeting attended by the TSB Risk Committee Chair, the TSB Audit Committee Chair, the TSB CAO, the TSB CRO, and others. The TSB CRO sent an email on 23 November 2017 setting out his specific concerns about SABIS from an operational risk perspective, noting the unique challenges of managing a new platform with *"idiosyncrasies"* with which any supplier might struggle. The TSB CRO noted in this email that:

> *"We've not yet seen the SABIS UK team mature sufficiently to have confidence that they can manage a brand new platform to the standards of our operational risk appetite"*.

## Internal Audit Reporting

15.33 TSB told us that it had gained additional comfort in respect of SABIS' ability to operate the Proteo4UK Platform through audits carried out by Internal Audit.

15.34 These included assessments of SABIS' operationalisation (i.e. readiness), which were published in November 2017 and April 2018. The reports from both reviews were rated 'amber' (*"There are material risk exposures that require your urgent attention. There is time to fix the issues raised but if they are not adequately addressed there is a risk to the safe delivery of the programme"*) and highlighted deficiencies in SABIS' internal controls.

15.35 Internal Audit's first review of SABIS' operationalisation (published in November 2017) assessed the design of SABIS' IT general controls framework (in particular, privileged user access management, non-privileged user access management, monitoring and disaster recovery), and found that *"the four control areas assessed were not fully operational"*. Internal Audit also noted that:

> *"[the] speed of programme delivery is impacting SABIS's ability to align planning and implementation of the [IT general controls] framework"*.

15.36 In the second review (published on 3 April 2018, 19 days before Go Live), Internal Audit assessed live business services (i.e. services put live under the Transition Events) in order to assess whether SABIS was ready to Go Live. Internal Audit found that *"Additional work*

*is…required to ensure that the control framework is formally embedded and that evidence to support the execution of key controls is documented and retained"*. Internal Audit also noted that *"SABIS UK may not be able to demonstrate that the supplier risk management framework is designed and embedded effectively"* and that, as a result, *"TSB may not be able to fulfil its SYSC8 Regulatory requirements for management of supplier risks within SABIS"*. In response, TSB's procurement team provided a secondee to bridge this gap.

15.37 These Internal Audit reviews focused primarily on the design rather than the effectiveness of controls. The TSB CAO explained to us that *"at the point of migration most of the controls that [Internal Audit] assessed were on the basis of the design rather than the operation"*, and that this was because Internal Audit *"could not assess the operation of many of the controls because SABIS was not operating"*.

15.38 Taking into account the limitations of these reviews and their amber ratings, it is difficult to understand how TSB could reasonably have taken comfort from these reviews when evaluating whether SABIS was ready to operate the Proteo4UK Platform.

## Report by KPMG Spain

15.39 TSB was entitled under the OSA to conduct *"independent assurance [of SABIS] (including to ISAE 3402 SOC 1….assurance) of the key IT, cyber and security operational controls to demonstrate that such controls are designed and operate effectively across all in-scope Services"*.

15.40 The TSB Audit Committee Chair explained to us that TSB had considered commissioning an ISAE 3402 report in order to gain comfort on SABIS' readiness to operate the Proteo4UK Platform, but that this had not been undertaken ahead of the decision to Go Live. This is notwithstanding that *"Sign off ISAE 3402"* was a pre-Go Live milestone in TSB's plans for assessing SABIS' readiness.

15.41 TSB has told us that this milestone did not require a formal ISAE 3402 report, and was only labelled as such *"to indicate the nature of the deliverable"*, and that *"On reflection TSB considers that the milestone should more accurately have been called an 'ISAE 3402-esque' report"*.

15.42 The *"ISAE 3402-esque"* report that TSB used to close the milestone was the report obtained by SABIS from KPMG Spain in February 2018 in order to *"provide a readiness assessment ahead of an ISAE 3402 Report"*. This report is discussed in further detail at paragraph 15.13.

15.43 On 22 January 2018, the TSB CIO presented a high-level overview of the KPMG Spain report to the TSB Board. Although the relevant slide did not address the report's findings in relation to capacity, configuration or Infrastructure, it did state that:

(A) the *"SABIS UK Risk Management Framework is being developed and has been subject to an ISAE3402 Control Adequacy Assessment by the SABIS Risk team supported by KPMG"*; and

(B) the *"design of all controls (100%) has been reviewed and tested. 82% of the controls have been proven to be effective"*.

15.44 This was despite the fact that:

(A) the KPMG Spain report was not, and did not purport to be, an ISAE 3402 assessment; and

(B) the TSB CAO subsequently decided not to rely on the KPMG Spain report for the purposes of Internal Audit's activities, in part because he *"did not consider it to provide any assessment of the effectiveness or otherwise of that control framework"*.

15.45 We asked TSB to confirm whether the TSB Board was ever informed that the TSB CAO had reached a conclusion which was seemingly at odds with the slide presented to them by the TSB CIO on 22 January 2018, but it declined to respond to our question.[4]

## Evidence of SABIS' Readiness Based on the Transition Events

15.46 In his report dated 20 November 2018 on the causes of the issues faced by TSB after Go Live, the TSB CIO explained that TSB had relied in part on the fact that it *"had the positive experience of several months ahead of the MME when SABIS was operating live services within the parameters agreed in the contracts between SABIS and TSB"*.[5] This was a reference to SABIS' performance under earlier Transition Events.

15.47 However, SABIS had consistently failed to meet agreed service levels in the period immediately following Transition Events. This included breaches of service levels following the Mobile App, payment schemes, mortgage sales and origination, and ATM Transition Events.

15.48 Figure 15.2, which is taken from a June 2018 presentation to the Service Executive Committee,[6] demonstrates that there was not a single month between June 2017 and May 2018 in which SABIS satisfied all of the agreed service levels set out in the OSA.

15.49 TSB has provided a number of explanations for service level performance following Transition Events, including that contemporaneous root cause analysis showed that most incidents were associated with ongoing Infrastructure build and optimisation rather than problems with the services themselves. The TSB CEO suggested that the service levels TSB required of SABIS were particularly high and that, despite failing to meet them, in certain cases SABIS had outperformed the equivalent service provided by LBG during the same period.

15.50 TSB also explained to us that a breach of service levels did not necessarily constitute a breach of its risk appetite. However, the risk appetite established for certain services was triggered by any breach of the 'SL2' threshold (see Figure 15.2) and it is clear that SABIS' performance failed to satisfy 'SL2' in respect of those services on a number of occasions following the Transition Events.[7]

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4 See further chapter 23, paragraph 23.12(A) and Figure 23.1.

5 The report was initially drafted in September 2018, with the latest draft updated in November 2018, but after this we were told that the TSB CIO did not intend to finalise the report.

6 The Service Executive Committee was a monthly forum intended to enable SABIS UK and TSB to provide management oversight for delivery of services in accordance with the OSA.

7 See for example, the service levels in Figure 15.2 for *"Faster Payments"*, *"Branch inc Business Banking"*, *"Digital"*, *"Self Service Devices"* (ATMs) and *"Mortgages"*.

Figure 15.2: SABIS Service Levels Achieved between June 2017 and May 2018 (From June 2018 Service Executive Committee, Dated 29 June 2018)

May Incidents — Critical 6 / High 19 — Actual Service Performance

| | | | SLA | May-18 | Apr-18 | Mar-18 | Feb-18 | Jan-18 | Dec-17 | Nov-17 | Oct-17 | Sep-17 | Aug-17 | Jul-17 | Jun-17 | Service Excellance Awards |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Payments | 1 | Faster Payments | 99.99% | 99.943% | 99.91% | 99.977% | 100% | 99.904% | 99.997% | 99.982% | 99.996% | 99.99% | 99.59% | 99.95% | 99.56% | 2* |
| | 2 | BACS (CASS / Reference Data) | 99.90% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 2 |
| | 3 | Cash and Cheques | 99.90% | 100% | 100% | 100% | | | | | | | | | | 2 |
| | 4 | CHAPs and International | 99.90% | 100% | 100% | 100% | | | | | | | | | | 2 |
| Channels | 5 | Branch inc Business Banking | 99.90% | 99.91% | 97.74% | 99.99% | 99.85% | 99.94% | 99.72% | 100% | 100% | 99.30% | 100% | 100% | 100% | No Award |
| | 6 | Telephony | 99.90% | 99.94% | 98.33% | 100% | 100% | 100% | 100% | | | | | | | No Award |
| | 7 | Digital | 99.90% | 99.82% | 93.64% | 99.90% | 99.99% | 100% | 99.69% | 99.97% | 99.85% | 100% | 97.67% | 99.45% | 100% | No Award |
| | 8 | Self Service Devices | 99.90% | 99.97% | 100% | 99.91% | 99.90% | 100% | 99.58% | 99.55% | 99.93% | 98.13% | 99.49% | 100% | 99.79% | 2 |
| | 9 | Mortgages | 99.90% | 99.89% | 100% | 99.97% | 99.80% | 99.87% | 99.96% | 99.20% | 99.22% | 98.97% | | | | No Award |
| Central | 10 | Risk | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99.90% | 99.68% | 99.81% | 99.96% | 2 |
| | 11 | Finance | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99.82% | 99.66% | 99.68% | 99.93% | 2 |
| | 12 | HR | 99.90% | 100.00% | 100% | 100% | 99.97% | 100% | 100% | 100% | 100% | 100% | 99.91% | 99.92% | 100% | 1 |
| | 13 | Treasury | 99.90% | 100.00% | 100% | 100% | | | | | | | | | | 2 |
| | 14 | Security and Fraud | 99.90% | 100.00% | 99.89% | 97.11% | 100% | | | | | | | | | No Award |
| | 15 | Marketing | 99.90% | 100.00% | 100% | | | | | | | | | | | No Award |
| | 16 | Property and Procurement | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 1 |
| Operations | 17 | Service Centre | 99.90% | 99.98% | 100% | 100% | | | | | | | | | | 2 |
| | 18 | Collections and Recoveries | 99.90% | 100.00% | 99.52% | | | | | | | | | | | No Award |
| | 19 | Loans Processing | 99.90% | 100.00% | 100% | 100% | | | | | | | | | | 2 |
| | 20 | Cards Processing | 99.90% | 100.00% | 100% | 100% | 100% | | | | | | | | | 2 |
| | 21 | Mail Management and Printing | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | | 2 |
| | 22 | Data Warehouse | 99.90% | 100.00% | 100% | | | | | | | | | | | No Award |
| Total | | | | 99.98% | 99.50% | 99.83% | 99.97% | 99.98% | 99.91% | 99.88% | 99.91% | 99.65% | 99.60% | 99.88% | 99.91% | |

**Service Level Agreements – Services 02 - 21**

- = 100%
- = or >99.90% but <100%. Green is within SLA
- = < 99.90% and fails SLA1
- = < 99.50% and breaches SL2
- = < 96.00% and breaches SL3

**Service Level Agreements – 01 : Faster Payments**

- = 100%
- = 99.99%
- = < 99.99% and fails SLA1
- = < 99.90% and breaches SL2
- = < 99.70% and breaches SL3

15.51 The Transition Events involved the provision of: (i) a narrow set of services (the Early Cutovers); and (ii) a broader set of services at low volumes (Live Proving). By contrast, Go Live involved substantially all of the Proteo4UK Platform being taken live simultaneously for TSB's c.5 million customers. Given the evidence of SABIS' performance following the Transition Events, TSB should have been concerned that service issues might arise following Go Live, and should have taken sufficient steps to assure itself that SABIS was capable of operating the Proteo4UK Platform to agreed service levels.

# CHAPTER 16: THE ASSURANCE MATRIX

## KEY POINTS

- We have been told repeatedly by members of the TSB Board and the Executive that TSB's guiding principle for the Main Migration Event ("**MME**") was *"we won't go until we're ready"*, in other words, TSB would not proceed with the MME until it was of the view that it could Go Live safely.
- In this regard, the Assurance Matrix was the principal tool used by TSB to assess whether it was ready to proceed with the MME. The TSB CEO referred to the Assurance Matrix as *"the principal first-line artefact demonstrating readiness of each [Executive] function"* and explained that it sought to *"draw together all of the key questions each part of the business must be able to answer to give confidence that it is prepared for the migration event and to operate post migration"*.
- The Assurance Matrix had the potential to be a very useful framework for assessing the Programme's readiness for Go Live. However, in practice, there were a number of factors that undermined its effectiveness in relation to three key areas relevant to the issues experienced by TSB and its customers after Go Live:
  - Inadequate scope of questions - The Assurance Matrix questions did not clearly assess SABIS' readiness to operate the Proteo4UK Platform after Go Live.
  - Flawed evidence - The underlying evidence supporting key questions relating to Defects and Non-functional Testing ("**NFT**") was inaccurate and incomplete as a result of TSB not having a clear understanding of the volume of Defects raised during the Programme and remaining open at the MME and material issues with the Programme's design, execution, and reporting of NFT. Consequently, certain cells of the Assurance Matrix were incorrectly marked as complete.
  - Overreliance on the TSB CIO - In completing their sections of the Assurance Matrix relevant to NFT, the Executives based their answers on documents produced by the TSB CIO and his team. Some of them did so without having independently and critically reviewed those documents. This meant that an opportunity to identify the flaws in this evidence was missed.

## INTRODUCTION

16.1 The Assurance Matrix was the principal first line tool used by TSB to assess the Programme's readiness to 'go live' with three of the Transition Events[1] and the Main Migration Event ("**MME**"). The Assurance Matrix was, in effect, a readiness checklist expressed as a series of questions to which answers and underlying evidence were to be compiled and assessed.

[1] The Mobile App transition (T0), Live Proving (T1), and the mortgage sales and origination transition (T2a). See chapter 10 for further information about the Transition Events.

16.2 In the interviews conducted as part of our Review, the most common response to questions about how TSB would assess the Programme's readiness for the MME was by reference to the Assurance Matrix. For example, the TSB CRO described the Assurance Matrix to us as *"a comprehensive set of questions to ask about your system before you take it live"* and the TSB CEO told us: *"[t]he benefit of having an assurance matrix is it's binary. Until the assurance matrix is built, we don't migrate."*

## OVERVIEW OF THE ASSURANCE MATRIX

16.3 The TSB COO told us that TSB had originally asked a number of third parties (including Deloitte) whether there was a standard framework for assurance on IT transformation programmes. Having concluded that such a standard framework did not exist, the Programme Team developed the Assurance Matrix in-house, based on an approach used on the Lloyds TSB/HBOS integration and the Verde programme.

16.4 The Assurance Matrix was first presented to the TSB Board at its 18 May 2016 meeting. A paper presented by the TSB COO and the TSB CIO described the Assurance Matrix as a *"framework for the first line to give a comprehensive overview of all the assurance parameters required for first line validation of the Migration Programme deliverables"* and that it would be used *"for each transition state, to inform the go / no go decision to go live"*.

### Structure of the Assurance Matrix

16.5 As shown in Figure 16.1, the Assurance Matrix was a 5x4 grid, comprising five rows (referred to as 'horizontals') and four columns (referred to as 'verticals'):

(A) The five horizontals covered:

(i) the readiness of the Proteo4UK Platform Applications to meet TSB's requirements;

(ii) the readiness of the supporting Proteo4UK Platform Infrastructure to meet TSB's requirements;

(iii) the readiness of TSB's business to use the Proteo4UK Platform;

(iv) the IT service provider (SABIS) contract; and

(v) the ability to provide the data necessary to populate the new IT system.

(B) The four verticals covered the performance of each horizontal by seeking to ensure there was:

(i) capability in line with the specified requirements (functional and non-functional);

(ii) an ability to support business volumes;

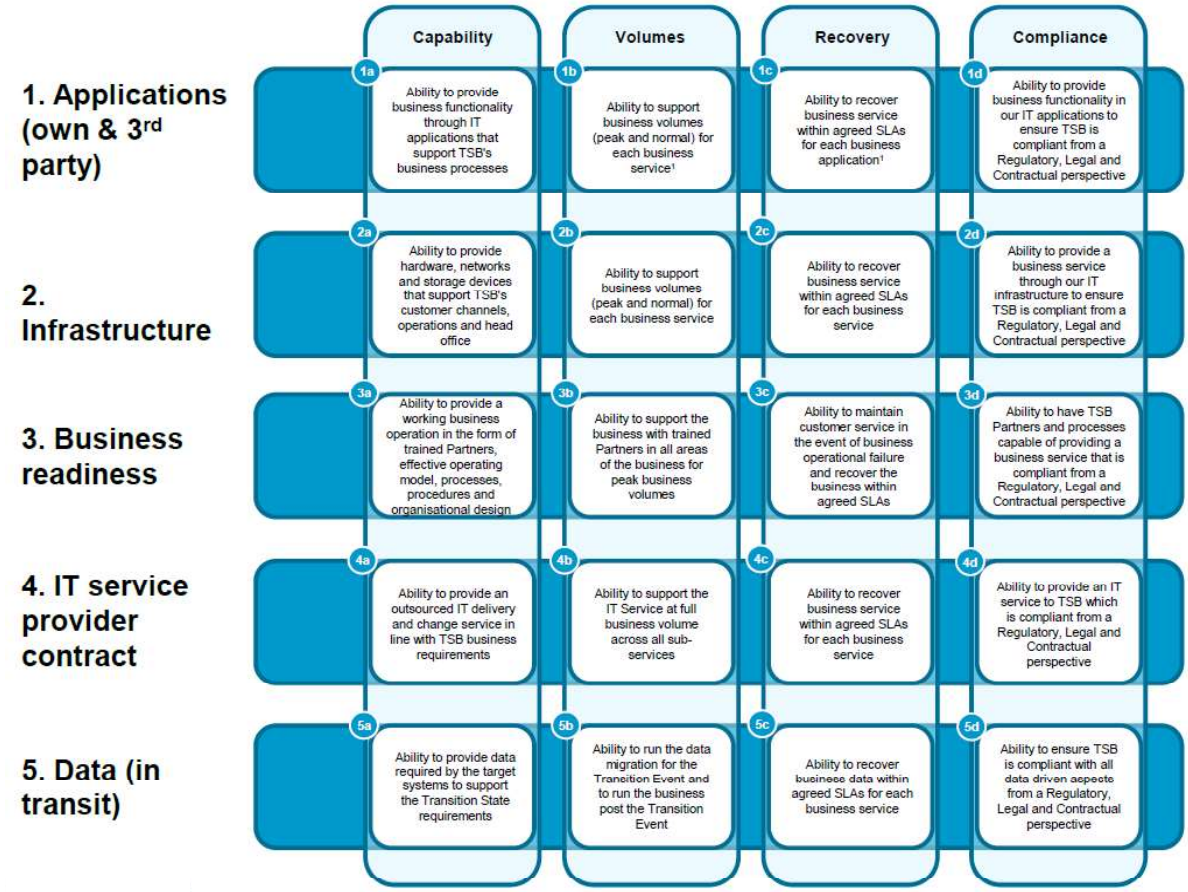
(iii) an ability to recover should a component or part of the system fail; and

(iv) compliance with all regulatory, legal, and contractual requirements.

16.6 The 20 intersections of the five horizontals and four verticals were referred to as 'cells'. Each cell was intended to function as a control to *"validate the performance of the individual Programme components against their design"*. As shown in Figure 16.1, each cell was labelled with a number and a letter to identify it, and contained a description of the

required control. For example, the cell at the intersection of the 'Applications' horizontal and the 'Volumes' vertical was labelled *"1b"* and was described as validating the *"[a]bility to support business volumes (peak and normal) for each business service"*.

**Figure 16.1: The Assurance Matrix at the MME (Extracted From the T3 Memo, Dated 17 April 2018)**

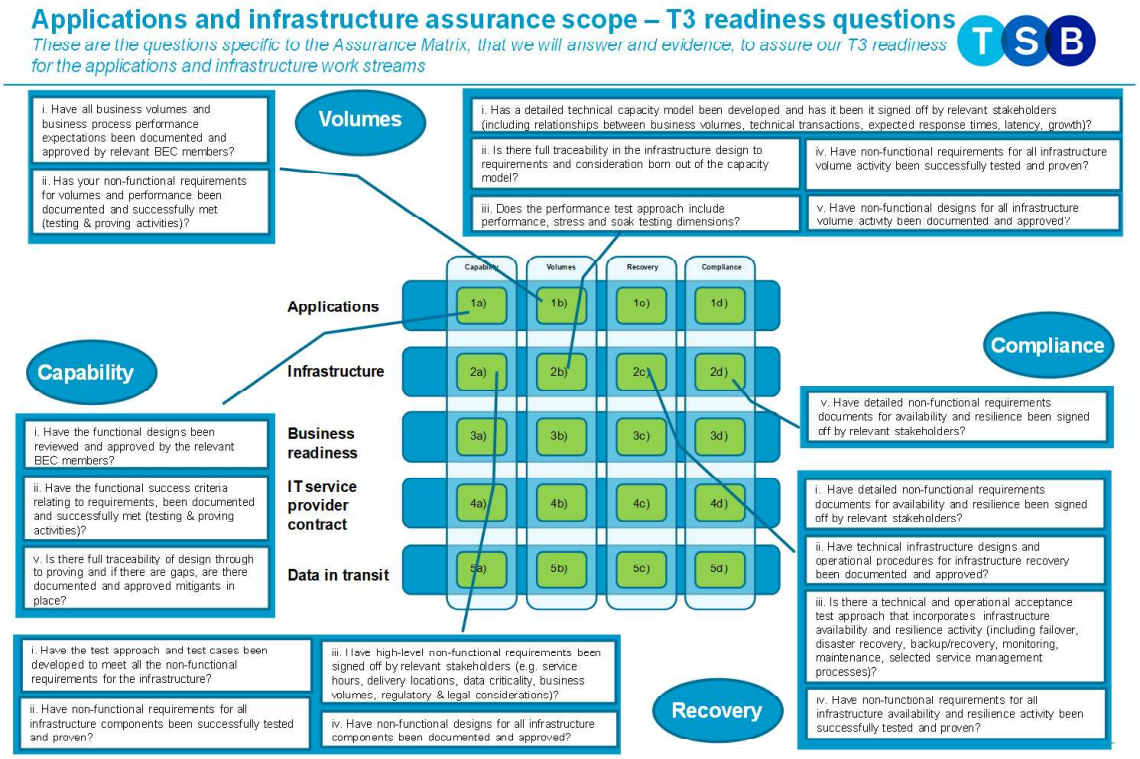



16.7 TSB developed a set of assurance questions for each of the cells to ensure that appropriate evidence was collected and assessed to confirm that the 20 controls had been validated. The initial assurance questions were then amended and refined over the course of the Programme, including to incorporate learnings from the relevant Transition Events. Figure 16.2 provides a sample of the assurance questions as at 20 February 2017.

16.8 For each question, there were specific entry criteria and evidence requirements that needed to be satisfied before the question could be marked blue (meaning complete). Following collation and review, the evidence underlying each question was to be gathered in a Virtual Data Room ("**VDR**").

16.9 As is clear from the above, the effectiveness of the Assurance Matrix was reliant on the comprehensiveness of the question set, and the quality and completeness of the evidence collated and reviewed in relation to these questions.

**Figure 16.2: Sample Questions from the Assurance Matrix for the MME as at 20 February 2017 (from an Audit Committee Pack, Dated 20 February 2017)**




## The Assurance Matrix at Go Live

16.10 To demonstrate the readiness of their business units for Go Live, 12 Executives were required to complete versions of the Assurance Matrix containing the cells and questions that were relevant to their respective functional areas. In doing so, each of these Executives was required to review the evidence gathered for the relevant questions and, if satisfied that the evidence was complete, mark the relevant cell as complete.

16.11 Once all the relevant cells had been marked as complete, the relevant Executive would provide a written attestation ("**Attestation**") to the TSB CEO, confirming that each functional area for which he or she was responsible was ready to 'go live'. Specifically, these Attestations confirmed that the relevant Executive had *"addressed the detailed questions set out in the Assurance Matrix for [their] Business Function, exercising a reasonable degree of care"*, including *"making due inquiry of [their] direct reports"*, and that *"the Assurance Matrix for [their] Business Function [was] complete"*.

16.12 The TSB CEO explained to us that these Attestations meant that he did not personally need to look through every piece of evidence in the VDR before recommending that the TSB Board proceed with the MME as *"the structure of the attestations is designed to ensure that the executive team member is attesting to the completeness of the evidence that's in the data room and its validity."*

## RELIANCE PLACED ON THE ASSURANCE MATRIX BY THE TSB BOARD

16.13 The importance of the Assurance Matrix was emphasised to the TSB Board at various points in the Programme. For example:

(A) At the 23 November 2016 TSB Board meeting, as part of a discussion on how to assess the appropriateness of the Migration Services Agreement ("**MSA**") and the Outsourced Services Agreement ("**OSA**") with SABIS from a *"conduct perspective"*, the TSB COO explained that *"[e]ach [Executive] would be required to sign off on their respective aspects of the assurance matrix. This was intended to provide an all encompassing assurance around the programme."*

(B) At the 11 December 2017 Audit Committee meeting, the TSB Risk Committee Chair referred to the issues that the TSB Board should be worried about at the MME, being *"the ability to recover on any level and whether all the critical functionality had been tested"*. In response, the TSB COO explained that *"individual [Executives] would have signed off on the full scope and complete testing of their dossiers through the mechanism of the Assurance Matrix"*. The Second TSB Board Adviser added that *"it all pointed back to the Assurance Matrix"*.

(C) In the 17 April 2018 T3 Memo, the TSB CEO referred to the Assurance Matrix as *"the principal first-line artefact demonstrating readiness of each [Executive] function"* which sought to *"draw together all of the key questions each part of the business must be able to answer to give confidence that it is prepared for the migration event and to operate post migration"*.

(D) During our Review, in a letter written to us on behalf of the TSB CEO we were told that *"the Assurance Matrix was an innovative and bespoke tool that enabled [the TSB CEO] and the [Executive] to draw together a complex and wide-ranging Programme into a digestible and clear decision-making tool for the TSB Board"*.

16.14 Given this, it is unsurprising that the TSB Board placed a large amount of reliance on the Assurance Matrix and on the Executives' Attestations when assessing the Programme's readiness for Go Live. A TSB INED told us how he thought the Assurance Matrix was *"one of the most robust pieces of assurance matrix and work I had ever seen…I know that a lot of people within the board felt the same way"*. When asked in what circumstances he might have come to the view that TSB was not ready to proceed with the MME if the Assurance Matrix had been complete, the TSB INED replied *"[i]f the assurance matrix was complete I'm struggling to understand why we would say no."*

## ISSUES WITH THE EFFECTIVENESS OF THE ASSURANCE MATRIX AT GO LIVE

16.15 There were, however, a number of issues in practice that undermined the effectiveness of the Assurance Matrix in relation to the three horizontals most relevant to the issues experienced by TSB and its customers after Go Live, that is: (i) 'Infrastructure'; (ii) 'IT Service Provider Contract'; and (iii) 'Applications'.

### Issues Relating to the 'Infrastructure' Horizontal

16.16 In order to determine readiness for Go Live, it was important for the Executives to have assessed the capability of the Proteo4UK Platform Infrastructure to perform as required at full scale (i.e. at the volumes of transactions and customers anticipated after Go Live).

16.17 The cells of the Assurance Matrix most relevant to this assessment were those on the 'Infrastructure' horizontal. However, as set out below, the evidence uploaded in support of those questions was flawed, and responsibility for scrutinising this evidence rested largely with the TSB CIO. This meant that an opportunity to identify the flaws in this evidence was missed.

## Flaws in the NFT Evidence

16.18 The results from Non-functional Testing ("**NFT**") were a key consideration for the Executives to take into account when assessing whether to mark the questions on the 'Infrastructure' horizontal as complete (as reflected in the evidence requirements for the relevant questions).

16.19 However, as set out in chapter 14, there were material issues with the Programme's design, execution, and reporting of NFT, which meant that the evidence uploaded to the VDR in respect of the NFT questions on the 'Infrastructure' horizontal was flawed and, consequently, the questions were incorrectly marked as complete.

## Overreliance on the TSB CIO

16.20 As set out at paragraph 16.10, the intention had been that each of the Executives would independently review and approve the evidence gathered for the Assurance Matrix questions falling within their areas of responsibility. This included each Executive independently confirming whether Performance Testing had demonstrated that the parts of the Proteo4UK Platform relevant to their business areas were ready to perform at full scale (i.e. ready to serve TSB's c.5 million customers).

16.21 For the MME, the decision was taken that, in respect of at least nine[2] questions relating to NFT, each Executive would rely on assurance provided by the TSB CIO when attesting to the completeness of those questions for their own functions.

16.22 Specifically, at the 9 February 2018 BEC DE meeting, the TSB CIO advised that *"NFT discussions had been taking too long"* and proposed that: (i) each Executive sign-off on their Non-Functional Requirements ("**NFRs**")[3] in their own Attestation; and (ii) the TSB CIO would confirm exactly which of these NFRs had been tested and which had not. In other words, each Executive would remain responsible and accountable for these nine questions in respect of their business areas, but they would answer those questions based on a confirmation provided by the TSB CIO that the testing had been completed to their requisite specifications.

16.23 As set out in paragraphs 14.28 and 14.29 of chapter 14, the 'TSB NFT Events - Final Report' was drafted by the TSB CTO's team with input from SABIS and was reviewed by the New TSB CTO and the TSB CIO. This report summarised the NFT results following work done by the TSB CIO and his team where they went through the list of NFRs one by one and *"cross-checked [them] against the [Executives'] attestations and determined which ones were more problematic and were in need of additional NFT assurance"*.

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[2] According to the NFT Memo, the nine NFT-related questions in relation to which reliance would be placed on the TSB CIO were: 2a.ii; 2a.iii; 2a.iv; 2b.ii; 2b.iii; 2c.i; 2c.ii; 2c.iii; and 2c.iv. However, we understand from TSB that reliance may also have been placed on the TSB CIO in relation to three additional questions relevant to NFT, being: 2d.ii; 2d.iv; and 3a.xvii.

[3] As explained further in paragraph 14.4 of chapter 14, typical NFRs cover the performance, efficiency, compatibility, usability, reliability, security, maintainability, and portability of an IT system.

16.24 The final version (version 5.0) of this report (the "**NFT Final Report**") was circulated on the afternoon of 17 April 2018 – the day before the Executives had to complete their Attestations as to readiness to proceed with the MME.

16.25 On that same afternoon, the TSB CIO also produced a two-page memorandum (the "**NFT Memo**") for the BEC DE, summarising certain of the content of the NFT Final Report. In the NFT Memo, the TSB CIO stated that he was *"satisfied with the results of the NFT carried out by Sabis jointly with the TSB CIO function"* and that the results:

> *"demonstrate that the Proteo4UK platform, associated systems and infrastructure will be able to support the 21 IT services that Sabis will provide to TSB under the [OSA], at the appropriate levels of resilience and capacity required"*.

16.26 As set out in paragraph 14.51 of chapter 14, the NFT Memo presented a more positive picture of NFT than was warranted, omitted a number of relevant facts, and relied on a number of caveated third and fourth party attestations.

16.27 It is clear that the Executives placed significant reliance on the NFT Memo when completing the nine NFT-related questions for their functional areas. On 17 April 2018, the TSB Products Director wrote in an email that the TSB CIO's NFT Memo *"allows me to turn the remaining NFR questions in the assurance matrix blue"* and the TSB CRO told us that there was a *"situation of a sole reliance on [the TSB CIO] to perform and attest to the non-functional testing"*.

16.28 While it was not necessarily unreasonable to rely on the TSB CIO to collate and review the NFT test results in respect of the other Executives' NFRs (given the potential efficiencies involved in centralising this task and the expertise of the TSB CIO),[4] it was important for the proper functioning of the Assurance Matrix that each of the other Executives did not just look at the NFT Memo, but also independently and critically reviewed the NFT Final Report itself so as to satisfy themselves that they could mark as complete the NFT-related questions in respect of their functional areas.

16.29 However, given that the NFT Final Report was not circulated until the afternoon of 17 April 2018, the Executives had very little time to consider it prior to finalising their Attestations. Indeed eight of the Attestations were finalised on the same day, with the remaining four finalised the following day. The TSB Distribution Director told us that he had not seen the NFT Final Report before providing his Attestation. We also heard from the TSB COO how, while she did see the NFT Final Report, she did not go through it line-by-line as she was concentrating more on conversations she was having with the TSB CIO.

16.30 We asked TSB to provide evidence as to whether and how the other Executives reviewed the NFT Final Report, but TSB declined to respond.[5]

16.31 This limited opportunity for the Executives independently and critically to review the NFT Final Report meant that the opportunity to identify the flaws in the underlying NFT evidence was missed.

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[4] We note that a similar decision to rely on the TSB CIO was not taken in relation to the results of Functional Testing. It is not clear why the Executives would necessarily have been better placed independently to review the results of Functional Testing, but not the results of NFT.

[5] See further chapter 23, paragraph 23.12(A).

## Issues Relating to the 'IT Service Provider Contract' Horizontal

16.32 In order to determine readiness for the MME, it was also important for TSB to have assessed the readiness of the IT service provider (SABIS) to operate the Proteo4UK Platform after Go Live.

16.33 We have listed at Appendix 4 the full set of questions for the cells on the 'IT Service Provider Contract' horizontal. However, none of these questions clearly assessed SABIS' readiness to operate the Proteo4UK Platform after Go Live. The scope of questions contained in the Assurance Matrix was therefore inadequate in this regard.

16.34 These questions (and in particular the underlying evidence to support them) appear to have focused more on the existence and terms of the contracts with SABIS (i.e. the MSA and OSA), than on the forward-looking question of whether SABIS would be ready to operate the full range of services required after Go Live. In this context, we note:

(A) The references to the relevant models being *"tested"* in questions 4a.ii[6] and 4b.i[7] could potentially have been interpreted as an assessment of SABIS' readiness to operate the Proteo4UK Platform after Go Live. When asked whether the Assurance Matrix included questions to assess SABIS' readiness to operate the Proteo4UK Platform after Go Live, the TSB CEO told us that this was covered explicitly by cell 4a of the Assurance Matrix, encompassing question 4a.ii.[8] [9] However, having reviewed the material stored in the VDR in relation to questions 4a.ii and 4b.i, we do not consider that the evidence uploaded provided satisfactory proof of SABIS' readiness to operate the Proteo4UK Platform after Go Live. In fact, TSB has confirmed to us that question 4a.ii related only to the existence (and testing) of the management model and not to the underlying performance of each service. A similar reasoning would also appear to apply to question 4b.i in respect of the operating model.

(B) The references to the historical performance of live SABIS business services in question 4c.v[10] and to service performance levels in question 4c.vi[11] may in part have covered SABIS' readiness to operate the Proteo4UK Platform. However, these questions were focused on an assessment of the limited set of services that SABIS was running before the MME, rather than on the forward-looking question of whether SABIS would be ready to operate the full range of services required after Go Live.

(C) When we asked TSB to identify which questions (if any) on the Assurance Matrix assessed underlying service performance by SABIS, TSB declined to respond.[12]

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6 4a.ii (*"Has the Service Management model with SABIS been documented and understood by all parties involved and has the model been successfully tested?"*).

7 4b.i (*"Is the operating model between TSB and SABIS for running the services documented, understood and tested with all resources trained and in place?"*).

8 Cell 4a also encompassed question 4a.i (*"Are all the in scope 3rd party services, KPI's and Service Levels clearly and correctly defined in the Service Schedule with SABIS (Outsourcing Services Agreement) and other directly, (TSB), held 3rd party IT supplier contracts?"*). This question, however, clearly relates to the terms of the contracts with SABIS and other third party IT suppliers, rather than SABIS' readiness to operate the Proteo4UK Platform after Go Live.

9 On further discussion, the TSB CEO also said *"[y]ou have to read the other questions"* and referred in particular to question 4b.i.

10 4c.v (*"If you have a SABIS business service live, do you understand the historic performance of that service from the monthly service and incident reporting data reviewed at the Services Executive Committee (SEC)?"*).

11 4c.vi (*"If you have a SABIS service that has fallen below service performance expectations, therefore requiring a formal Service Remediation Plan at SEC, are you satisfied that there is evidence that service performance levels have returned to target levels?"*).

12 See further chapter 23, paragraph 23.12(A).

16.35 Further, as set out in paragraph 18.60 of chapter 18, in his Attestation for the MME, the TSB CIO included a separate Attestation that SABIS was prepared for the MME, would perform all obligations under the MSA required before the MME, and would be ready to perform its remaining obligations under the MSA and OSA after Go Live.[13] This indicates that an assessment of SABIS' readiness was treated, to some extent, as additional to, and not fully covered by, the TSB CIO and other Executives' separate Attestations that the Assurance Matrices for their business functions were complete.

16.36 Given how important an assessment of SABIS' ability to run the Proteo4UK Platform was to an overall assessment of the Programme's readiness to Go Live, this failure of the Assurance Matrix to assess the readiness of SABIS to operate the full range of services required after Go Live was a significant limitation in the completeness and effectiveness of the Assurance Matrix as a readiness tool.

16.37 If the scope of questions in the Assurance Matrix had been adequately designed to include an assessment of SABIS' readiness to operate the Proteo4UK Platform after Go Live, we would have expected it to contain evidence requirements for a completed ISAE 3402 controls report as well as a report into SABIS' production readiness for Go Live.[14] For further discussion of TSB's assessment of SABIS' readiness, see chapter 15.

### Issues Relating to the 'Applications' Horizontal

16.38 In order to determine readiness for the MME, it was important for the Executives to have understood the extent of any outstanding Defects in relation to their areas of responsibility.

16.39 The Assurance Matrix question most relevant to this assessment was question 1a.ii in relation to functional Defects (*"Have your functional success criteria relating to requirements…been documented and successfully met (testing: UAT & MDT activities)?"*). The entry criteria for question 1a.ii were that: (i) there were no unmitigated Severity 1 and Severity 2 Defects; and (ii) must-have Functional Testing was complete.

16.40 However, as set out in chapter 17, TSB did not at the time have a clear understanding of the volume of Defects raised during the Programme and remaining open at the MME, suggesting that the evidence underlying question 1a.ii of the Assurance Matrix was necessarily inaccurate and incomplete.

16.41 Given how important an assessment of outstanding Defects was to the overall assessment of the Programme's readiness for the MME, the inadequacy of the evidence supporting the Assurance Matrix in relation to Defects (and the failure of the Assurance Matrix to identify this inadequacy) was a significant limitation in the effectiveness of the Assurance Matrix as a readiness tool.

## FURTHER OBSERVATIONS

16.42 The Assurance Matrix had the potential to be a very useful framework for assessing the Programme's readiness for the MME. In particular, there is significant merit in having a framework in place that requires each Executive to: (i) take ownership of whether their

[13] As set out in chapter 18, the evidence relied on by the TSB CIO to provide this attestation as to SABIS readiness was limited and inadequate.

[14] As set out in paragraph 15.12 of chapter 15, ISAE 3402 is a global assurance standard, titled *"Assurance Reports on Controls at a Service Organization"*. ISAE stands for International Standards for Assurance Engagements.

business areas are ready to Go Live; and (ii) document the basis on which they have reached that decision.

16.43 However, in practice, there were a number of factors that undermined its effectiveness, including a failure clearly to assess SABIS' readiness to operate the Proteo4UK Platform after Go Live, the evidence supporting key questions relating to Defects and NFT being inaccurate and incomplete, and an overreliance on the TSB CIO in relation to NFT.

16.44 The existence of these issues suggests that, given the import of a completed and evidenced Assurance Matrix to the decision to Go Live, there was a more general failure by TSB to step back and examine critically whether the Assurance Matrix covered all the right questions and that the evidence underlying those questions was robust.

# CHAPTER 17: DEFECTS

## KEY POINTS

- Information about unresolved defects can be a key indicator of platform completeness and stability, and is therefore an essential part of assessing whether a new platform is ready to go live.
- As part of our Review, we sought to conduct an objective analysis of the Defects within the Proteo4UK Platform over the lifetime of the Programme using a data set from a Defect management tool known as JIRA. Our analysis reached a number of significant conclusions. TSB has taken issue with some of these conclusions and, despite our best efforts, we have been unable to reconcile our Defects analysis with that of TSB.
- However, it is clear from both TSB's analysis and our own that:
  - the TSB Board was not provided with an accurate view of the Defects outstanding prior to Go Live - for example, there were at least two and a half times as many Defects as the number reported in the T3 Memo; and
  - there was a consistent backlog of Functional Testing Defects until TSB began deferring and de-scoping functionality in January 2018.
- The Programme's Defects records were disorganised and remained disorganised following the Main Migration Event. This: (i) prevented TSB from making the decision to Go Live with an accurate picture of the number and Severity of Defects; and (ii) could have hindered TSB's ability to rectify the issues that arose following Go Live.

## INTRODUCTION

17.1 IT transformation programmes commonly use metrics relating to defects (see insight box below) as key indicators of the completeness and stability of the relevant platform. For example, a large number of unresolved defects at the time a new platform is taken live suggests that the platform is likely to encounter problems or issues in live service. Similarly, a platform may be unstable if significant numbers of new defects are still being raised in the later stages of the programme, even if those defects are being resolved quickly.

17.2 TSB used defect-based measures as key indicators of the completeness and stability of the Proteo4UK Platform. For example:

(A) metrics such as the number (and Severity) of unresolved Defects and the Defect closure rate featured in the Programme Team's reporting;

(B) one of the key assumptions used in formulating the Defender Plan was that there would be sufficient capacity to fix all high and urgent Defects by Christmas 2017 (see Figure 11.3 in chapter 11);

(C) the Assurance Matrix entry criteria for both Applications and Infrastructure required there to be no unmitigated Severity 1 or Severity 2 Defects (being the two highest Severity categories) prior to Go Live; and

(D) at the final TSB Board meeting prior to Go Live, the TSB Board was told that *"of the c.85,000 defects raised during the programme, we will be taking around 800 defects into live, of which 300 are classified Severity 1 or Severity 2"*.

### What is a 'defect'?

- A 'defect' can be defined as anything that is identified during testing that is seen as a deviation from the business or technical requirements of a platform. This includes flaws or weaknesses in a platform that cause unintended or unwanted behaviours.
- TSB used the term 'defect' to describe both (i) deviations from requested functionality i.e. where SABIS had failed to deliver functionality that TSB requested, as well as (ii) changes to TSB's requirements, i.e. Change Requests for missing functionality or technical improvements to functionality previously requested ("**Defects**").
- Defects can be categorised both according to their Severity (i.e. the seriousness of a defect's impact on the business) and according to their priority (i.e. the priority which should be given to a defect by the team responsible for fixing it, largely based on the number of test cases the defect is blocking).

17.3 As part of our Review, we sought to conduct an objective analysis of the Defects in the Proteo4UK Platform throughout the Programme, with a particular focus on pivotal decision-making points such as the Replan and Go Live. This chapter describes the process that we followed and the conclusions that we have reached.

## OUR DEFECTS ANALYSIS

17.4 TSB and SABIS used a third party tool known as JIRA to log and track the Defects in the Proteo4UK Platform identified during testing ("**JIRA**"). JIRA is a system that enables the management of Programme issues and Defects, and also provides management information about, and reporting dashboards for, the underlying Defects data. Defects were identified at almost every stage of testing, and all of the Defects identified were to be recorded and managed in JIRA, making it the single data source for Defects in the Proteo4UK Platform. SABIS was responsible for reviewing and fixing the Defects.

17.5 We have faced a number of obstacles and difficulties in attempting to carry out an analysis of the Defects in the Proteo4UK Platform during the course of our Review.

17.6 We first requested access to JIRA on 13 September 2018. While a number of extracts were provided between late September and mid-October 2018, these were largely incomplete and unworkable. We received direct access to JIRA on 9 November 2018, but we were still unable to extract a full data set due to further issues with the completeness of the data provided and certain other issues. We finally received what we were told was the complete data set on 22 November 2018 (the "**SABIS JIRA Extract**").

17.7 From our analysis of this data, we formed the following key conclusions.

## Functional Defects before the Replan (July 2016 to October 2017)

17.8 Typically, there is an expectation that the backlog of open Defects should reduce towards the end of User Acceptance Testing ("**UAT**") (due to the completeness and quality of the code improving). However, our analysis suggests that the volume of open functional Defects created during the Functional Testing phase instead grew steadily during the period from the start of Functional Testing execution in October 2016 to the end of October 2017.

(A) From October 2016 to October 2017, a cumulative total of 34,671 functional Defects were created and a total of 31,419 were closed.

(B) Before the Replan, an average of 520 functional Defects were created per week, whilst an average of only 466 were closed per week.

(C) The average age (i.e. the Defect turnaround time) of functional Defects in the period before the Replan was 17 days.

## Functional Defects after the Replan (October 2017 to April 2018)

17.9 Despite the expectation that the Proteo4UK Platform would become more complete and stable following the October 2017 Replan and in the months leading up to Go Live, our analysis suggests that the rate of Defect creation actually increased after the Replan. In particular:

(A) Of the total number of functional Defects raised by the Programme prior to Go Live (c. 57,093), c. 22,256 of these or 39% were raised between 24 October 2017 and Go Live, i.e. during the Programme's final stages.

(B) The weekly functional Defect creation rate, which had averaged 520 Defects per week during the period prior to the Replan, increased significantly to an average of 956 Defects per week in the three months following the Replan.

(C) The backlog of open functional Defects increased from 3,334 at the end of October 2017 to 3,590 at the end of January 2018 (i.e. the month in which UAT was meant to have been completed according to the Defender Plan).

(D) The average age (i.e. the Defect turnaround time) of functional Defects in the period after the Replan increased to 20 days.

## Defects in the Lead up to the Go Live Decision (April 2018)

17.10 Typically, IT transformation programmes would expect a downward trend in the number of defects being raised in the weeks and days leading up to the new platform going live. However, our analysis suggested that a significant number of Defects remained open and new Defects continued to be raised, indicating that the Proteo4UK Platform was not complete:

(A) On 10 April 2018, twelve days before Go Live, the Programme had a Defect backlog of 5,349 Defects, 840 of which were classified as Severity 1 or Severity 2 (i.e. the highest Severity levels).

(B) 2,551 Defects were closed in JIRA between 9 April and 22 April 2018, suggesting fixes were being deployed in the Production Environment in the days leading up to the

Main Migration Event ("**MME**") (despite the intention to have a *"fixed code base"* (see chapter 11)).

(C) There were 4,424 Defects recorded as having been raised on or before 18 April 2018 and which were still open at Go Live.[1]

(D) Between 2 April and 22 April 2018, 3,374 new Defects were raised (i.e. over 1,000 Defects per week). A further 446 new Defects were raised on the MME Weekend itself, and of these 395 Defects were still open on 22 April 2018.

### Post-MME Period (April 2018 onwards)

17.11 The Programme continued to raise significant numbers of new Defects until at least November 2018, the month we received the SABIS JIRA Extract. In particular, 4,596 Defects were created between 23 April and 3 May 2018 and 7,632 Defects were created between 4 May and 18 June 2018.

## TSB'S CRITICISMS OF OUR DEFECTS ANALYSIS

17.12 Our analysis of the Programme's Defects has been criticised by TSB, which has argued that our observations are premised on an incorrect analysis of the underlying JIRA data. TSB's primary criticism of our analysis is that it includes JIRA entries that were opened for reasons unrelated to the MME (primarily because JIRA was also used by TSB and SABIS to manage Defects for services that had already gone live, and changes to the Platform deferred for release after the MME).

17.13 In response to the Defects analysis in our Exposure Draft, TSB produced its own analysis (the "**TSB Defects Analysis**"). According to this analysis, the number of outstanding Defects at 18 April 2018 was 4,396. This is very similar to the number of outstanding Defects that we found in our analysis (4,424). However, the TSB Defects Analysis concluded that as at 18 April 2018, there were only 98 outstanding Defects that TSB considers to be the *"relevant population [of Defects] applicable to MME from the total JIRA population"*. In our view, TSB only arrived at this number by inappropriately excluding a number of major categories of Defects.

17.14 The TSB Defects Analysis excluded (amongst others) the following major categories of Defects:

(A) Defects arising from TSB Beta and testing other than Functional Testing - TSB excluded any Defects that did not arise from UAT and Migrated Data Testing ("**MDT**"). This excluded any Defects relating to TSB Beta, Non-functional Testing ("**NFT**"), System Integration Testing ("**SIT**"), Unit Testing ("**UT**"), or Production-like Assurance ("**PLA**"), or to the event testing for the Dress Rehearsals ("**DRs**") and Migration Acceptance Cycles ("**MACs**"). When considering the number of Defects in the Proteo4UK Platform at the point of Go Live, we do not see how the Defects arising from these testing activities could reasonably be excluded.

(B) Deferred Defects - TSB excluded any Defects in relation to functionality that it had decided it could defer via the relevant governance process, including the Migration

[1] These figures represent the number of Defects found in JIRA at this particular point in time, and are therefore a snapshot of the Defects that were in the system at one point on the day in question.

Deferred Defects Forum process ("**MDDF**"). Again, we do not consider this to be a valid reason to exclude these Defects from the analysis, particularly because TSB did not exclude this type of Defect from the Defects analysis that it presented to the TSB Board in the T3 Memo (i.e. the *"around 800 defects"* quoted in paragraph 17.2(D)).

(C) Non-MME Defects - TSB excluded any Defects that related to functionality that was already live (such as the services which comprised the Early Cutovers). These services would continue to be available to customers on the Proteo4UK Platform following Go Live and therefore any Defects relating to these services would provide insight into the Platform completeness both before and following Go Live.

17.15 We made further attempts to engage with TSB following our receipt of the TSB Defects Analysis, in order to be able to understand fully the approach it had taken and reconcile this approach with our own. A meeting took place on 25 July 2019 with the TSB Migration Director and TSB Head of Change Delivery at which they helpfully guided us through the TSB Defects Analysis. It became clear from this meeting that TSB had been working with a different data set to the SABIS JIRA Extract.

17.16 TSB told us that as the JIRA records were disorganised, TSB had looked at each Defect individually to validate its categorisation into the relevant Programme workstream. TSB also acknowledged that it was difficult to get a consolidated view of the Defect position because Defects were managed in siloes reflecting the respective testing responsibilities of TSB and SABIS. As a result, TSB had focused on the Defects arising from Functional Testing and this is reflected in the incomplete reporting of the Programme's outstanding Defects in the T3 Memo.

## COMMON CONCLUSIONS ON PROGRAMME DEFECTS

17.17 The Defects information provided to us by TSB was not at a level of granularity that allowed us to compare the data set that we reviewed with the data set that had been used for the TSB Defects Analysis. While TSB provided us with a breakdown of the various Defect categories at our request, it refused to provide us with the underlying data used for the TSB Defects Analysis. Without the underlying data informing TSB's Defect categorisation, we have been unable to reconcile the TSB Defects Analysis with our own.

17.18 However, a number of common conclusions can be drawn from both the TSB Defects Analysis and our own analysis. These are as follows.

### Functional Defects before the Replan (July 2016 to October 2017)

17.19 As mentioned in paragraph 17.1, the backlog of unresolved Defects was an important indicator of the completeness of the Proteo4UK Platform. Both the TSB Defects Analysis and our analysis of Defects found that the backlog of open functional Defects grew consistently during the period from October 2016 to April 2017 and then remained steady until the Replan.

## Functional Defects after the Replan (October 2017 to April 2018)

17.20 Both the TSB Defects Analysis and our analysis of outstanding Defects found that the backlog of unresolved Defects prior to the Replan did not fall materially between the Replan (according to the TSB Defects Analysis, 2,350) and January 2018 (according to the TSB Defects Analysis, 2,305) and only began to decrease after this point. As described in chapter 11, this decrease coincides with the start of the 'migration ready testing' approach in which Items of Functionality (and their associated Defects) were deferred or de-scoped from what was required for the Proteo4UK Platform at Go Live.[2]

## Defects in the Lead up to the Go Live Decision (April 2018)

17.21 The T3 Memo did not present an accurate picture of the outstanding Defects to the TSB Board. There was nothing in the main body of the T3 Memo that indicated to the TSB Board that the c.800 outstanding *"defects"* was limited to Functional Testing Defects nor that these were in fact linked to Items of Functionality, each of which may have represented multiple Defects. In particular, there was nothing in the T3 Memo indicating to the TSB Board that there were outstanding Defects arising from other types of testing and Live Proving.

17.22 The TSB Defects Analysis states that there were at least 2,061 Defects relating to Functional Testing at the time of the Go Live decision whereas only c.800 *"defects"* were presented to the TSB Board. TSB told us that the number of *"defects"* presented to the TSB Board were in fact Items of Functionality representing groups of 1,270 Defects. There were also a number of Defects relating to Functional Testing not included in the presentation to the TSB Board.[3]

17.23 There were a significant number of Defects that arose from testing other than Functional Testing and these Defects were also not included in the reporting to the TSB Board prior to Go Live. TSB's analysis indicates that at the time of the Go Live decision, there were 1,256 Defects relating to other forms of testing that SABIS were managing.

17.24 According to the TSB Defects Analysis therefore, there were at least a total of 3,317 Defects prior to Go Live and this number was not reported to the TSB Board in the T3 Memo.

# FURTHER OBSERVATIONS

17.25 TSB did not at the time and still did not during the course of our Review have a comprehensive view of the Defects raised during the Programme and remaining open at the MME. We would expect a set of Defect statistics agreed between TSB and SABIS to inform the decision to Go Live, and in fact the Assurance Matrix entry criteria for both Applications and Infrastructure required there to be no unmitigated Defects of the two highest Severity categories prior to the MME.

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[2] See chapter 11, paragraphs 11.30, 11.34 and 11.35.

[3] TSB told us that the Functional Testing Defects not reported to the Board *"were assessed by MDDF or business teams pre migration and deemed to not be material for go-live (with the exclusion of 39 defects that are lacking evidence of management treatment or deferral, due to admin errors)".*

17.26 Instead, the JIRA Defects records were disorganised, both by category and priority, which prevented TSB from making the decision to Go Live with an accurate picture of the number and Severity of outstanding Defects.

17.27 In addition, the EY Root Cause Analysis Report commented that the fact that issues such as the state of the Programme's JIRA records (including duplicated records and inconsistent application of the priority criteria) *"could potentially have impacted the ability of [TSB and SABIS] to address the incidents that arose post-MME, by diverting resources to the analysis of duplicated issues, [and] focussing on addressing issues with a higher priority than that warranted by the established priority criteria"*.

# CHAPTER 18: THE DECISION TO GO LIVE

## KEY POINTS

- During the course of April 2018, TSB held a series of governance meetings leading to the final decision for TSB to Go Live with the Proteo4UK Platform.
- The TSB Board meeting on 10 April 2018 was less than two weeks prior to the MME, and it was the last TSB Board meeting before the TSB Board was to be asked to authorise the MME Board Sub-Committee to initiate the MME (on 18 April 2018). The TSB Board should have used its 10 April meeting as an opportunity to interrogate the status of the Programme given:
  - at this meeting, the TSB Board was to decide whether TSB should serve the Definitive Notice of Migration on LBG;
  - at the time of this meeting, fundamental Programme elements such as testing were not yet complete, and the TSB CEO did not have complete Attestations from BEC members. This should have alerted the TSB Board to the frantic pace at which key Programme activities were being finalised in the lead up to Go Live; and
  - having already postponed Go Live once, it would have been easier to discuss whether the evidence supported the need for a further delay at the 10 April TSB Board meeting (10 days before the scheduled start of the MME Weekend) rather than at the 18 April TSB Board meeting (only two days before the scheduled start of the MME Weekend).

  In the event this opportunity was missed.
- At its 18 April 2018 meeting, the TSB Board delegated authority to the MME Board Sub-Committee to initiate the Main Migration Event. The MME Board Sub-Committee met three times following this TSB Board meeting, and made the decision to Go Live on 22 April 2018.
- The TSB Board did not have a proper understanding of the state of the Programme when taking key decisions in April 2018. The TSB Board, in particular, had been presented with inaccurate or inadequate information about several key factors:
  - the number of open Defects in the Proteo4UK Platform;
  - the stability of the Proteo4UK Platform;
  - the limitations in the design, execution and reporting of Non-functional Testing;
  - the capacity of the Citrix Infrastructure; and
  - SABIS' readiness to operate the Platform in accordance with its obligations under the OSA.
- Had the TSB Board or the MME Board Sub-Committee been presented with more complete and accurate information about these key factors, we believe that they would have concluded that TSB was not ready to Go Live on 22 April 2018.

## INTRODUCTION

18.1 The Programme culminated in the Main Migration Event (the "**MME**") over the weekend of 20-22 April 2018 (the "**MME Weekend**"). During the MME, TSB's customer data was migrated from the LBG IT Platform onto the Proteo4UK Platform, and the Proteo4UK Platform was put live to TSB's customers. This chapter:

(A) describes the key governance meetings that took place in April 2018, which culminated in TSB deciding to proceed with the MME (the decision to "**Go Live**"); and

(B) explains how and why the decision to Go Live was made on the basis of inaccurate and incomplete information.

## KEY TSB GOVERNANCE MEETINGS

### Figure 18.1: Summary of Key TSB Governance Meetings in April 2018

| Date and time | Length of meeting | Governance body | Key MME-related decision |
|---|---|---|---|
| 10 April 2018 (16:30-17:20) | 50 minutes | TSB Board | Approval of the serving of the Definitive Notice of Migration on LBG on 12 April 2018. |
| 18 April 2018 (10:00-12.45) | 2 hours and 45 minutes | TSB Board | Delegation to the MME Board Sub-Committee[1] of authority to grant approval to initiate the MME over the weekend of 20-22 April 2018. |
| 19 April 2018 (08:30-08.45) | 15 minutes | MME Board Sub-Committee | Authorisation of the Executive Gold Team to initiate the MME over the weekend of 20-22 April 2018.[2] |
| 22 April 2018 (10:00-10:15) | 15 minutes | MME Board Sub-Committee | No decisions made. |
| 22 April 2018 (13:00-13:10) | 10 minutes | MME Board Sub-Committee | Authorisation of the Executive Gold Team to complete the MME and to Go Live. |

18.2 Figure 18.1 summarises the key TSB governance meetings held in April 2018. In summary, there were three key stages to TSB's decision making process in April 2018:

(A) the 10 April decision by the TSB Board to serve the Definitive Notice of Migration on LBG, thereby surrendering the Carve-out Exit Option and committing TSB to the Proteo Exit Option;

[1] The MME Board Sub-Committee comprised the Current TSB Chairman, the Sabadell Group COO, the TSB Audit Committee Chair, and the TSB CEO. It was empowered to authorise the Executive Gold Team to initiate the MME, and to make the decision to Go Live (i.e. to proceed with the migration of TSB's data from the LBG IT Platform to the Proteo4UK Platform).

[2] The Executive Gold Team comprised the TSB CIO, the TSB COO and the Sabadell Group CIO, the former two of whom were jointly the 'Gold Command & Control' leads.

(B) the 18 April decision by the TSB Board to delegate authority to a sub-committee (the "**MME Board Sub-Committee**") to authorise the initiation of the MME over the MME Weekend; and

(C) the meetings of the MME Board Sub-Committee between 19 April and 22 April during which they prepared for and ultimately made the decision to Go Live.

## 10 April 2018 – Decision to Serve the Definitive Notice of Migration on LBG

18.3 The 10 April TSB Board meeting took place less than two weeks before the scheduled Go Live, and was the last TSB Board meeting before the TSB Board would (eight days later) meet to consider the TSB CEO's recommendation to progress to the MME Weekend. As such, it was a critical point at which the TSB Board should have taken a step back and reflected on whether the Programme was progressed sufficiently such that TSB would be ready to Go Live safely over the weekend of 20-22 April 2018. The TSB Board ought to have paused and reflected on the following matters:

(A) at this meeting, the TSB Board decided to serve the Definitive Notice of Migration (which was subsequently served on LBG on 12 April 2018);

(B) at the time of this meeting the TSB Board was told that the TSB CEO did not yet have completed Attestations (see paragraph 18.9) and testing, a fundamental element of the Programme, was still ongoing (see paragraph 18.10, and for more detail regarding ongoing testing see chapters 11 and 14). This ought to have given rise to more robust questioning from the TSB Board about whether it was realistic to expect that enough could be done in the next 12 days to ensure that the Programme was ready to Go Live safely; and

(C) having already postponed the Go Live date once (see chapter 12), and given the gravity of a decision to delay the Go Live date once again if that would be required, the 10 April TSB Board meeting (10 days before the scheduled start of the MME Weekend) presented a better opportunity for consideration and discussion of any such need for a further delay to Go Live than the 18 April TSB Board meeting (which was only two days before the scheduled start of the MME Weekend).

18.4 A memorandum from the TSB CEO to the TSB Board explained that the effect of the Definitive Notice of Migration was that TSB would be *"waiving its right to a carve-out"* and *"committed [TSB] to exiting the TSA via a migration at some point not sooner than 7 calendar days after serving of the Notice"*. Whilst giving up the Carve-out Exit Option did not commit TSB to proceed with Go Live over the 20-22 April 2018 weekend, serving the Definitive Notice of Migration did commit TSB to proceed with the Proteo Exit Option.

18.5 The TSB CEO explained to us (in the course of our review, and more than a year after the MME) the importance of retaining the Carve-out Exit Option as follows:

(A) *"retaining the carve-out was the ultimate risk mitigant for TSB: if it transpired that SABIS could not build or demonstrate its readiness to operate the Platform to TSB's standards, TSB could have opted not to migrate and instead opted for a carve-out"*; and

(B) *"Ultimately, the TSB Board could decide if and when to give up the carve-out option and only did so once it was confident that SABIS could meet its obligations under the [MSA] and the [OSA]"*.

18.6 The TSB CEO's comments about the importance of the Carve-out Exit Option are precisely why the TSB Board ought to have used this decision to surrender the Carve-out Exit Option on 10 April as an opportunity to interrogate more closely the readiness of the Protoeo4UK Platform and SABIS' readiness to operate it, as well as how the Programme was performing against the Defender Plan.[3]

18.7 The decision to serve the Definitive Notice of Migration was an important symbolic watershed: the final commitment to the Proteo4UK Platform. Given the TSB Board was only eight days away from making its decision on 18 April for TSB to enter into the MME Weekend, the TSB Board should have reflected on whether it would reasonably be ready to Go Live safely with a complete and stable Platform in 12 days' time.

18.8 In that context, the TSB Board should have reflected on the fact that, as at 10 April 2018, the Programme had deviated from the Defender Plan in several material respects. User Acceptance Testing ("**UAT**") had not been completed at the end of January as planned, which meant that major Programme workstreams, including Non-functional Testing ("**NFT**"), were running in parallel right up to April 2018. One of the Guiding Principles in the Defender Plan (sensibly, given the nature of the Programme) was that the Programme would *"have reduced levels of parallel work streams to decrease regression risk and resourcing schedule contention"* (see chapter 13 for more detail about the Defender Plan and its Guiding Principles). The effect of major workstreams such as UAT and NFT running in parallel was that the Programme was falling foul of this Guiding Principle. Further, a large number of Items of Functionality were deferred until after Go Live, because there was not enough time prior to Go Live to get them working.

18.9 Unfortunately, it appears that there was no detailed discussion of any of these matters at the 10 April TSB Board meeting. The minutes of that meeting record that a *"high level summary"* was provided on the *"status of migration readiness"*, and there was a discussion about the *"different"* approach to regression testing that the Programme had taken as compared to what had been planned (i.e. that the dedicated regression testing phase had not taken place – see chapter 13). In addition, as at 10 April, not all of the Attestations were complete, and the TSB CEO's expectation was that all Attestations (and therefore the Assurance Matrix) would only be complete by *"the end of Tuesday 17 April"*, just one day before the TSB Board's decision to enter into the MME Weekend.

18.10 In response to the Current TSB Chairman and a TSB INED expressing the view that it was important for the Executive to "*provide an overall assessment that the amount of testing was appropriate and reasonable"*, the TSB CEO advised that *"although not at this stage fully completed, based on the assurance undertaken by each of the three lines of defence, his expectation was that the Executive would be in a position to confirm on 18 April that the level of testing was appropriate and reasonable"*.

18.11 The TSB Board should have been more engaged in an assessment of, and provided stronger challenge to, the Executive's explanation on the adequacy of testing, and requested more details about the status of the Programme's readiness, particularly given the extent to which the Programme had deviated from the Defender Plan. The fact that the TSB CEO did not yet have completed Attestations, and was not yet able to confirm that testing had been appropriate and reasonable, and that these important assurance indicators would not be

[3] We question the emphasis that the TSB CEO places on the importance of retaining the Carve-out Exit Option as we do not think it was practical, particularly at such a late stage, for TSB to have opted to take up the Carve-out Exit Option. Indeed the minutes of the 10 April TSB Board meeting record that just prior to Go Live, the TSB CEO himself considered the residual risk of serving the Definitive Notice of Migration to be "*minimal as it was inconceivable to him that carve-out remained a viable option for TSB.*"

completed until the end of 17 April at the earliest, should have alerted the TSB Board to the frantic pace at which key Programme activities were being finalised so close to the proposed date for Go Live. This should have prompted the TSB Board to scrutinise more closely whether it was reasonable to expect that TSB would be ready to Go Live safely with the new Proteo4UK Platform to c.5 million customers in less than two weeks' time.

18.12 The Current TSB Chairman made a number of requests at the 10 April TSB Board meeting for the discussion to be had by the TSB Board on 18 April 2018 including for the *"BEC member attestations to evidence more directly to there being nothing in their respective functional areas that would prevent them from supporting the [TSB CEO]'s recommendation to proceed with the migration"*. It would have been more appropriate for the discussion arising from this general request to have happened at the 10 April TSB Board meeting, with each BEC member being required to explain to the TSB Board, at that stage, what was complete in his or her area, and what was outstanding and therefore required to be completed in the next eight days. The 18 April TSB Board meeting would therefore have focused properly on the status of completion of the items that had been outstanding as at 10 April.

18.13 In our view, it would have helped the BEC members who were required to give Attestations to know that they were providing a view on completeness, and a plan for the completion of outstanding items, sufficiently in advance of the TSB Board's decision on 18 April, rather than providing that view at the meeting at which the TSB Board was to decide to enter into the MME Weekend, where the impact of a BEC member expressing reservations would be effectively to block the decision to Go Live. The momentum of the final stages of such a large project is such that it would make it extremely difficult for someone to raise their hand and say "*I don't think we are ready to go*" the closer to the Go Live date that this issue was raised.

## 18 April 2018 - Decision to Authorise the MME Board Sub-Committee to Make the Decision to Go Live

18.14 The TSB Board meeting on 18 April was the last time the TSB Board met as a whole before Go Live, and was the TSB Board's final chance to consider the available evidence as to whether TSB was ready to Go Live on Proteo4UK. At this meeting, the TSB Board approved the TSB CEO's recommendation to proceed with the MME Weekend by delegating authority to the MME Board Sub-Committee to initiate the MME over the weekend of 20-22 April 2018. The TSB CEO's recommendation and supporting evidence[4] was contained in a document called the T3 Memo.[5]

18.15 Along with the Assurance Matrix, the T3 Memo was a key readiness tool for the Programme.

18.16 There were some material flaws in the T3 Memo, which meant that it did not provide the TSB Board with all of the information needed to assess the Programme's readiness prior to making the decision to delegate authority to the MME Board Sub-Committee to authorise the

[4] The TSB CEO had asked BEC members to provide him with "*a signed attestation, testifying to the readiness of their function for T3 and beyond*" and "*confirming their support for the Recommendations [he made] in [the T3 Memo]*". Each BEC member's Attestation addressed the Assurance Matrix questions for their area (see chapter 16).

[5] A draft of the T3 Memo was first circulated by the TSB CEO to the TSB Board in June 2017, and it continued to develop (and was discussed at TSB Board meetings) over the following 10 months until it was presented to the TSB Board at its 18 April meeting.

initiation of the MME over the weekend of 20-22 April 2018. These flaws are discussed at paragraphs 18.19 to 18.20.

## 19-22 April 2018 - Lead up to the MME Weekend and the MME Weekend

18.17 The MME Board Sub-Committee met three times between 19 April 2018 and 22 April 2018 (see Figure 18.1). At the third meeting of the MME Board Sub-Committee at 13:00 on Sunday 22 April 2018, the TSB COO advised that:

> *"the Executive Gold team were recommending that the migration be completed, with each functional area being supportive of this recommendation and no issues being raised by the second and third line observations that would suggest that the migration should not complete".*

18.18 The MME Board Sub-Committee then authorised the Executive Gold Team to complete the MME. TSB completed the MME at approximately 18:00 on 22 April 2018, following which TSB's c.5 million customers were given access to its new online banking system.

# PROBLEMS WITH THE DECISION TO GO LIVE

18.19 Because of materially inaccurate or inadequate reporting, the decisions of the TSB Board and the MME Board Sub-Committee in April 2018 were made without a proper understanding of several relevant factors:

(A) the number of open Defects in the Proteo4UK Platform (see chapter 17 and paragraphs 18.21 to 18.24);

(B) the stability of the Proteo4UK Platform (see paragraphs 18.25 to 18.29);

(C) the limitations in the design, execution and reporting of Non-functional Testing (see chapter 14 and paragraphs 18.30 to 18.48);

(D) the capacity of the Citrix Infrastructure (see paragraphs 18.49 to 18.54); and

(E) SABIS' readiness to operate the Proteo4UK Platform in accordance with its obligations under the Outsourced Services Agreement ("**OSA**") (see chapter 15 and paragraphs 18.55 to 18.85).

18.20 Each of these key factors is considered in turn below. Had the TSB Board and/or the MME Board Sub-Committee been presented with more complete and accurate information about these key factors, we believe that they would have concluded that TSB was not ready to Go Live on 22 April 2018.

## Defects in the Proteo4UK Platform at the Time of Go Live

18.21 In its consideration of the evidence available to determine whether "*the bank that [TSB would] go live with*" on 22 April would be "*sufficiently complete to enable [TSB] to serve [its] customers adequately*", the T3 Memo identified that a number of "*defects*" would be taken into the live environment:

> *"of the c.85,000 defects raised during the programme we will be taking around 800 defects into live".*

18.22 However, the TSB Defect Analysis, which was compiled by TSB after the MME in response to the Defects analysis in our Exposure Draft (see chapter 17), confirms that the "*800 defects*" were not a subset of the "*c. 85,000 defects*", and that there were a number of Defects present in the Platform at the time of Go Live which were not reported in the T3 Memo. Specifically:

(A) the "*800 defects*" were not actually Defects, they were 'Items of Functionality';

(B) even when identified correctly as Items of Functionality, those specific 800 Items of Functionality that were reported in the T3 Memo represented, in aggregate, 1,270 Defects;

(C) in addition to these, a further 791 Defects relating to Functional Testing were present in the Proteo4UK Platform at Go Live, and were not related to the "*800 defects*" reported in the T3 Memo. Therefore, at the time of Go Live, there were actually 2,061 Defects relating to Functional Testing present in the Proteo4UK Platform; and

(D) there were an additional 1,256 Defects present in the Platform at the time of Go Live, which had been identified outside of Functional Testing (for example, in TSB Beta, NFT and System Integration Testing). These were not reported in the T3 Memo, and there was nothing in the main body of the T3 Memo that indicated to the TSB Board that these "*800 defects*" were limited to Functional Testing Defects.

18.23 Accordingly, the number of Defects that were actually present in the Platform at Go Live was 3,317, a significantly greater number than that reported to the TSB Board in the T3 Memo on 18 April. As we explained in chapter 17, TSB did not at the time of Go Live, and did not during the course of our Review, have a comprehensive view of the Defects raised during the Programme and remaining open at the MME.

18.24 The Programme should have carried out a proper assessment of the Defects present in the Platform prior to Go Live. We would expect the decision to Go Live to have been informed by a set of Defect statistics that had been agreed between TSB and SABIS.

## Stability of the Proteo4UK Platform

18.25 In its consideration of the evidence available to determine whether "*the bank [TSB would] go live with*" on 22 April would be "*sufficiently stable to enable [TSB] to serve [its] customers adequately*", the TSB CEO wrote in the T3 Memo that he had "*taken into account the 1st line attestations, particularly of the [TSB CIO] and [the TSB COO], the results we have seen from our various test phases, ranging from UAT and MDT to NFT and TSB Beta; and the stability we have experienced following the code lock-down on 8th April*".

18.26 In this context, we understand that "*stability*" is a period where there is a significantly reduced volume of change being introduced to a platform as major phases of testing are being completed. However, it is important to understand the limitations of the test phases and the code lock-down that the TSB CEO relied on to evidence the stability of the Platform.

18.27 In relation to the TSB CEO's reference to the "*results we have seen from various test phases, ranging from UAT and MDT to NFT and TSB Beta*", we note that:

(A) there was a significant delay in Functional Testing (User Acceptance Testing ("**UAT**") and Migrated Data Testing ("**MDT**")), and it was only completed because of systematic deferral of Items of Functionality until after Go Live (see chapter 11);

(B) there were limitations in the design, execution and reporting of Non-functional Testing, and due to delays, it was still being executed in the days leading up to the MME Weekend (see chapter 14, and paragraphs 18.30 to 18.48);

(C) the duration, scope, and scale of TSB Beta meant it was of limited value in terms of giving assurance that TSB was ready to Go Live on Proteo4UK (see chapter 10); and

(D) TSB did not undertake a specific regression testing phase as it had planned to do in the Defender Plan, and the "*other elements of the plan*" relied on by TSB to justify the lack of regression testing phase, such as TSB Beta, were not an adequate substitute (see chapter 13).

18.28 In relation to the "*code lock-down*", which was implemented on 8 April 2018:

(A) given the newness of the Platform and the choice of a predominantly single event migration approach, we would have expected that there would be a sufficient period of time after completion of the Functional Testing during which there would be a code lock-down (i.e. a period where changes to the code are limited and more carefully controlled) in order for the Programme to focus on NFT and Live Proving (see chapters 7, 8, and 13). This approach was needed to demonstrate whether the Platform could operate at volume;

(B) in the Defender Plan, TSB itself had envisaged that Functional Testing (including a regression testing phase) would be completed by the end of January 2018, following which there would be a six week period from February 2018 to mid-March 2018 (the point at which TSB was to be "*Migration ready*") during which the only activity would be Dress Rehearsals, and "*Additional Assurance*" of both NFT and Live Proving (see chapter 13, Figure 13.2); and

(C) in the event, TSB's code lock-down was implemented on 8 April 2018, which was only 10 days before the TSB Board met to consider the T3 Memo on 18 April 2018. The code lock-down was not absolute, and TSB continued to apply "*hot fixes*".

18.29 Accordingly, the TSB CEO's confidence in the results from the "*test phases*" (i.e. the testing and Live Proving carried out by the Programme), and the "*code lock-down*", as indicators of stability, was misplaced.

## Non-functional Testing

18.30 As explained in chapter 14, there were a number of shortcomings with the design, execution and reporting of NFT, in particular, Performance Testing, which meant that the TSB CEO's reliance on NFT results as evidence of stability was misplaced. These shortcomings included:

(A) shortcomings in the design of NFT:

(i) TSB and SABIS did not run Performance Testing on the Active/Active configuration of the Proteo4UK Platform, and therefore did not test Applications across the entire Infrastructure. TSB has acknowledged that had this been done, some of the post-MME issues that were caused by

configuration inconsistencies might have been identified (see paragraphs 14.11 to 14.19 in chapter 14);

(ii) the soak tests that were run as part of the Branch Event to test the branch Infrastructure were only run for two hours. As the branch employees would use the Platform throughout the working day, a longer period of testing was required (see paragraph 14.23 in chapter 14); and

(iii) only *"read-only"* transactions, and not transactions that would update data, were tested in the Production Environment. Therefore no NFT was undertaken for payments transactions on Digital Channels (see paragraphs 14.20 to 14.22 in chapter 14); and

(B) shortcomings in the execution and reporting of NFT:

(i) while the original NFT Target load for Mobile App and Internet Banking login was 150% of peak login volumes, the target load was reduced when the Digital tests were not passing at this original NFT Target load (i.e. the threshold for passing the test was lowered in order to allow the test to be passed). None of the results for the Digital login tests conducted with a load at 150% of peak were reported in any of the versions of the NFT Events Report, and therefore none of these results were taken into account for the Assurance Matrix, or in the Attestations of the BEC members, or in the T3 Memo. The NFT Final Report said that Digital was proven at 100% of peak with 150% *"pending"* (see paragraphs 14.31 to 14.37 in chapter 14);

(ii) Non-functional Testing ran in parallel with Functional Testing and continued up to the MME (see paragraph 14.27 in chapter 14); and

(iii) TSB's reporting in relation to NFT results from the Telephone Channel and on NFT readiness was misleading. In both instances, the RAG status was upgraded on the instruction of the TSB CIO despite evidence he had received that did not support the upgrade (see paragraphs 14.44 to 14.50 in chapter 14).[6]

18.31 Given the newness of the Channel Applications and Middleware with which TSB was going live, we would have expected the TSB Board to have been provided with more information about NFT, particularly Performance Testing, before the decision to Go Live was taken. However, there was very little information about NFT in the T3 Memo, particularly in comparison with the detailed reporting on Functional Testing. Given TSB was putting all its customers live at the same time, for the first time, on the Proteo4UK Platform, and given the lack of detail provided about NFT in the T3 Memo, we would have expected the TSB Board to ask for more information about Performance Testing. We would have also expected the Second TSB Board Adviser to have asked for, or advised the TSB Board to ask for, more information from the Executive about NFT.

18.32 The TSB CEO told us that had he *"known of the shortcomings in NFT and the issues that would arise after the MME, he would never have recommended that TSB initiate the MME"*. The fact that the TSB CEO was not aware of these shortcomings of NFT in the Programme is a failure of reporting in the Programme.

[6] See chapter 14 on Non-functional Testing.

18.33 While the TSB CEO may not have been aware of these shortcomings, the TSB CIO was aware of many of them (see chapter 14), and he should have escalated them to the TSB CEO and to the TSB Board.

18.34 In light of the shortcomings described above and in more detail in chapter 14, the TSB CIO's statements to the TSB Board at its 18 April meeting that he was *"confident that the platform had been tested to the point that it was ready for migration"*, and that the Infrastructure had been *"tested over several months and he was confident that the infrastructure would work as expected"*, were ill-judged.

18.35 While originally TSB had planned for all BEC members to sign-off on NFT for their respective Dossiers in their Attestations in support of the decision to Go Live, in February 2018, the BEC DE decided that the TSB CIO would be best placed to attest to NFT and the other BEC members would sign-off based on his NFT specific confirmation (the NFT Memo) (see paragraphs 16.20 to 16.22). It appears to us that, as a consequence, many of the BEC members were not as engaged with the detail of NFT as they should have been, and therefore were unlikely to identify and escalate the NFT shortcomings to the TSB Board.

18.36 Unfortunately, neither of TSB's Risk Oversight or Internal Audit functions were in a position to point out the shortcomings of NFT to the TSB Board either (as explained below).

## The Risk Oversight Opinion in the T3 Memo

18.37 In the Risk Oversight Opinion, dated 17 April 2018 (Appendix 17 to the T3 Memo) the TSB CRO stated:

> *"2.1.1 I concur with the First Line of defence's interpretation of the facts and I am satisfied that the information provided to the Board is fair, balanced and reasonable;*
>
> *2.1.2 The key risks of the MME have been appropriately identified, managed and reported to the TSB Executive & Board; and*
>
> *2.1.3 Key issues raised by Risk Oversight have been adequately documented and addressed, and all actions required to be closed pre-MME are complete."*

18.38 However, in the final paragraph of the Risk Oversight Opinion, there was a list of "*Items not covered within Oversight scope"*. The list included items *"such as Non-Functional Testing, Regression Testing and E2E [end-to-end] production proving"* in respect of which Risk Oversight had limited oversight *"due to the design or timings of migration deliverables"*.

18.39 Risk Oversight's limited oversight of NFT (a critical element of the Programme) was a fundamental exclusion from the scope of the Risk Oversight Opinion. There were a number of problems with the way this limitation was reported:

(A) we would have expected this limitation and its impact to have been:

(i) given greater prominence and explained in more detail in the Risk Oversight Opinion itself;

(ii) explained to the TSB Board by the TSB CRO at the TSB Board meeting on 18 April; and

(B) further, there was no mention of this limitation in the main body of the T3 Memo, which concluded that the TSB CEO was *"confident that there is nothing raised by the CRO in his 2nd line Risk Oversight opinion that would lead me to believe that the business will not be ready by the morning of Thursday 19 April 2018 to commence the T3 event"*. The TSB CEO should have specifically drawn this limitation to the attention of the TSB Board in the main body of the T3 Memo.

18.40 TSB and the TSB CEO have told us that because the limitation was presented in an appendix to the T3 Memo, it is "*reasonable to expect that the [TSB Board] would read and note those exclusions*". Given that the T3 Memo (including its appendices) was 560 pages in total, we think this assertion is questionable, and the TSB CEO should have done more to draw the TSB Board's attention to this limitation in the main body of the T3 Memo. If, however, that assertion is correct and the TSB Board did "*read and note*" this limitation, then the TSB Board ought to have focused more on these carve outs in the Risk Oversight Opinion and challenged the TSB CRO and the Executive on the implications of Risk Oversight having had limited oversight of NFT. It is particularly problematic that Risk Oversight did not oversee NFT given the degree to which the Executive relied on the TSB CIO to sign-off the Programme's NFT.

18.41 Both the TSB CRO and the TSB CEO should have specifically drawn the TSB Board's attention to the fact that Risk Oversight had limited oversight of NFT. In his interview, the TSB CRO told us that, although the risks described to the TSB Board were a fair and balanced reflection of the risks as understood at the time, he thought that *"[w]ith hindsight the risks described to the board were inaccurate"* and *"didn't capture the likelihood of serious infrastructure and non-functional issues"*.

## Internal Audit Opinion in the T3 Memo

18.42 The TSB CAO provided the following confirmation in his Internal Audit Opinion (contained in Appendix 18 to the T3 Memo):

> *"I concur with the First Line of defence's interpretation of the facts and I am satisfied that the information provided to the Board is fair, balanced and reasonable;*
>
> *the key risks of proceeding with the MME have been appropriately identified, managed and reported to the TSB Board;*
>
> *Key issues raised by Internal Audit have been adequately documented and addressed and all associated management actions required by MME have been closed."*

18.43 We were told by the TSB CAO that the basis for this confirmation was that Internal Audit was *"assessing the risks and control framework in each of the business areas to assess the readiness but not the readiness itself"* and that in relation to *"assessing the controls for readiness…it was not for Internal Audit in this attestation, in [the CAO] attestation to say that we were ready to migrate"*.

18.44 The TSB IT, Change and Operations Audit Director explained that Internal Audit did not provide any quality assurance, and that his role upon receiving the NFT Final Report was *"to reconcile what was in the [NFT Final Report] to what was in the TSB CIO memo"* and hold the Programme Team accountable.

18.45 The TSB CAO should have made it clear that Internal Audit had had very little time to review the NFT Final Report given it was not delivered to Internal Audit until after 16:30 on 17 April 2018. This was only the day before the TSB Board was to consider the T3 Memo. The Internal Audit Opinion was dated 17 April 2018, and was presented to the TSB Board on 18 April 2018. Given the timing, the TSB CAO would have had very little time to review the NFT results before providing the Internal Audit Opinion.

18.46 The TSB CAO and his team informed us that Internal Audit had sufficient time to consider the NFT results. However, the Internal Audit Opinion was silent on the discrepancies between the NFT Final Report and the NFT Memo. A key discrepancy was that the TSB CIO's NFT Memo said that "*[t]he infrastructure that supports our digital channels can support up to 150% of our known peak workload (which I consider to be sufficient)*". In contrast, the NFT Final Report indicated that this load had yet to be proven "*Digital - Proven to 100% of peak. Pending specified volumes of 150% of peak*". As explained in chapter 14, a number of tests conducted at 150% of peak had failed.

18.47 Even if Internal Audit's role was not to quality assure NFT, but only to "*reconcile*" the contents of the NFT Final Report with the NFT Memo, the fact that Internal Audit did not pick up on this key discrepancy suggests that Internal Audit was not able to perform a thorough review of these documents.

18.48 Our Review has not identified any evidence to suggest that the risk of having very limited time to undertake a review was considered and evaluated (or reported) at this time.

## Citrix Capacity

18.49 The shortcomings in TSB's design, execution and reporting of NFT were exacerbated by the issues TSB experienced with Citrix capacity both before and after Go Live. Citrix is the Infrastructure component which allows TSB's employees to work and collaborate remotely across the branch and head office locations via a virtual desktop. Citrix was used in both TSB's Telephone and branch Channels, and capacity issues caused significant problems after the MME, as noted in Post-MME Reports as follows:

(A) the TSB CIO's draft post-MME report dated 20 November 2018:

*"However, there were significant capacity issues with the network and the IVR that have impacted our Telephony centers, as well as an insufficient capacity to cope with all our desktops in a Datacenter disaster recovery scenario (operating on a single Datacenter)"*. The root cause reference provided for the desktop capacity issue in this report was *"RC11-Desktop insufficient capacity (CITRIX farm)"*.

(B) the IBM Report:

*"Change E: Infrastructure - Distributed: It was observed that whilst the Data Centres were stated by Sabis (and their suppliers) to have sufficient resources to maintain TSB operations out of one or the other, there was a notable exception in the lack of sufficient Citrix capacity to support the Bank's workplace solution. This was remediated by BT, with additional capacity added into both Data Centres mitigating the operational risk (in the event of loss of a single Data Centre) and provided additional capacity to the increased number of Contact Centre agents)."*

18.50 The TSB CIO was aware of these issues with Citrix capacity prior to the MME Board Sub-Committee's decision to Go Live. In a WhatsApp message that the TSB CIO sent to the

Sabadell Group CTO on 20 April 2018 he stated *"In fact it seems clear that in the farm we do not fulfil one of the fundamental principles of the program, to be able to provide a service with a single Datacenter"*. The TSB CIO explained to us that this message was that it related to a conversation he had with the Sabadell Group CTO raising the concern that he was not *"fully confident that if we lost one data centre we would have enough capacity in Citrix (virtual desktop) in the remaining data centre"*.

18.51 The TSB CIO said that he did not bring this issue to the attention of the TSB Board or the BEC, and he did not raise this issue to the MME Board Sub-Committee at any of its meetings on 22 April 2018 before it made the decision to Go Live. He explained that this was because he was satisfied that this risk had been sufficiently mitigated in light of:

(A) his conversation with the Sabadell Group CIO who confirmed that he would buy extra capacity in each data centre so that each data centre would have the capacity to deal with TSB's Citrix requirements by itself; and

(B) SABIS having informed him that increasing the intensity per server would not impact the service and that they were confident that, in the unlikely scenario of losing one data centre, they would be able to manage with the existing capacity.

18.52 In the event, this risk proved not to have been sufficiently mitigated. The TSB CIO has confirmed to us that the Citrix-related problem TSB had when one of the data centres went down on the Tuesday after Go Live was this same problem.

18.53 The TSB CIO's explanation for not bringing the Citrix capacity issue to the attention of the TSB Board or the MME Board Sub-Committee was not well founded, as his assumption that additional capacity would be available on demand did not work in practice when the issue occurred in live service.

18.54 The risk that Citrix capacity would be an issue for TSB post-MME was significant enough that the TSB CIO should have brought it to the attention of the TSB Board or the MME Board Sub-Committee, and the issue should have given him (and the TSB Board/MME Board Sub-Committee, had they known about it) reservations about TSB's readiness to Go Live.

## Assurances about SABIS' Readiness

18.55 Given SABIS' responsibilities included designing, building, and testing the Proteo4UK Platform, and operating the Platform once it was built, we would have expected TSB's preparation for Go Live to have included a rigorous assessment of SABIS' readiness for Go Live. As part of making the decision to Go Live in April 2018, it was important for TSB to:

(A) ask itself whether SABIS was ready to operate the Platform;

(B) ask for assurance from SABIS and Sabadell as to SABIS' readiness to operate the Platform after Go Live; and

(C) consider SABIS' pre-MME performance and whether that provided sufficient comfort that SABIS would be ready to operate the Platform after Go Live.

18.56 As the following paragraphs will demonstrate, TSB did not adequately consider SABIS' readiness, it did not seek or receive adequate assurances from SABIS or Sabadell as to SABIS' readiness, and SABIS' past performance ought not to have provided comfort that SABIS was ready to operate the Platform.

## TSB's Consideration of SABIS' Readiness

18.57 The Assurance Matrix and the T3 Memo were two of TSB's key readiness frameworks. Neither of these contained adequate consideration of whether SABIS would be ready to operate the Platform after the MME.

18.58 The questions in the Assurance Matrix relating to SABIS were focused on having contracts in place with appropriate terms, rather than on whether there was sufficient evidence that SABIS could perform the services as required under these contracts. The Assurance Matrix questions did not assess clearly SABIS' readiness to operate the Platform after Go Live (see chapter 16).

18.59 The TSB CEO's recommendation to the TSB Board in the T3 Memo also failed to include adequate consideration of SABIS' readiness to operate the Platform. In particular:

(A) in developing his own position regarding the *"critical judgment"* about whether or not to recommend that TSB Go Live, the TSB CEO explained that he had asked himself five *"key questions"*. The "*key questions"* did not include a question relating to the readiness of SABIS to operate the Platform. We consider the absence of such a question to be a critical omission; and

(B) the three *"macro-risks"* that the TSB CEO had identified (after having reviewed all of the risks identified by the Programme Team, Risk Oversight and Internal Audit), did not include the risk that SABIS would not be ready to operate the Platform despite the TSB CIO identifying it as a residual risk in his Attestation.[7] Given SABIS was responsible for operating the Platform (including fixing any issues which might arise after the MME), we would have expected the TSB CEO to make this risk clear to the TSB Board as one of the *"macro risks"* he chose to draw to the TSB Board's attention at this important stage.

18.60 SABIS' readiness was addressed in the TSB CIO's Attestation, included as part of Appendix 16 to the T3 Memo as follows:

> *"Sabadell Information Systems S.A.U. (**SABIS**), as a key supplier, is prepared for the T3 Event. SABIS has confirmed to me that it will have performed its obligations as set out in the [Migration] Services Agreement between TSB and SABIS (the **MSA**) and Contract Change Note no. 1 to the MSA dated 10 April 2018 (the **CCN**) (to the extent that these are required to be performed ahead of the T3 Event) and will be ready to perform its remaining obligations under the MSA and CCN as well as its obligations under the Outsourced Services Agreement between TSB, SABIS and Sabadell Information Systems Limited from the T3 Event. I am satisfied that this confirmation can be relied upon."*

18.61 The TSB CIO told us that he made his Attestation as to SABIS' readiness on the basis of:

(A) his experience of working with SABIS; and

(B) a letter he received on 5 April 2018 from the SABIS UK Managing Director, which is discussed further in paragraphs 18.62 to 18.68.

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[7] The residual risk in the TSB CIO's Attestation was titled "*Sabis Operationalisation*" and described as: "*The operating model for running the services struggles to cope with multiple major incidents and multiple emergency changes happening simultaneously in the period immediately post go live".*

## Assurances from SABIS and Sabadell as to SABIS' Readiness

### *Assurance from SABIS as to SABIS' Readiness*

18.62 The TSB CIO received a letter from the SABIS UK Managing Director dated 5 April 2018 (see Figure 18.2), in which the SABIS UK Managing Director stated that SABIS had:

> *"executed reasonable different tests in agreement with [TSB's] CTO team in order to prove resilience and performance"*, and he trusted that the summary of the testing results provided alongside the letter satisfied the TSB CIO's need for evidence that *"within reason, [SABIS] expect the Platform to perform as required on both accounts [resilience and performance] for the current business volumes and system access behaviour patterns."*

18.63 The 5 April 2018 letter from the SABIS UK Managing Director should not have satisfied the TSB CIO that SABIS would be ready to perform its obligations under the OSA. The statements in that letter relate to the SABIS UK Managing Director's expectations regarding the performance of the Proteo4UK Platform, rather than his expectations regarding the ability of SABIS to operate it.

18.64 The letter also said that with regard to *"critical"* third parties, the SABIS UK Managing Director had:

> *"received positive written confirmation from First Data, Microsoft and Unisys that they are confident that their infrastructure is fit for purpose and therefore they are prepared for the expected volumes and are also committed to provide the agreed Service Levels. I am awaiting written confirmation from BT, but I do not expect any issue in receiving it from conversations on the subject."*

18.65 It is worth noting that when the written confirmation from BT was eventually sent to the SABIS UK Managing Director on 10 April 2018, it confirmed that BT had in place "*the infrastructure and associated capacity as per contractual agreements between BT and SABIS"* but also set out a series of exceptions to that confirmation, and highlighted a number of risks relating to testing that BT had not been able to complete, and relating to areas in SABIS' control in relation to which it had identified potential risks.

18.66 The Sabadell Group CIO clarified in his interview that the letter from the SABIS UK Managing Director was not a formal SABIS attestation, and that he himself did not have any involvement in producing it or any knowledge of the information that the SABIS UK Managing Director relied on to provide it.

18.67 The TSB CIO told us that the SABIS UK Managing Director's letter was *"the final artefact that [used] for attestation"*. He also stated:

> *"Of course it was an important one in terms of being a formal attestation, but I was relying on two-and-a-half years of working together in the programme, […] despite of the attestation, and it was a very assertive attestation, the one I got from [the Sabis UK Managing Director], to be honest, I was confident at that point this time that we were ready."*

## Figure 18.2: Letter from the SABIS UK Managing Director to the TSB CIO

**Sabis**
Sabadell Information Systems Ltd.

The Leadenhall Building
122 Leadenhall Street
London EC3V 4AB

T +44 20 7155 3870
[redacted]@sabadell.co.uk
www.sabis.tech

Mr. [redacted]
Chief Information Officer
TSB
20 Gresham Street
London EC2V 7JE

Sabis.

London, 5th of April 2018

Reference: Non-functional readiness

Dear [redacted],

As part of the preparation for the decision on the execution of the Migration from LBG to TSB's new system, you have required that I provide you with comfort regarding the ability of the new Platform to meet the Service Level Agreements between SABIS and TSB.

Over the last months, as you are well aware, we have executed reasonable different tests in agreement with your CTO team in order to prove resilience and performance. A summary of the results is being provided to you along with this letter. I trust that the information contained in that document will satisfy your need for evidence that, within reason, we expect the Platform to perform as required on both accounts for the current business volumes and system access behaviour patterns. In the few exceptions where there are further tests that need to be completed in the next week or so, because of different circumstances, we feel comfortable that we wil not find any cause for concern towards being "migration ready"by the 19th of April.

Also, from the point of view of critical Third Parties ("fourth parties" in the case of TSB), I have received positive written confirmation from First Data, Microsoft and Unisys that they are coinfident that their infrastructure is fit for purpose and therefore that they are prepared for the expected volumes and are also committed to provide the agreed Service Levels. I am awaiting written confirmation from BT, but I do not expect any issue in receiving it from conversations on the subject.

Finally, please rest assured that while we are confident on the "migration readiness" of the Platform, we have plans in place to continue working on performance so as to further improve TSB's customers' and partners' experience, and to cater for future growth plans in advance.

Please feel free to reach out should you need any additional information

Kind regards,

[redacted]

Managing Director

18.68 We do not agree that it was an "*assertive attestation*". Had SABIS been an arm's length third party supplier, we expect TSB would have sought, and SABIS would have provided, formal assurance, together with supporting evidence demonstrating how SABIS had fulfilled its obligations under the MSA and demonstrating its ability to satisfy its OSA obligations. No such formal, evidenced attestation was sought by TSB or provided by SABIS.

## *Assurance from Sabadell as to SABIS' Readiness*

18.69 In early March 2018, the Sabadell Group governance plan for the MME had envisaged that the Sabadell Group CIO would provide a separate recommendation that would "*support the final recommendation of the TSB CEO*". The Sabadell Group CIO's recommendation was to include contributions from five key members of the SABIS team involved in the Programme. The Sabadell Group CIO told us that a decision was made by either the Sabadell Board or the Sabadell Executive Committee that this separate recommendation was "*redundant*" in light of the TSB CIO's Attestation, which they believed *"already included all relevant readiness statements from SABIS*."

18.70 Sabadell gave no formal assurance around SABIS' readiness. We understand that this was on the basis that the TSB CIO was providing the assurance as to SABIS' readiness.

18.71 The TSB CEO did state in the T3 Memo: *"I have also sought and received assurance from the [Sabadell Group COO] who has ultimate responsibility for SABIS within Sabadell, that he is personally aware of and committed to the future release schedule and that he will ensure SABIS has the leadership and resource required to deliver this schedule."*

18.72 However, this statement that SABIS would continue to be committed at the same capacity, and support the post-MME functionality releases, does not provide any assurance as to SABIS' readiness to operate the Platform. Rather, the statement refers to the fact that significant Items of Functionality had been deferred to the post-MME period through the deferral process supported by the Migration Deferred Defects Forum (see chapter 11), and resources would need to be available to deliver the deferred functionality after Go Live.

18.73 The final version of the 18 April TSB Board meeting minutes record the Sabadell Group COO as saying *"the IT resources of Sabadell and Sabis would continue to be committed at the same capacity as currently throughout MME and to support the post-MME main functionality releases and confirmed that Sabis was ready for MME"*.[8]

18.74 We have been told that the Sabadell Group COO was commenting in his capacity as a TSB NED rather than as the Chief Operating Officer of the Sabadell Group on this occasion,[9] which makes no sense given what the minutes report him to have said. The Sabadell Group COO told us that this statement from the minutes was not a formal attestation he was making on behalf of Sabadell. We agree that the statements made by the Sabadell Group COO did not constitute formal assurance from Sabadell.

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[8] The words "*and confirmed that Sabis was ready for MME*" appear in the final minutes for the 18 April TSB Board meeting, but do not appear in the draft meeting minutes which were presented in the papers for the TSB Board meeting on 18 June 2018 to be approved "*subject to any final comments*". We do not know when the minutes of the 18 April TSB Board meeting were signed, but we know it was after 9 October 2018.

[9] This explanation was provided to us in the consolidated comments on the draft of our Report that we received from TSB and SABIS. As explained in chapter 23, we are not able to determine which entity provided this comment.

18.75 Had TSB managed SABIS as an arm's length supplier, we would have expected TSB to have requested formal assurance at the Sabadell Group level, from either the Sabadell Group COO or the Sabadell CIO (in addition to a formal, evidence-based assurance from SABIS).

18.76 We were told by both the Current TSB Chairman and the TSB RemCo Chair that the TSB Board relied on assurances from the Sabadell Group COO that SABIS was ready and able to deliver. When we asked the Sabadell Group COO what process had been undertaken to assess SABIS' readiness, he replied *"I was convinced that it was the case"*.

18.77 However, in the report he prepared after the MME, the Sabadell Group COO stated: *"As regards **I.T. Operations**, Sabis did not have sufficient capacity to respond to and resolve the incidents"* and *"Although Sabis was fully committed and prepared to deliver adequate I.T. Operation services in a BAU situation, the team appeared to fall short in terms of practice in running the new platform"*.

18.78 We conclude from this that, at the point of Go Live, TSB had not received formal assurance from either the Sabadell Group COO or the Sabadell Group CIO of SABIS' ability to operate and were therefore relying on the letter provided by the SABIS UK Managing Director and the previous experience of the TSB CIO.

## Evidence Available to TSB Regarding SABIS' Readiness as at 18 April 2018

18.79 There was evidence available to TSB regarding SABIS' operation of the Platform. Given the Platform was about to go live to the whole of TSB's customer base, that evidence should have been considered with rigour, and in detail, in the T3 Memo.

18.80 Had TSB examined the evidence available, it would have seen that, based on the time taken by SABIS to achieve TSB's required service levels following each Transition Event, past performance did not reasonably give comfort that SABIS was ready to operate the Platform. As was explained in chapters 10 and 15:

(A) the Transition Events were only being run over a small portion of the Platform. They could not therefore, alone and of themselves, have provided sufficiently robust evidence of SABIS' readiness to operate the Platform as a whole from Go Live; and

(B) even in the limited Transition Events that had been carried out, SABIS had consistently failed to satisfy agreed service levels in respect of the Transition Events, particularly in the periods immediately following new parts of the Platform entering into live use by customers. This included breaches of service levels following the Mobile App, payment schemes, mortgage sales and origination, and the ATM Transition Events.

18.81 Notwithstanding the information that had been gathered about SABIS' performance during the Transition Events that took place during the Programme, the information presented to the TSB Board as part of the T3 Memo covered only service levels achieved during a seven-day period from 10 to 16 April 2018, which coincided with the code lock-down (see paragraphs 18.28 to 18.29). The service level data set out in the T3 Memo is depicted at Figure 18.3.

18.82 TSB has explained to us that *"the daily service levels provided for the week running up to MME were intended to show only that the service levels were stable at that time"*, and that they *"were not intended to provide an indication of SABIS' overall performance to date, or to provide an insight as to live services after Transition Events"*.

**Figure 18.3: Daily Service Levels Achieved over a Seven-day Period During the Code Lock-down (From the T3 Memo, Dated 17 April 2018)**

| | 10/04 | 11/04 | 12/04 | 13/04 | 14/04 | 15/04 | | 16/04 |
|---|---|---|---|---|---|---|---|---|
| 1. Faster Payments | 100 | 100 | 99.94 | 100 | 100 | 99.99 | ↑ | 100 |
| 2. Branch and Business Banking | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 3. Telephony | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 4. Digital | 99.36 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 5. Self Service Devices | 100 | 100 | 100 | 100 | 100 | 100 | ↓ | 99.86 |
| 6. Cards Processing | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 7. BACS | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 8. Cash & Cheques | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 9. CHAPS & International | 100 | 99.88 | 100 | 100 | 100 | 100 | → | 100 |
| 10. Mortgages | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 11. Risk | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 12. Finance | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 13. HR | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 14. Treasury | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 15. Security & Fraud | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 16. Marketing | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 17. Property & Procurement | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 18. Service Centre | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 19. Collections & Recoveries | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 20. Loan Processing | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 21. Mail Management & Print | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |
| 22. Data | 100 | 100 | 100 | 100 | 100 | 100 | → | 100 |

18.83 Although details of service level performance had been provided to the TSB Board throughout the Programme, including through regular updates by the TSB CIO and TSB COO, TSB has explained to us that SABIS' performance following the Transition Events was not expected to reflect the service provided at Go Live, as the Transition Events were being provided in a less stable system than TSB envisaged would be the case at Go Live (e.g. due to ongoing Infrastructure work on the Platform). As explained in chapter 15 and set out again in Figure 18.4, there was not a single month between June 2017 and May 2018 in which SABIS satisfied all of the agreed service levels set out in the OSA.

18.84 In our view, inclusion in the T3 Memo of service levels achieved during a single week just prior to the MME, rather than, for the extended period during which SABIS had been operating the Platform (including most critically the period directly following each of the Transition Events) failed to provide the TSB Board with the information they needed to evaluate SABIS' performance.

18.85 Having failed to consider adequately SABIS' readiness to operate the Platform itself, or ask for evidence-based assurances from either SABIS or Sabadell, and in light of SABIS' pre-MME performance following the Transition Events, TSB did not have a reasonable basis on which to conclude in April 2018 that SABIS was ready. We also note that the lack of consideration in respect of SABIS' readiness is in stark contrast to the highly structured approach that TSB took, through the Assurance Matrix, to assess its own readiness.

Figure 18.4: SABIS Service Levels Achieved between June 2017 and May 2018 (From June 2018 Service Executive Committee, Dated 29 June 2018)

May Incidents — Critical 6 / High 19 — Actual Service Performance

| | | | SLA | May-18 | Apr-18 | Mar-18 | Feb-18 | Jan-18 | Dec-17 | Nov-17 | Oct-17 | Sep-17 | Aug-17 | Jul-17 | Jun-17 | Service Excellance Awards |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Payments | 1 | Faster Payments | 99.99% | 99.943% | 99.91% | 99.977% | 100% | 99.904% | 99.997% | 99.982% | 99.996% | 99.99% | 99.59% | 99.95% | 99.56% | 2* |
| | 2 | BACS (CASS / Reference Data) | 99.90% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 2 |
| | 3 | Cash and Cheques | 99.90% | 100% | 100% | 100% | | | | | | | | | | 2 |
| | 4 | CHAPs and International | 99.90% | 100% | 100% | 100% | | | | | | | | | | 2 |
| Channels | 5 | Branch inc Business Banking | 99.90% | 99.91% | 97.74% | 99.99% | 99.85% | 99.94% | 99.72% | 100% | 100% | 99.30% | 100% | 100% | 100% | No Award |
| | 6 | Telephony | 99.90% | 99.94% | 98.33% | 100% | 100% | 100% | 100% | | | | | | | No Award |
| | 7 | Digital | 99.90% | 99.82% | 93.64% | 99.90% | 99.99% | 100% | 99.69% | 99.97% | 99.85% | 100% | 97.67% | 99.45% | 100% | No Award |
| | 8 | Self Service Devices | 99.90% | 99.97% | 100% | 99.91% | 99.90% | 100% | 99.58% | 99.55% | 99.93% | 98.13% | 99.49% | 100% | 99.79% | 2 |
| | 9 | Mortgages | 99.90% | 99.89% | 100% | 99.97% | 99.80% | 99.87% | 99.96% | 99.20% | 99.22% | 98.97% | | | | No Award |
| Central | 10 | Risk | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99.90% | 99.68% | 99.81% | 99.96% | 2 |
| | 11 | Finance | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99.82% | 99.66% | 99.68% | 99.93% | 2 |
| | 12 | HR | 99.90% | 100.00% | 100% | 100% | 99.97% | 100% | 100% | 100% | 100% | 100% | 99.91% | 99.92% | 100% | 1 |
| | 13 | Treasury | 99.90% | 100.00% | 100% | 100% | | | | | | | | | | 2 |
| | 14 | Security and Fraud | 99.90% | 100.00% | 99.89% | 97.11% | 100% | | | | | | | | | No Award |
| | 15 | Marketing | 99.90% | 100.00% | 100% | | | | | | | | | | | No Award |
| | 16 | Property and Procurement | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 1 |
| Operations | 17 | Service Centre | 99.90% | 99.98% | 100% | 100% | | | | | | | | | | 2 |
| | 18 | Collections and Recoveries | 99.90% | 100.00% | 99.52% | | | | | | | | | | | No Award |
| | 19 | Loans Processing | 99.90% | 100.00% | 100% | 100% | | | | | | | | | | 2 |
| | 20 | Cards Processing | 99.90% | 100.00% | 100% | 100% | 100% | | | | | | | | | 2 |
| | 21 | Mail Management and Printing | 99.90% | 100.00% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | | 2 |
| | 22 | Data Warehouse | 99.90% | 100.00% | 100% | | | | | | | | | | | No Award |
| | Total | | | 99.98% | 99.50% | 99.83% | 99.97% | 99.98% | 99.91% | 99.88% | 99.91% | 99.65% | 99.60% | 99.88% | 99.91% | |

**Service Level Agreements – Services 02 - 21**

- = 100%
- = or >99.90% but <100%. Green is within SLA
- = < 99.90% and fails SLA1
- = < 99.50% and breaches SL2
- = < 96.00% and breaches SL3

**Service Level Agreements – 01 : Faster Payments**

- = 100%
- = 99.99%
- = < 99.99% and fails SLA1
- = < 99.90% and breaches SL2
- = < 99.70% and breaches SL3

# CHAPTER 19: EVENTS AFTER GO LIVE

## KEY POINTS

- TSB's principal customer Channels experienced significant failures in the week following Go Live. The Internet Banking and Mobile App Channels were unstable and almost unusable. Customers were waiting a long period to speak on the telephone to an adviser (an average of approximately 90 minutes on the first day after Go Live). TSB experienced widespread issues in its branches, with many services unavailable (e.g. chip and pin).
- Problems with the Proteo4UK Platform continued to cause significant issues in TSB's Internet Banking, Mobile App, branch, and Telephone Channels for a number of weeks. From 30 April 2018 (in the second week after Go Live), TSB's customers began to experience an increase in opportunistic fraud attacks. These attacks peaked around 15 May 2018 (in the fourth week after Go Live), when they were approximately 70 times higher than usual levels.
- Many of the issues with the Proteo4UK Platform had been rectified by June 2018 (two months after Go Live), although there are indications that some problems persisted until at least early 2019.
- Given the scale and size of the Programme, it was to be expected that some IT issues would arise. However, the magnitude and duration of the problems, and the consequences for TSB's customers, went far beyond what was anticipated or acceptable.

## INTRODUCTION

19.1 At approximately 18:00 on Sunday 22 April 2018, following completion of Go Live, TSB's c.5 million customers were given access to its new online banking system. This chapter summarises the issues TSB and its customers experienced over the following weeks and months. While an analysis of TSB's management of the period after Go Live is outside the scope of this Report, an understanding of the events that occurred after Go Live is necessary to provide the context for the issues examined in this Report.

19.2 Specifically, we have reviewed a number of TSB and third party reports which were produced after the Main Migration Event ("**MME**") for TSB or the Sabadell Group (the "**Post-MME Reports**"),[1] some of which remain in draft or are incomplete, together with

[1] We have included at Appendix 5 a list of the Post-MME Reports we have relied on for this Report, together with comments received from TSB or SABIS on their completeness. In particular, we have been informed by TSB that some of the Post-MME Reports that we have relied on for this Report were prepared at short notice and/or were not independently reviewed, audited, or verified. However, these are the best sources available to us and over the course of our Review we have not identified any information which suggests that the information provided in the relevant Post-MME Reports is materially inaccurate.

information from public sources, to provide in this chapter a summary of the available information on the following key matters:

(A) the issues TSB and its customers experienced after Go Live; and

(B) the detriment suffered by TSB's customers as a result of these issues.

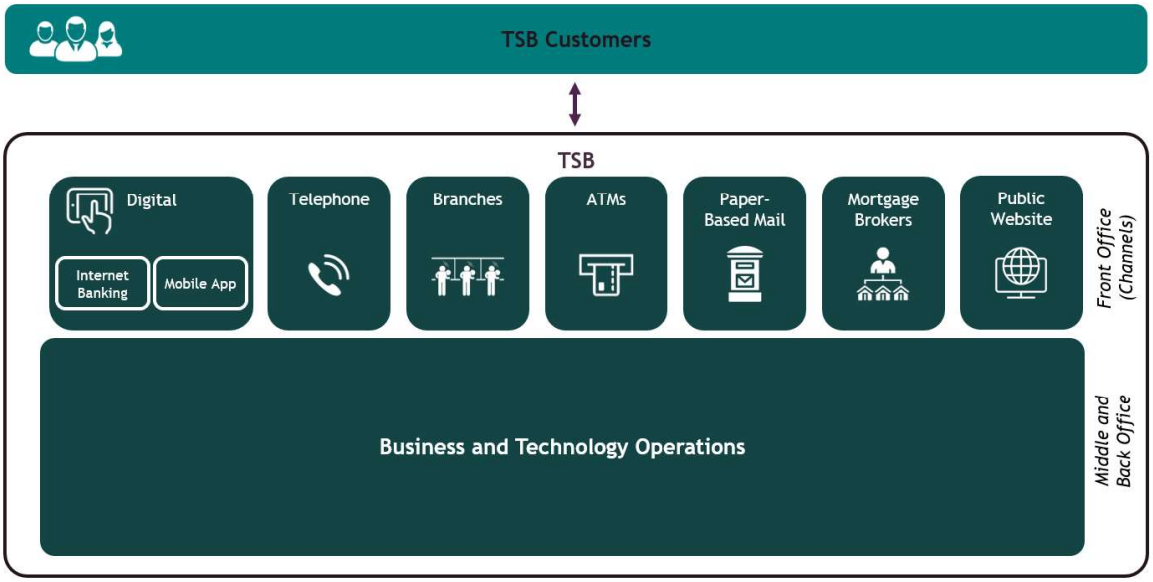
19.3 This chapter only provides a summary of events that arose following Go Live through to the end of the period defined in our Terms of Reference (i.e. up to 10 June 2018). We understand, however, that certain issues with the Proteo4UK Platform continued after this date (and indeed through to at least early 2019).

## THE ISSUES TSB AND ITS CUSTOMERS EXPERIENCED AFTER GO LIVE

### Overview of TSB Customer Channels

19.4 In the discussion below, it is helpful to bear in mind the representation set out in Figure 19.1 of the Channels through which TSB's customers access their accounts and otherwise interact with TSB.

**Figure 19.1: TSB's Customer Channels**




19.5 When we refer to the Digital Channels in this Report, this is a collective reference to both TSB's mobile Application (the "**Mobile App**") and its Internet Banking website ("**Internet Banking**").

19.6 TSB anticipated the following peak usage for its key customer Channels after Go Live:

(A) Digital - 137,000 transactions per hour (consisting of 72,000 transactions per hour for the Mobile App and 65,000 transactions per hour for Internet Banking);

(B) Telephone - 4,981 calls per hour;

(C) Branch - 5,500 concurrent users; and

(D) ATMs - 1,500 transactions per minute.

19.7 As is clear from these anticipated peak usage figures, were TSB's Digital Channels to be impaired, the remaining key Channels were unlikely to have sufficient capacity to cater for the additional customer demand.

19.8 As set out in this chapter, in the period following Go Live, TSB in fact experienced problems relating to each of its Digital, telephone and branch Channels. We have summarised these in Figure 19.2.

## Initial Issues that Emerged in the First Week After Go Live (22-29 April 2018)

19.9 Over the evening of Sunday 22 April 2018 (the day of Go Live), TSB became aware of a number of problems:

(A) Linked/nominee accounts - At approximately 18:20, TSB became aware of reports on social media of customers being able to see transactions and balances they did not recognise. Upon investigation, TSB determined that this related to customers being able to view (and make transactions on) linked and nominee accounts via the Mobile App and Internet Banking (access which they would only normally be able to have through the telephone and branch Channels). Nominees also had access to nominators' accounts in respect of which they did not have permission.

(B) Automated fraud alerts - TSB received calls from customers who were receiving unexpected fraud alerts via SMS. Upon investigation, these alerts were being triggered when a transaction was made with a merchant based overseas (as opposed to where customers were using their cards in person when themselves overseas).

(C) Overseas ATM transactions - A number of attempts by TSB customers to withdraw money from ATMs overseas were declined.

19.10 Due to the linked/nominee accounts problem, at approximately 19:00 on that Sunday, TSB's Digital Channels were taken offline for approximately seven hours.

19.11 Following the implementation of fixes to resolve the linked/nominee accounts problem, TSB reopened its Digital Channels at approximately 02:00 on Monday 23 April 2018 (the day after Go Live).

19.12 Over the course of that Monday:

(A) Digital Channels (access) - By 06:45 both the Mobile App and the Internet Banking Channels started to show errors that made it difficult for customers to access their accounts.[2] TSB was only able to serve approximately 200,000 sessions via Internet Banking (versus an expected level of approximately 450,000) and approximately 28% of customers attempting to access the Mobile App were unsuccessful on their first attempt. Further, according to the TSB CIO, the Digital Channels remained *"unstable and almost unusable"* until Thursday 26 April 2018 (four days after Go Live).

[2] We understand that initial issues with degraded performance and unsuccessful logins were already apparent on the evening of Sunday 22 April 2018.

(B) Digital Channels (functionality, including payments) – Functionality of the Digital Channels was impaired such that only 52% of attempted payments on the Mobile App and only 41% of attempted payments using Internet Banking were successful.[3] [4]

(C) Telephone Channel – Partly as a result of the issues in the Digital Channels, TSB's contact centres received approximately 86,000[5] calls (compared with 36,000 in a BAU situation), exceeding the 50% increase in call volumes that TSB had anticipated when planning Telephone Channel resource prior to Go Live.[6] In parallel, a number of serious technological failures occurred, impacting the ability of customers to proceed through TSB's Intelligent/Interactive Voice Recognition ("**IVR**") system and the ability of contact centre agents to transfer calls or execute transactions on behalf of customers.[7] These issues resulted in significant call wait times and high rates of customers abandoning calls. In particular:

(i) on Monday 23 April 2018 (the day after Go Live), the average customer call wait time was approximately 90 minutes with 70% of calls being abandoned and 31.6% of calls not even reaching the IVR system; and

(ii) by the following Sunday 29 April 2018 (one week after Go Live), the average call wait time was still 46 minutes with a 48% abandonment rate.

(D) Branches – TSB experienced widespread issues with its branch counter technology, which coincided with a significant increase in the number of customers making branch visits (due to the issues with the Digital and Telephone Channels). In particular, the desktop system of the Proteo4UK Platform was subject to frequent crashes (approximately 4,500 crashes per day across TSB's 500 branches) and freezes, severely constraining the ability of staff to service customers. A number of key branch functions were also unavailable, including chip and pin, printing, and voucher readers.[8] The TSB Distribution Director told us that on Saturday 28 April 2018 (six days after Go Live), virtually none of TSB's branches were working as intended from a counter service perspective.

The above issues were widely reported on social media (for further discussion on social media, see chapter 20).

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3 We understand that initial issues with unsuccessful payments were already apparent on the evening of Sunday 22 April 2018.

4 TSB told us that the issue with payments arose because customers could not *"go through"* the Mobile App or Internet Banking to make payments (rather than there being an issue with the payment system itself). It is not clear whether TSB is referring here to customers not being able to access (i.e. login to) the Digital Channels (in which case, it is not clear how they could have indicated an intention to make a payment) or whether customers were able to login, but issues arose at the point of trying make a payment.

5 The SABIS Post-MME Report stated that on Monday 23 April 2018, TSB received 184,000 calls. However, TSB has told us that this is inaccurate and, according to their records, the correct figure should be 86,000 calls.

6 In preparation for Go Live, TSB arranged for an additional 255 full-time equivalent ("**FTE**") staff from external suppliers to be available to supplement the existing Telephone Channel resource (an uplift of 78%).

7 Specifically, there were issues with: (i) TSB's IVR system relating to voice quality, identification and verification, and capacity; (ii) the unavailability of Web On Behalf Of ("**WOBO**") (functionality that allows contact centre agents to use the TSB website to execute transactions on behalf of customers); and (iii) transferring calls between agents.

8 Key issues included the unavailability of: (i) chip and pin, used for customer identification and verification; (ii) voucher readers, used to read paper payment documents (primarily cheques); (iii) printing, which affected the printing of withdrawal slips and passbook balances; (iv) Teller Cash Recyclers ("**TCRs**"), used to authenticate incoming bank notes and manage cash in vaults; and (v) Immediate Deposit Machines ("**IDMs**"), used by customers to deposit cash and cheques by themselves. TSB has stated that the issues with IDMs were not related to issues with the Proteo4UK Platform, but were instead caused by the IDMs not being cleaned properly. We asked TSB for evidence to support this, but TSB declined to respond. See further chapter 23, paragraph 23.12(A) and Figure 23.1.

### Figure 19.2: Key Customer Impacts in the First Seven Weeks after Go Live

| Week after Go Live | Digital | Telephone | Branch | Fraud and other issues |
|---|---|---|---|---|
| First week (Sunday 22 April to Sunday 29 April 2018) | Many customers unable to access (i.e. login to) Digital Channels.<br>Many customers unsuccessful when attempting to make payments.<br>Customers could view and make transactions on linked and nominee accounts. | A number of serious technological failures occur.<br>Significant call wait times and high rates of customers abandoning calls. | Desktop system of Proteo4UK Platform subject to frequent crashes and long reboot times.<br>A number of key branch functions were unavailable (including chip and pin). | Unexpected automated fraud alerts.<br>A number of overseas ATM transactions declined.<br>Certain customers saw erroneous balances on their accounts. |
| Second week (Monday 30 April to Sunday 6 May 2018) | Continued service degradations and outages.<br>Continued issues with customer data and payments. | Continued significant call wait times and high rates of customers abandoning calls through to the seventh week. | Continued branch issues (including crashes, freezes, and auto-restarts) through to the seventh week. | Continued increase in opportunistic fraud attacks through to the seventh week. |
| Third week (Monday 7 May to Sunday 13 May 2018) | | | | |
| Fourth week (Monday 14 May to Sunday 20 May 2018) | | | | |
| Fifth week (Monday 21 May to Sunday 27 May 2018) | Issues with Mobile App access. | | | |
| Sixth week (Monday 28 May to Sunday 3 June 2018) | | | | |
| Seventh week (Monday 4 June to Sunday 10 June 2018) | | | | |

19.13 On Tuesday 24 April 2018 (two days after Go Live), at approximately 10:00, TSB's Digital Channels were once again taken down, with the intention of reopening them at approximately 11:00. The deployment of the relevant fix in fact required 15 hours and TSB's Digital Channels were not reopened until approximately 03:00 on Wednesday 25 April 2018.

19.14 In addition to the issues outlined in the preceding paragraphs in respect of the Digital, telephone, and branch Channels, other issues identified by the end of the first week after Go Live (as summarised in the TSB CAO Narratives[9]) included:

(A) Issues for retail and business banking customers.

A significant proportion of business banking customers could not make payments to new beneficiaries online as they had not yet been able to set up the new authenticator Application required to make such payments. Further, 20-30% of retail and business banking customers could not make any payments online, due to password errors and an inability to reset their credentials.

(B) *"Some customers have experienced delays in credits or debits being applied to their accounts"*.

Certain customers saw erroneous balances on their accounts due to delays from a number of branch transactions having to be processed manually. Some customers' balances were too high due to successful outbound Faster Payments not yet being recognised in their accounts. A *"very low"* proportion of credit payments coming into customers' accounts were rejected during the week.

(C) *"Some customers have made decisions with incorrect or confusing information due to error messages or missing information in their accounts"*.

Some customers made duplicated payments after receiving confusing error messages from successful payments in the Digital Channels; customers were unable to see their mortgage account using the Digital Channels; and customers were unable to view the details of their savings accounts in the Mobile App.

Additionally, customers were provided with certain incorrect information, including:

(i) incorrect historical rolling balances for current accounts (Internet Banking and Mobile App);

(ii) missing transactions on current accounts (Internet Banking and Mobile App); and

(iii) missing and incorrect information on credit cards (Internet Banking).

Detailed information from migrated debit card transactions was not available in any Channel.

## Continuing Issues After Go Live (from 30 April 2018 to 10 June 2018)

19.15 Following the first week after Go Live, TSB continued to experience issues relating to its Digital, telephone, and branch Channels.

19.16 To assess the extent of these issues, we asked TSB to provide us with clear data on a number of metrics for the period from Go Live through to 10 June 2018 (including Mobile App and Internet Banking login success rates). TSB declined to provide this data. [10] In providing the summary of continuing issues after Go Live below, therefore, we have relied instead upon

[9] For each of the first three weeks after Go Live, the TSB CAO prepared a narrative timeline of events occurring during that week (the "**TSB CAO Narratives**"). Each of the TSB CAO Narratives contained the following (or close equivalent) caveat explaining that *"the evidence supporting the facts described in this document [has] not been independently verified and audited, and is based on material and communications shared predominantly at [Executive and Executive Gold Team] meetings"*.

[10] See further chapter 23, paragraph 23.12(A) and Figure 23.1.

the data contained within the available Post-MME Reports, including, principally, the TSB CAO Narratives and a draft report prepared by a consulting team within SABIS dated 19 June 2018 (the "**SABIS Post-MME Report**").

## Digital Channels (Access)

19.17 Digital Channels continued to experience service degradations and outages, especially from Monday 30 April 2018 to Friday 4 May 2018 (near the end of the second week after Go Live). In particular, intermittent access issues occurred on Monday 30 April 2018 (from 09:05 to 12:45), Thursday 3 May 2018 (when the Proteo4UK Platform was unavailable for approximately 30 minutes), and Friday 4 May 2018 (with drops in performance at 11:00 and 13:00). Access to Digital Channels appears to have improved from Monday 7 May 2018 (in the third week after Go Live), though there were issues with Mobile App access on both Wednesday 23 May 2018 and Friday 25 May 2018 (in the fifth week after Go Live).

19.18 TSB has told us that, following a fix made to the Proteo4UK Platform on the evening of Wednesday 25 April 2018 (three days after Go Live), stability returned to TSB's Digital Channels and, from then onwards, issues in Digital Channels were *"a combination of some incidents and functional Defects that had prevented some people accessing their accounts"*. It is not entirely clear what TSB means by this statement. However, if TSB's statement is intended to downplay the disruption to customers, it appears inconsistent with the evidence from the Post-MME Reports summarised in paragraphs 19.30 to 19.35.

## Digital Channels (Functionality and Payments)

19.19 Digital Channels continued to experience issues with customer data and payments, especially in the period up to Saturday 5 May 2018 (near the end of the second week after Go Live). Examples of some of the more serious issues (not all of which affected a large number of people) included:

(A) certain business banking delegates having access to all the accounts of their business through Internet Banking (rather than only being able to access the accounts they had access rights to);

(B) certain customers seeing other customers' statements or communications through the Digital 'inbox';

(C) certain customers receiving text messages for accounts owned by other customers;

(D) on Tuesday 1 May 2018, standing orders that should have been applied overnight not appearing in customers' accounts, with the backlog only finally being cleared at 16:30;

(E) on Wednesday 2 May 2018, internal inter-account transfers not completing from 20:00 until 03:00 the following day;

(F) a very small number of customers being linked by 'also known as' relationships where there was no genuine relationship between them, with the result that for the period from Thursday 2 August 2018 until Sunday 5 August 2018 (four months after Go Live), these customers could see all the accounts of the other customer; and

(G) over an undisclosed time period, customers who had closed or switched their accounts to another bank having the incorrect reason code applied, meaning that they were incorrectly recorded as being deceased. Certain of these customers then received correspondence from the organisations they paid by direct debit addressed *"To the personal representative of the deceased"*.

19.20 In relation to payments, Figure 19.3 and Figure 19.4 indicate that both Mobile App and Internet Banking payment success rates remained significantly below BAU levels until Saturday 5 May 2018 (in the second week after Go Live), with this time period being highlighted in yellow.

## Telephone Channel

19.21 The Telephone Channel continued to experience a high volume of calls, together with long wait times and high abandonment rates. Specific issues in the second week after Go Live included the following:

(A) on Wednesday 2 May 2018, although IVR capacity was increased, customers experienced an engaged tone or 'subscriber busy' message when calling the main TSB customer service number and approximately 70% of customer calls dropped out before reaching the IVR system; and

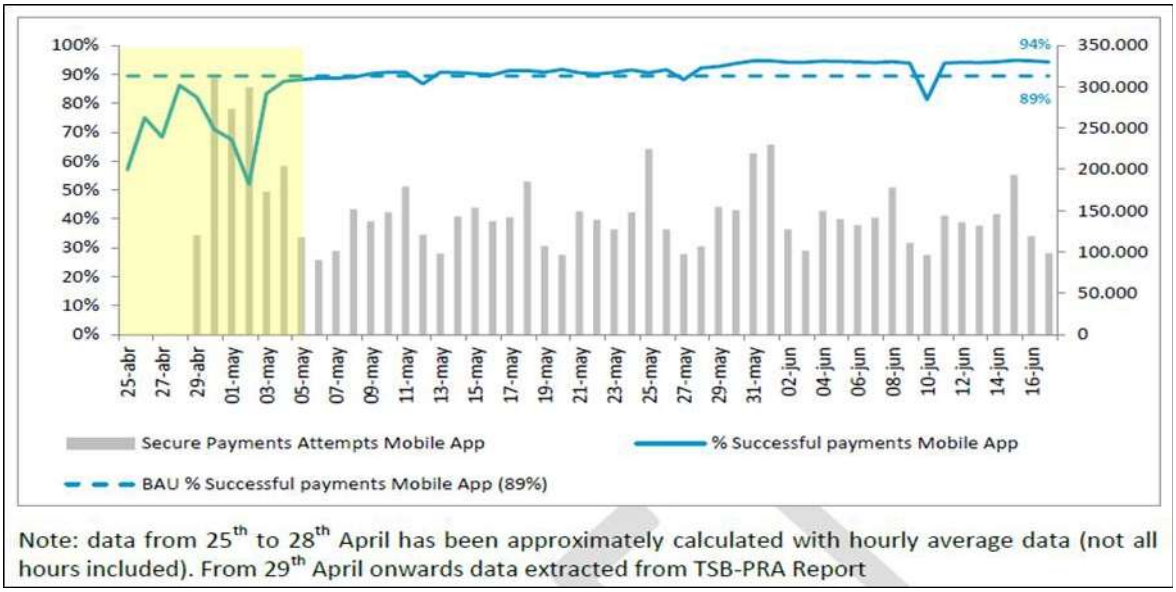
(B) on the same day, three high-impact periods of degradation with Citrix resulted in employees working in the telephone and branch Channels being logged off and having to reboot, with calls being handled by contact centre agents being dropped.

19.22 On the following day, Thursday 3 May 2018, between 11:05 and 11:12 (i.e. for seven minutes), TSB experienced an outage of multiple services simultaneously, meaning that agents could not service calls as they could not access the Proteo4UK Platform. An issue also arose whereby customers were transferred incorrectly from the IVR system to agents. The severity of the issues can be seen from the decision of the Executive on the same day (Thursday 3 May 2018) to raise the severity of the telephone issues to *"Emergency"*.

19.23 Nevertheless, issues with the Telephone Channel persisted. On Wednesday 30 May 2018, the FCA wrote to the Treasury Select Committee noting, among other things, that: TSB's Telephone Channel continued to experience Network issues, which remained a *"high priority"* for the FCA and TSB to resolve; over 40% of calls were still being abandoned or disconnected before progressing through the IVR system; and wait times to speak to an agent were at times in excess of 30 minutes.

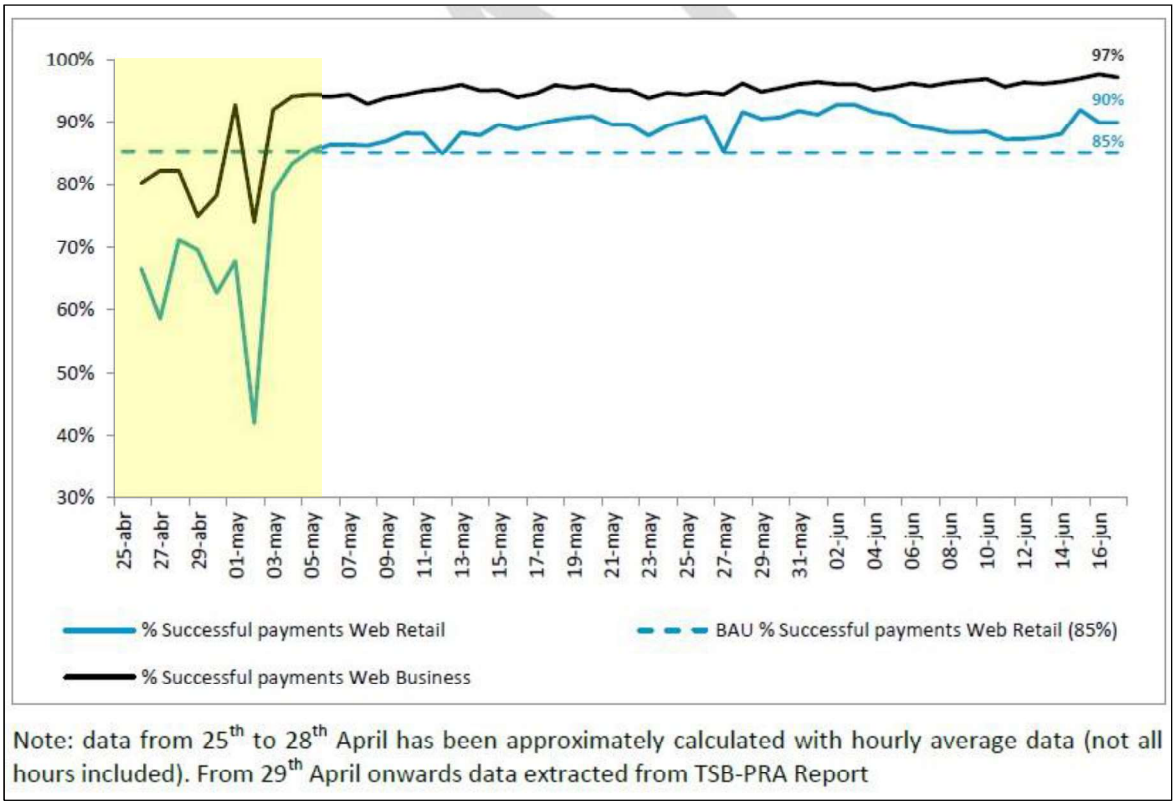
19.24 TSB has commented that during this period, plans were in place to increase the number of contact centre agents from 305 to 478 by Monday 18 June 2018 (as opposed to 140 in BAU conditions) and to increase call capacity for the existing agents (including through limiting holidays, increasing overtime, and reducing the time spent off the phone). However, as is evident from Figure 19.5, it took until mid-June 2018 (two months after Go Live) for the average time taken to answer calls to return to the BAU level (with average call waiting times remaining above c.20 minutes until 18 May 2018, and above c.10 minutes until early June 2018).

Figure 19.3: Mobile App Payments Success Rates (From the SABIS Post-MME Report, Dated 19 June 2018, Yellow Shading Added)



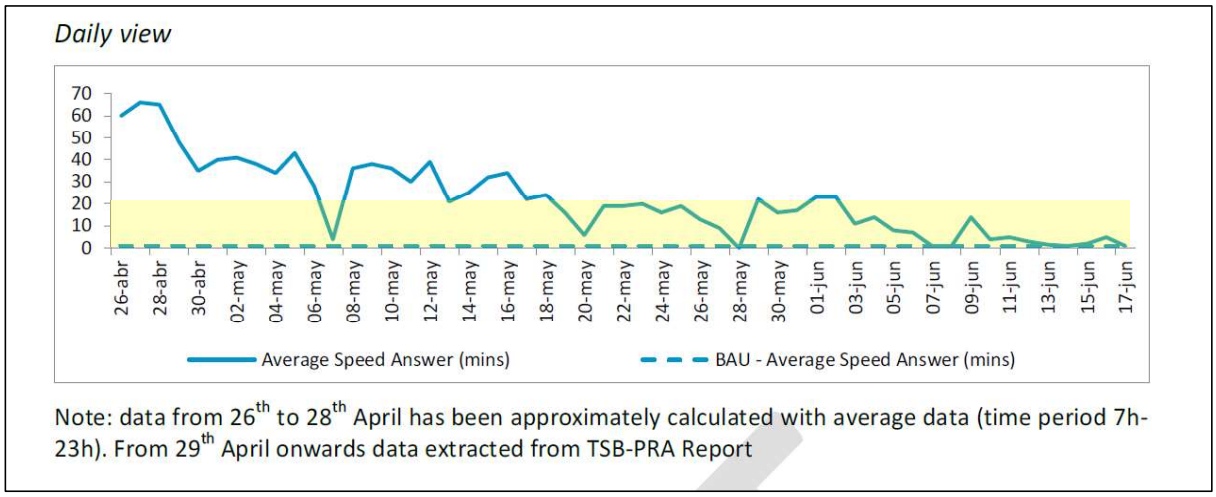

Note: data from 25th to 28th April has been approximately calculated with hourly average data (not all hours included). From 29th April onwards data extracted from TSB-PRA Report

Figure 19.4: Internet Banking Payments Success Rates (From the SABIS Post-MME Report, Dated 19 June 2018, Yellow Shading Added)




Note: data from 25th to 28th April has been approximately calculated with hourly average data (not all hours included). From 29th April onwards data extracted from TSB-PRA Report

**Figure 19.5: Average Speed to Answer Calls in Minutes (From the SABIS Post-MME Report, Dated 19 June 2018, Yellow Shading Added)**




## Branches

19.25 Branches continued to be affected by broadly the same issues as those present in the first week after Go Live (see paragraph 19.12(D)).

19.26 In fact, certain branch issues persisted through June and July 2018, such that on 13 July 2018 (three months after Go Live) the TSB Distribution Director called a summit in Barcelona, as he told us, to *"accelerate the depth and extent of the focus on getting…[his] part of the business back in a[n]…acceptable state"*. The summit's objectives included the identification of *"additional actions to improve branches service and partners [employees'] experience"* and to *"[d]iscuss next steps and transition to stability"*.

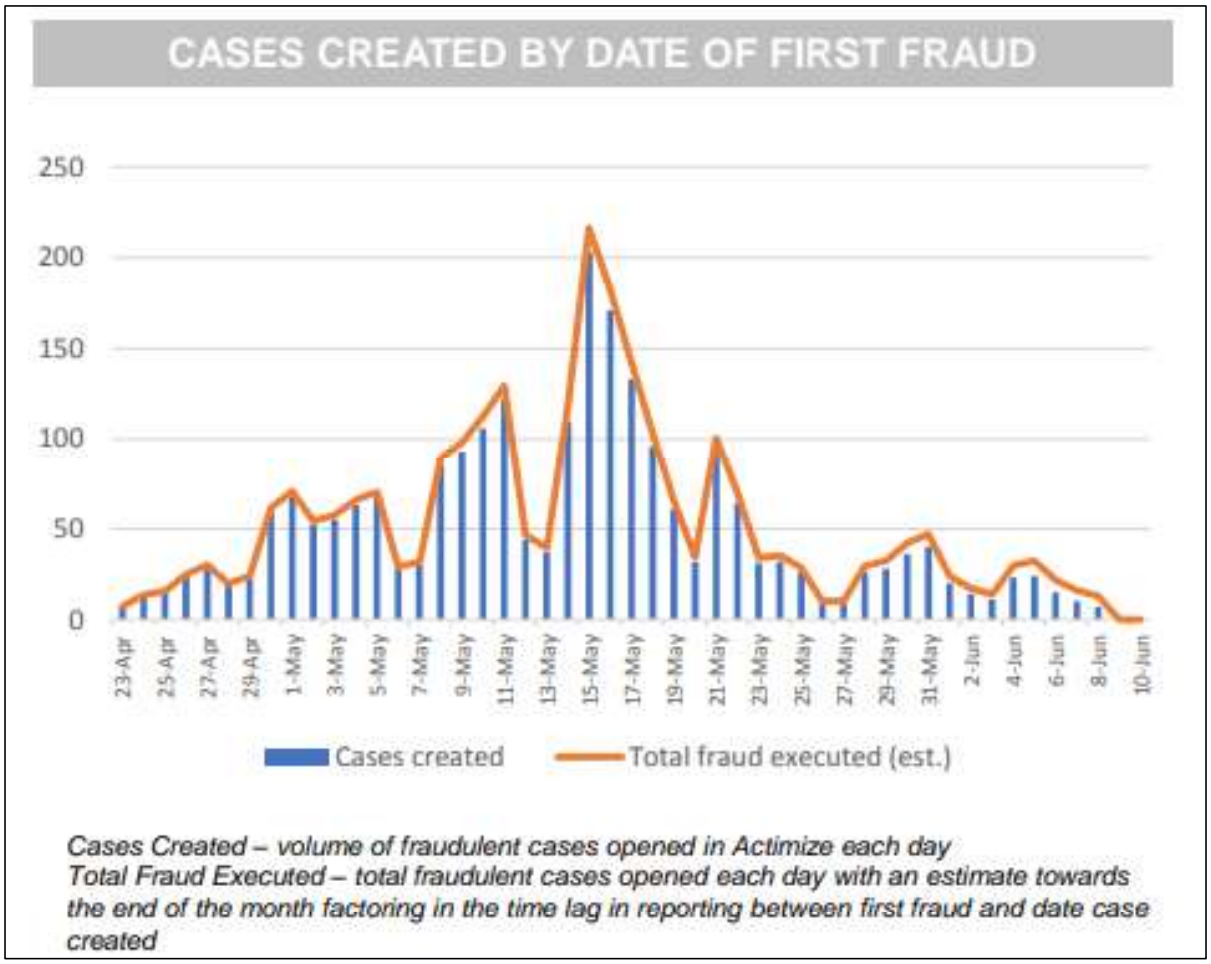
19.27 The papers for the summit noted that there were still approximately 300 crashes, 1,400 freezes, and 2,000 auto-restarts per day and that the average number of times an individual branch staff user of the Proteo4UK Platform would have to log back into their account over the course of a day was never lower than three times per day during the period from 27 June 2018 to 11 July 2018, peaking at 6.5 times per day on 10 July 2018.

## Fraud

19.28 In addition to continued issues affecting the Digital, telephone, and branch Channels, from the week commencing Monday 30 April 2018 (i.e. the second week after Go Live), TSB's customers began to experience an increase in opportunistic fraud attacks. This increased steadily until, according to the TSB CIO, the scale of the fraud attacks faced *"exceeded by far the ability to serve customers affected by fraud"*.

19.29 The volume of fraud attacks at the peak of the attacks (around Tuesday 15 May 2018, in the fourth week after Go Live) was approximately 70 times BAU levels. Figure 19.6 summarises the fraudulent activity reported over the period from April to June 2018.

**Figure 19.6: Fraud Cases Created Per Day (From an Executive Gold Team Update, Dated 12 June 2018)**




## TECHNICAL CAUSES OF THE ISSUES SUFFERED BY TSB'S CUSTOMERS

19.30 As we explain at paragraph 23.3(A), it was not our role to investigate the technical causes of the issues after Go Live. We have had access to a number of Post-MME Reports, which are listed at Appendix 5. Two of these Post-MME Reports (the IBM Report and the EY Root Cause Analysis Report) have been of particular assistance in identifying the technical causes of the post-Go Live issues:

(A) The IBM Report - TSB commissioned IBM to analyse non-functional technology changes approved by TSB for implementation into the Proteo4UK Platform between 4 May 2018 and 18 June 2018, in order to identify some of the likely technical causes of instability after Go Live.[11] IBM's conclusions were contained in a draft report dated 3 July 2018 (the "**IBM Report**").[12]

[11] The IBM Report examined the following nine areas, as agreed with TSB: Microservices, Open AM, Actimize, Exadata, Load Balancing, WebLogic, Telephony including IVR, Branch and Payments.

[12] The IBM Report states that it "*is not, and is not intended as, a root cause analysis of the underlying reasons why the technology issues arose*". However, the IBM Report is of considerable value to our understanding of technical causes as it nonetheless explains: (i) the "*principal areas contributing to technology instability*"; and (ii) example approved changes

(B) The EY Root Cause Analysis Report - EY was jointly commissioned by TSB and Sabadell. Its report considers issues that occurred between 4 May 2018 and 26 August 2018 (the "**EY Root Cause Analysis Report**"). The EY Root Cause Analysis Report explains (i) the key functional and non-functional technical causes of these post-Go Live issues; and (ii) the stages of testing in the Software Development Life Cycle ("**SDLC**") where they could have been found. The EY Root Cause Analysis Report does not generally explain why the technical causes were not caught at those stages of the SDLC. The EY Root Cause Analysis Report is dated 9 April 2019. Unfortunately, as explained at paragraph 23.14 we only received the EY Root Cause Analysis Report on 3 October 2019, at which point we were finalising this Report.

19.31 The IBM Report and the EY Root Cause Analysis Report cannot be fully reconciled, as there were significant differences between their scope (including time periods covered), analytical approaches and methodologies. The most significant differences between these reports are explained in Appendix 6.

19.32 We have also relied on a draft report produced by the TSB CIO dated 20 November 2018, titled "*TSB Migration, The crisis from the inside*". The TSB CIO account is different in nature to the IBM and EY Root Cause Analysis Reports, as it is a *"personal interpretation of what happened and why it happened, and the categorization of the problems and how they contributed to the crisis"*, and *"not the result of a formal investigation"*.

19.33 Despite inconsistencies between these reports, the picture they present of the main technical causes of the issues after Go Live is broadly consistent. That picture is as follows:

(A) non-functional issues (i.e. issues with how the Proteo4UK Platform performed) had the greatest impact on TSB's customers in the weeks following Go Live through their impact on the Digital, branch and telephone Channels. The most significant technical causes of the non-functional issues were configuration and capacity issues. IBM define these as follows:

(i) *"configuration changes are…changes made to settings, versions or parameters that affect the function or performance of a technology component"*; and

(ii) *"capacity changes are…changes to the resources of a technology component, such as CPU, Memory, Bandwidth, etc, which can aid in increasing system performance"*;

(B) functional issues (i.e. issues with what the Proteo4UK Platform did) had a lesser impact on TSB's customers in the weeks following Go Live, but thereafter caused issues for TSB's customers for a longer period of time; and

(C) SABIS' ability to operate the Platform amplified these issues, heightening their severity and causing them to last for longer.

19.34 We discuss the technical causes of the non-functional and functional issues in further detail at paragraphs 19.36 to 19.42. SABIS' readiness, and the steps taken by TSB to assess this are discussed in chapter 15.

which IBM observed as contributing to significant improvements in technology stability. These explanations generally describe IBM's understanding of what led to the issue which required an *"approved change*.

19.35 We do not discuss the causes of the fraud suffered by TSB's customers as we have not received an analysis of this (and it is not within the scope of our Review). However, we note the comment in the TSB CIO report that the public nature of the issues suffered by TSB's customers led to a *"massive fraud attack"*.

## Causes of Non-functional Issues

19.36 Both EY and TSB have suggested that many of the non-functional issues could have been identified in non-functional Performance Testing. For example:

(A) EY's analysis showed that all of the Defects in the "*Architecture, Infrastructure and Platform design*" (which caused capacity and other issues),[13] and 43% of the weighted impact of configuration errors could have been caught in NFT Performance Testing; and

(B) TSB has told us that of the 38 non-functional incidents it identified between 22 April and 30 June 2018, up to 17 (i.e. 45%) of them may have been found by increasing the scope of NFT.

19.37 The key observations from the IBM, EY and TSB CIO Reports regarding the technical causes of non-functional issues are set out at Appendix 7.

19.38 TSB has suggested that the non-consistent Active/Active configuration of TSB's dual data centre setup was the *"key factor contributing to the issues following MME"*.[14] However:

(A) although the IBM Report acknowledges the significance of this issue (*"configuration change was the area at the time of our engagement which presented the most immediate need for attention to alleviate critical issues in the Customer and Partner journeys, most notably load balancing in the Data Centres"*) it explains that a wide range of changes were made to code, capacity and configuration in order to stabilise the Platform; and

(B) EY did not investigate this incident as it did not meet its weighted impact criteria. It therefore was not included in its sample of 201 incidents.

19.39 The flaws in the design, execution and reporting of NFT are discussed in chapter 14.

## Causes of Functional Issues

19.40 IBM's report did not cover functional issues. However, EY's analysis of functional issues determined that the most important cause of the functional issues affecting TSB's customers was coding Defects.

19.41 EY found that *"There [was] greater concentration of these [coding] defects in Remote Channels (like Web and Mobile applications), Payments and Branches."*

19.42 EY's analysis demonstrated that:

(A) coding Defects accounted for 56% of the weighted impact on functional issues; and

[13] The other issues cited by EY were sizing of memory, response times between various applications, routing communications to a single data centre and performance of microservices.

[14] EY determined the Weighted Impact of particular issues, taking into account its assessment of the priority of the issue, whether the issue was reported as having a regulatory impact and the number of customers impacted.

(B) 60% of this weighted impact could have been caught by identifying the issues in System Integration Testing (45%) or Unit Testing (15%).[15]

## DETRIMENT SUFFERED BY TSB'S CUSTOMERS AFTER GO LIVE

19.43 To give an indication of the detriment suffered by TSB's customers as a result of the IT issues after Go Live, we have summarised below the available data on: (i) customer complaints; and (ii) current account switching. However, we note that not all customers who suffered inconvenience (or worse) would have made a formal complaint or have taken the active step of switching their account.

### Customer Complaints Data

19.44 By Wednesday 2 May 2018 (in the second week after Go Live), TSB had received 33,101 customer complaints since Go Live, representing an increase of 1,156% on the pre-Go Live baseline for the period. Further, during the first half of 2018, TSB received 136,913 complaints (compared with just under 76,000 during the whole of 2017), and, of these 136,913 complaints, 114,399 (c.84%) were received after Go Live.

19.45 To place these figures into context, according to data published by the FCA, the number of complaints received by TSB per 1,000 accounts increased from 4.1 (H1 2017) and 4.35 (H2 2017) to 16.5 (H1 2018), the latter being the second highest among the 238 banks within the dataset. In its summary of the H1 2018 complaints data, the FCA noted that TSB's move to the Proteo4UK Platform was responsible for approximately half of the 9% (193,360) increase in the total number of complaints across the industry as a whole as against H2 2017 (excluding complaints relating to payments protection insurance).

19.46 While we understand many of these complaints involved no financial loss, customers may have still suffered significant inconvenience and distress.

19.47 An assessment of TSB's customer compensation framework is outside the scope of this Report, however we note that over the period 1 July 2018 to 31 December 2018, the number of complaints escalated by TSB customers to the Financial Ombudsman Service was 5,764, compared to 855 complaints over the same period in 2017.

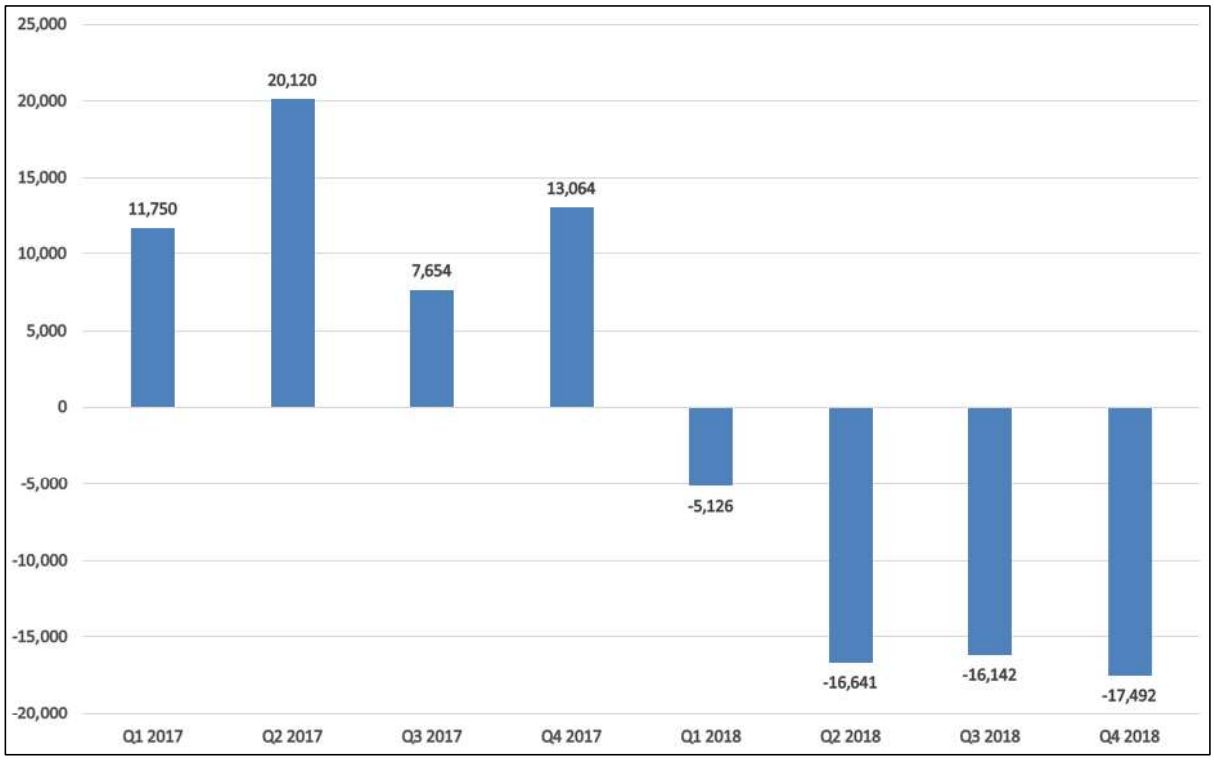
### Current Account Switch Service Data

19.48 Figure 19.7 summarises the data as to the number of customers that switched their current accounts away from TSB over the relevant period using the Current Account Switch Service ("**CASS**") scheme.

19.49 For each of Q2, Q3, and Q4 2018, TSB experienced the greatest net loss of any of the participants in the CASS scheme.

[15] This disregards the weighted impact of coding Defects that could have been caught in Performance Testing, as these would have been non-functional issues.

## Figure 19.7: Net Customers Gained or Lost by TSB through Current Account Switching (Based on Data Published by BACS)



# CHAPTER 20: THE EFFECT OF SOCIAL MEDIA

## KEY POINTS

- TSB has told us that the issues experienced after Go Live were exacerbated by social media, including by a number of false claims made by Twitter users.
- We have not assessed the extent of this, as it is outside the scope of this Report. However, while we have no reason to doubt that the way events unfolded would have been different in a pre-social media age:
  - the scale and duration of the problems that occurred across TSB's primary customer Channels would still have caused significant public and regulatory concern in a pre-social media age; and
  - we would expect that, as a challenger bank with a focus on becoming *"a more agile, digital business"*, TSB would have anticipated, and been prepared to deal with, intense social media interest after Go Live of the new Platform and in any problems (the anticipated *"bumps in the road"*) that it experienced.

20.1 TSB has on a number of occasions referred to the role that social media and the press may have played in *"amplifying"* the effects of the underlying IT issues.

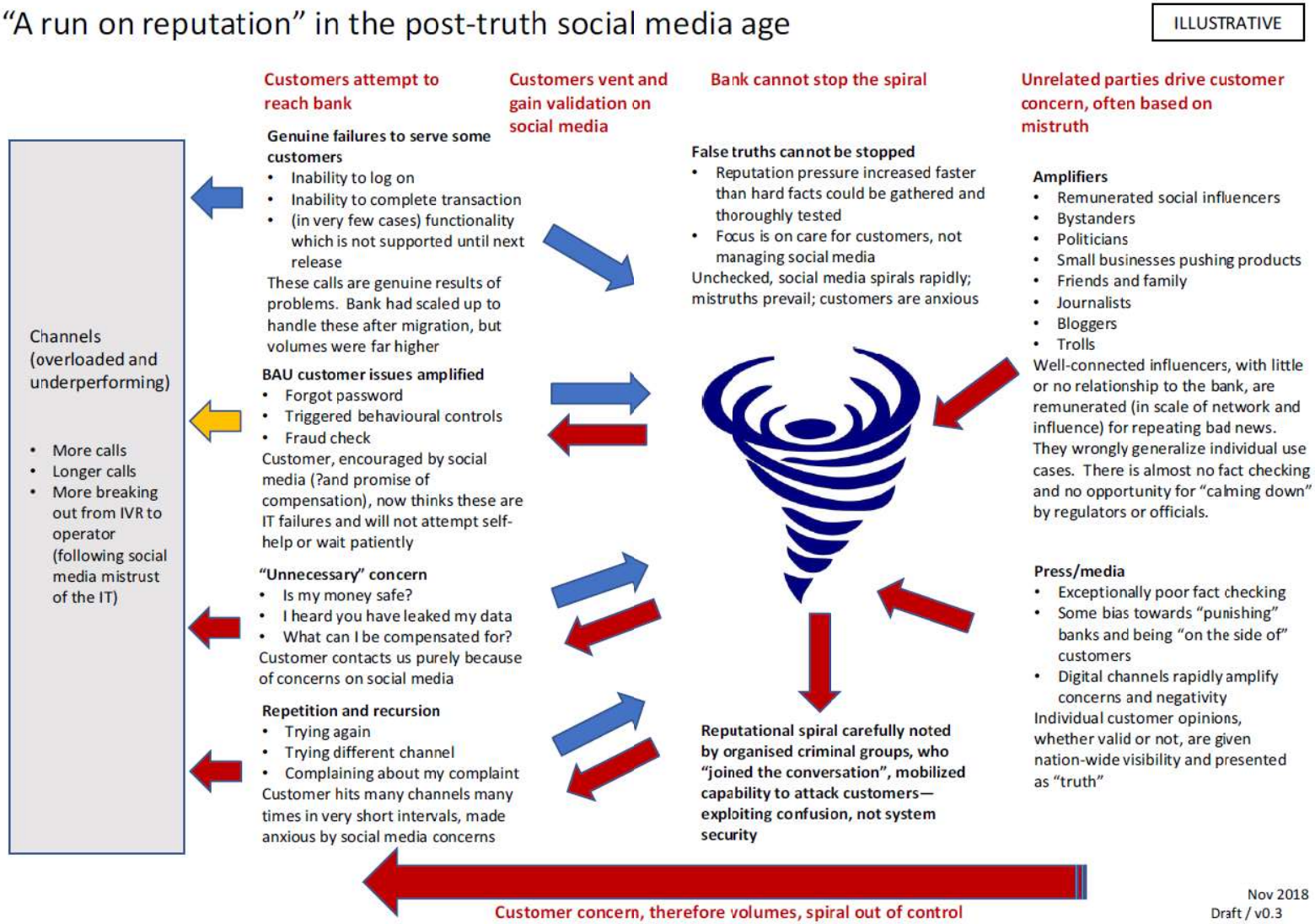
20.2 TSB has cited in support of this position, and was keen for us to refer to in this Report, a diagram titled *"'A run on reputation' in the post-truth social media age"* that was prepared by a TSB INED. The diagram (shown at Figure 20.1) identifies a number of causal mechanisms by which (in the view of the TSB INED) social media, the press, and TSB's customers interacted to *"amplif[y]"* the effects of the underlying IT issues on the bank.

20.3 We have asked TSB for evidence on the quantification of this social media impact, but the materials provided did not directly address this point.

20.4 It is outside the scope of this Report to assess the precise effect that social media and the press had on prolonging and amplifying the issues faced after Go Live, or the accuracy of the causal mechanisms outlined in the TSB INED's analysis. Nevertheless, while we have no reason to doubt the way events unfolded would have been different in a pre-social media age, we note that:

(A) TSB defined itself as a challenger bank, with a *"strong digital capability"* and a focus on becoming *"a more agile, digital business"*, and therefore could be expected to be prepared for evolving patterns of customer behaviour. Indeed, as early as 2015, TSB recognised in its communications strategy that social media had the potential to influence *"all stakeholders"*, its *"[i]mmediacy and potential reach can increase impact significantly"*, and *"[q]uick dissemination of messaging is crucial to stay in control of a story"*;

Figure 20.1: Diagram Prepared by a TSB INED, Dated November 2018



(B) TSB has acknowledged to us that:

(i) in its contingency planning for social media prior to the Main Migration Event ("**MME**"), it had *"underestimated the significant levels and breadth of adverse social media activity actually experienced following the MME…in terms of both its volume and its catalytic power"*;

(ii) *"[i]t may have been more effective to engage external social media experts in advance of the MME"*; and

(iii) the *"impact might have been mitigated to some extent by clearer communications to customers regarding the nature of the issue, in particular, a clear and early message to customers that their funds were not at risk"*.[1]

20.5 In our view, the underlying issues and potential customer detriment referred to in chapter 19, including the length of time for which these issues persisted and the fact they covered three of the primary Channels used by TSB's customers to access the bank, were sufficient to cause public and regulatory concern even in the absence of any amplification by social media.

[1] TSB also noted however that it is unclear whether engaging social media experts or clearer messaging would have been effective given the scale of the issues experienced, the length of time for which they persisted, and the impact of adverse press and social media attention.

# CHAPTER 21: RISK MANAGEMENT

## KEY POINTS

- The core of the Programme's approach to risk management was based on TSB's BAU 'three lines of defence' model, which consisted of: (i) the Programme Team, (ii) Risk Oversight and (iii) Internal Audit.
- There were significant problems with risk identification, reporting and oversight on the Programme. In particular, Programme risk management did not adequately cover three key risks:
  - the risk of going live with a new and unproven Platform following the adoption of a predominantly single event migration approach;
  - the risk that SABIS would be unable to design, build and test the Platform to TSB's requirements; and
  - the risk that SABIS would be unable to operate the Platform to TSB's requirements.
- The 22 Programme risks remained unchanged after December 2016, despite the significant changes in the Programme's risk profile. This demonstrates an absence of appropriate risk management by the Programme.
- Risk Oversight and Internal Audit carried out an extensive programme of reviews, including into areas which were directly relevant to the issues that materialised for TSB after Go Live. However, these reviews were at times inadequate, resulting in: (i) key issues not being identified; and (ii) actions not being followed through appropriately. In particular, they missed the opportunity to provide a robust independent opinion on risk management by the Programme Team in relation to three areas:
  - the Replan;
  - SABIS' ability to design, build and test the Platform; and
  - assurance of Non-functional Testing at Go Live.
- As a result, the TSB Board may have taken too much comfort from the opinions provided by Risk Oversight and Internal Audit when making decisions relating to the Replan and Go Live.
- In addition, Risk Oversight and Internal Audit should have ensured that the TSB Board understood all of the material caveats and limitations included in their opinions, so that they were fully taken into account by the TSB Board ahead of making the decisions relating to the Replan and the decision to Go Live.
- In turn, the TSB Board should have sought clarification of these caveats and limitations to ensure that they fully understood (i) the significance of these caveats, and (ii) the extent to which the Risk Oversight and Internal Audit opinions at these points in the Programme could be relied upon to provide comfort and support to the decisions made by the TSB Board.

## INTRODUCTION

21.1 The core of the Programme's approach to risk management was based on TSB's Business as Usual ("**BAU**") 'three lines of defence' model: (i) the Programme Team, (ii) Risk Oversight and (iii) Internal Audit (in chapter 5 we briefly described the key responsibilities and activities of TSB's three lines of defence in respect of the Programme).

21.2 In this chapter we set out our observations on the overall effectiveness of risk identification, reporting, and oversight in the Programme. In particular, we focus on:

(A) how Programme risks were assessed by the Programme Team (i.e. the first line), at the outset and as the Programme progressed; and

(B) the overall effectiveness of Risk Oversight (i.e. the second line) and Internal Audit (i.e. the third line) at key points in the Programme.

## RISK MANAGEMENT IN THE FIRST LINE

21.3 The Programme was one of the most complex and challenging IT transformations ever undertaken in the UK financial services sector. Given this, it was imperative that TSB put in place effective risk management. This required:

(A) the identification, evaluation, and prioritisation of Programme risks;[1]

(B) the allocation of appropriate resources to mitigate these risks;

(C) the monitoring of actions taken to mitigate risks and the reassessment of the risk profile of the Programme; and

(D) effective reporting of the risk profile within the Programme.

21.4 As part of the November 2015 TSB Board Deep Dives, the Programme Team identified 18 Programme risks. A further four risks were added over the course of 2016. This list of 22 Programme risks remained unchanged from December 2016 to the end of the Programme. We understand that TSB developed the list of Programme risks based on previous experience within TSB and Sabadell, as well as industry experience, including the Kelly Report.[2]

21.5 These were largely generic risks for a major IT transformation programme, including for example: (i) risk 3: *"Management stretch"*; (ii) risk 4: *"Cost increases"*; and (iii) risk 15: *"Reputational damage"* (see Appendix 8 for a full list of the Programme risks).

21.6 It was important that these types of generic risks be considered and included. However, in addition to generic risks, all significant risks specific to the particular circumstances of the Programme needed to be identified and managed. Some specific risks, such as the Programme's dependency on LBG (risk 11: "*LBG relationship*") and the risk of not finding a

[1] For the purposes of our Review, we have focused on the Programme risks reported to the Audit Committee (which was responsible for overseeing the management of Programme risks), and not on any other risk registers, for example those focusing primarily on BAU risks.

[2] Sir Christopher Kelly, 'Report of the independent review into the events leading to the Co-operative Bank's capital shortfall'.

date for Go Live due to competing external payment industry initiatives (risk 22: "*Payments landscape*"), were identified and monitored.

21.7 Taken together, these 22 risks did not reflect all the relevant key risks that should have been included. Some of the more obvious key risks, as well as their potential impacts on the Programme, were not specifically identified as Programme risks. Given their significance in the context of the Programme, we consider that the following risks should have been captured explicitly and/or prominently enough to get the right attention from the Programme Team and the TSB Board:

(A) the risk of going live with a new Platform following the adoption of a predominantly single event migration approach;

(B) the risk that SABIS would be unable to meet its obligations under the Migration Services Agreement to design, build and test the Platform to TSB's requirements; and

(C) the risk that SABIS would be unable to meet its obligations under the Outsourced Services Agreement to operate the Platform to TSB's requirements.

Appendix 9 summarises our analysis as to why these three risks were not adequately covered in the Programme risks register.

21.8 Evidence of active risk management in the Programme would include the following:

(A) identification of new risks as the Programme progressed;

(B) retirement of risks that had been largely mitigated as the Programme progressed and developed; and

(C) changes in the residual risk scores[3] assigned to each Programme risk.

21.9 From December 2016, there were significant changes in the risk profile as the Programme developed beyond this time (for example, numerous delays to the Platform build and Programme replans). Notwithstanding this, the list of 22 Programme risks reported by the Programme Team remained unchanged (see Appendix 10 which illustrates the risk profile of the Programme at key points).

21.10 The fact that:

(A) important risks were not specifically identified as Programme risks at the outset;

(B) the list of Programme risks remained static after December 2016; and

(C) there were insufficient changes to the risk scores assigned to these 22 risks (only 9 out of 22 were reclassified to a new Severity category over the course of the Programme),

demonstrates an absence of appropriate risk management by the Programme. This in turn may have resulted in appropriate corresponding mitigating actions not being taken to address the key risks and the Executive and the TSB Board taking decisions on key aspects of the Programme that were not fully informed or risk-assessed.

[3] Following a standard process of risk management, TSB allocated residual risk scores to each Programme risk, by reference to a combination of the likelihood of the risk occurring and the impact if it did.

21.11 Although the allocation of specific responsibilities within the 'three lines of defence' model may vary, the objective is for the combination of them to provide sufficient coverage to manage the organisation's risks effectively. For this Programme:

(A) Risk Oversight was responsible for providing *"an independent opinion on the risks associated with the programme and the way the '1st line' programme is managing and mitigating them"*; and

(B) Internal Audit was responsible for providing *"independent and objective assurance of the risk management activities of the 1st line programme…"*. This included providing *"assurance to the Board… over the effectiveness of the key programme controls"*.

21.12 The TSB Board recognised at the outset of the Programme that Risk Oversight and Internal Audit did not have the required capacity and capability to oversee the Programme alongside their BAU responsibilities. TSB took reasonable steps to address the gaps in resource and capability, including by co-sourcing additional capacity from Deloitte, KPMG, and EY and making a number of new hires.

21.13 Risk Oversight and Internal Audit carried out an extensive programme of reviews, including into areas of importance to the issues that materialised for TSB after Go Live. However, these reviews were at times inadequate, resulting in: (i) key issues not being identified; and (ii) actions not being followed through appropriately. In this chapter we give examples of inadequate reviews in relation to three areas that are relevant to the issues TSB experienced following Go Live:

(A) assessment of the Replan;

(B) SABIS' ability to design, build and test the Platform; and

(C) assurance of Non-functional Testing immediately prior to Go Live.

## Assessment of the Replan

21.14 The Replan presented an opportunity for TSB to take a realistic view of the status of the Programme, and to consider: (i) how far behind schedule the Programme was; (ii) what outstanding tasks remained to be achieved before TSB was 'migration ready'; and (iii) how long this would realistically take. It was also an opportunity to learn from the first 18 months of the Programme. This opportunity was missed. The Replan was not a comprehensive, 'bottom-up' process and there was little attempt to investigate the technical causes of the delays the Programme had faced to date.

21.15 The Replan, as described to the TSB Board, may have appeared to the TSB Board as comprehensive and rigorous, with input from several stakeholders, including Risk Oversight and Internal Audit. However, both the Replan and the Defender Plan had clear flaws which should have been challenged at the time by Risk Oversight and Internal Audit (among others) (see paragraphs 13.20 to 13.47).

21.16 Both Risk Oversight and Internal Audit provided opinions on the Replan. Both Risk Oversight and Internal Audit broadly concluded that the assumptions underlying the Defender Plan were reasonable and satisfactory. In view of the flaws that we have identified, we find this

surprising. Given the limited scope of these reviews (described below), which was clear from the opinions included in the TSB Board materials:

(A) Risk Oversight and Internal Audit should not have been providing this kind of comfort; and

(B) the TSB Board should have considered the extent to which the Risk Oversight and Internal Audit opinions on the Replan could be relied upon to support the decisions made by the TSB Board.

## The Risk Oversight Opinion on the Replan

21.17 The Replan presented an opportunity for Risk Oversight to provide a properly evidenced view of the Programme's risks, assumptions and dependencies on which the Defender Plan was based, including how these risks, assumptions and dependencies had changed since the Programme's inception. However, what they actually carried out fell short of their responsibility to provide *"an independent opinion on the risks associated with the programme and the way the '1st line' programme is managing and mitigating them"*.

21.18 As noted in the Risk Oversight opinion on the Replan: *"due to the short timescales of the re-plan"*, Risk Oversight could not complete control-based deep dives, but only gave *"an opinion based on observation and document review to form an opinion based on 'reasonableness' of the steps taken by 1st line to develop the re-plan, and high level opinion on the plan itself"*.

21.19 Risk Oversight identified that the Defender Plan would require "*improved performance in several areas*" (in particular User Acceptance Testing ("**UAT**") and Migrated Data Testing ("**MDT**")), but concluded *"there is a rationale for every improvement expected"* and that the key risks had been declared by the Programme Team. Simply noting that the team has a rationale for the expected improvements, and that it has declared the key risks, is neither an independent opinion of those risks, nor an assessment of whether they are being managed and mitigated appropriately.

## The Internal Audit Opinion on the Replan

21.20 Internal Audit stated in their opinion on the Replan that:

> *"the reasonableness of the process followed and assumptions made to arrive at the Re-Planned T3 date was found to be satisfactory overall"*.

21.21 Internal Audit caveated their opinion on the Replan by noting that they had *"not tested the bottom up details supporting the Re-Plan, such as the interlocking with all relevant Third Parties nor the capacity of BEC functions / SABIS to deliver in line with Re-Plan assumptions"*. These caveats undermined the value of Internal Audit's opinion that the reasonableness of the process and assumptions was *"satisfactory overall"*. In particular, the ability of SABIS to deliver in line with the Replan assumptions was central to the achievability of the Replan.

21.22 We were told by TSB that it was not Internal Audit's role to provide detailed feedback on the feasibility of TSB's approach to the Replan. This is inconsistent with a key role of Internal Audit which was to *"Provide … assurance to the Board… over the effectiveness of the key programme controls"*, given that:

(A) the Defender Plan was a key control to setting a revised Go Live date, and should have provided an updated snapshot of the risks to the Programme at that time; and

(B) as described in paragraph 21.18, Risk Oversight had not had time to perform a detailed review of the Replan.

## SABIS' Ability to Design, Build and Test the Platform

### Internal Audit's Limited Coverage of SABIS' Application Development

21.23 Only two of the 42 Programme reviews carried out by Internal Audit assessed Application development by SABIS, despite its significance.[4] Both of these audits assessed the IT quality assurance processes supporting the development of TSB's new Mobile App (a very small part of the Application build).

### Inadequate Management Action Regarding Architecture Design Documentation

21.24 Internal Audit correctly identified the risk associated with the lack of architectural design documentation received from SABIS. However, the management action agreed (to accept the delivery of a Configuration Management Database ("**CMDB**")[5] in lieu of architectural design documentation and for TSB to develop its own documentation based on the CMDB) was insufficient, and in any event was closed prematurely (see chapter 9).

## Assurance of Non-functional Testing at Go Live

21.25 Non-functional Testing ("**NFT**") was used to confirm that the Platform as a whole could operate at the service levels expected by TSB and its customers from the moment of Go Live. However, the design, execution and reporting of Performance Testing was not sufficient to mitigate the risk of putting live, for TSB's whole customer base, a Platform consisting of largely new Channel Applications, Middleware and entirely new Infrastructure. The Performance Testing conducted was compromised by shortcomings in requirements, design, execution, and reporting. As a result, it did not identify important issues that contributed to the problems after Go Live (as discussed in chapter 14).

21.26 Both Risk Oversight and Internal Audit issued opinions to support the TSB CEO's T3 Memo to the TSB Board. The purpose of these was for the TSB CRO and the TSB CAO each to provide an *"opinion on the first line's interpretation of the facts as they relate to readiness, the risks to the business of proceeding with the T3 event and the effectiveness of the mitigation actions"*.

21.27 In the T3 Memo, the TSB CEO referred to, and relied on, these opinions of Risk Oversight and Internal Audit to support his recommendation to the TSB Board. However:

(A) the Risk Oversight opinion contained an important caveat about the limited coverage of NFT, the significance of which was not explained to the TSB Board; and

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[4] Based on the information we have received: (i) we estimate that almost half of the Programme's spend was on Application development (see paragraph 9.60), and (ii) delayed delivery of Applications software from SABIS was a key reason for the delays of UAT (see chapter 11).

[5] See chapters 9 and 15 for further discussion on CMDB.

(B) Internal Audit did not perform a meaningful review of the NFT results prior to issuing their opinion.

The limited coverage provided by both Risk Oversight and Internal Audit meant they did not provide sufficient assurance of NFT to the TSB Board.

## The Risk Oversight Opinion in Support of the T3 Memo

21.28 In his Risk Oversight Opinion in the T3 Memo, the TSB CRO confirmed that:

(A) he *"concur[red] with the First Line of defence's interpretation of the facts"* and was *"satisfied that the information provided to the Board [was] fair, balanced and reasonable"*;

(B) the *"key risks of the MME ha[d] been appropriately identified, managed and reported to the TSB Executive & Board"*; and

(C) the "*key issues raised by Risk Oversight ha[d] been adequately documented and addressed, and all actions required to be closed pre-MME [were] complete*".

21.29 However, this Risk Oversight Opinion, contained an important caveat in respect of a number of areas of assurance:

> *"There remains only a few gaps where [Risk Oversight] have had limited coverage due to the design or timings of migration deliverables, such as Non-Functional Testing, Regression Testing, and E2E production proving."*

21.30 This was a material caveat, which meant that Risk Oversight was not providing assurance in these areas. In relation to NFT, the TSB Head of Operational Risk Oversight explained to us that the TSB CRO:

> *"was very aware of where [Risk Oversight] had got to, what [Risk Oversight] had proved, and where [Risk Oversight's] opinion fell short of providing formal assurance, but given…where we were in the programme, the best that [Risk Oversight] could do at that stage to support a go/no go was to say, 'You are not going to get any assurance from us'".*

21.31 This caveat should have been identified more prominently, and explained in detail, in the Risk Oversight Opinion in the T3 Memo, or otherwise should have been brought specifically to the TSB Board's attention and with an explanation of its implications (particularly, in light of the overreliance on the TSB CIO to sign-off the Programme's NFT).

21.32 The TSB CRO told us that, although the risks described to the TSB Board were a fair and balanced reflection of the risks as understood at the time, he thought that *"[w]ith hindsight the risks described to the Board were inaccurate"* and *"didn't capture the likelihood of serious infrastructure and non-functional issues"*.

21.33 Whilst it is the case that the TSB Board's attention was not drawn to Risk Oversight's caveats, we would have expected the TSB Board to have sought to understand any limitations in the TSB CRO's opinions.

## Internal Audit's Review of the Final NFT Results

21.34 Internal Audit's review of the final NFT results was limited. The TSB IT, Change and Operations Audit Director explained to us that his role was merely *"to reconcile what was in the NFT presentation to what was in the TSB CIO memo"*. This did not include a review of the underlying source data about the testing that had been performed. However, the role of Internal Audit is to assess the effectiveness of key Programme controls, such as NFT. Such a limited reconciliation review did not provide an effective assessment of the adequacy of NFT.

21.35 Even within this limited scope, the Internal Audit Opinion in the T3 Memo did not identify an important discrepancy between the NFT Final Report and the TSB CIO's NFT Memo. The NFT Memo said that *"the infrastructure that supports our digital channels can support up to 150% of our known peak workload (which I consider to be sufficient)"*. In contrast, according to the NFT Final Report, that load had yet to be proven: *"Digital - Proven to 100% of peak. Pending specified volumes of 150% of peak"*. The performance of the Digital Channels was an important issue for TSB after Go Live.

# CHAPTER 22: ADVISERS TO THE TSB BOARD

## KEY POINTS

- The TSB Board recognised that it required external advice in order to assist it in making key Programme-related decisions and in overseeing the Programme more generally.
- Two individuals were appointed as Board Advisers to help the TSB Board *"ask the right questions of the executive"*. However the appointment of these TSB Board Advisers was not as effective as needed due to their limited mandate, the limited time that they spent working on the Programme, and the fact that no such adviser was engaged at some of the critical points of the Programme.
- The TSB Board also relied on the advice given to the Programme Team and to Risk Oversight by Deloitte. However, the advice which Deloitte provided to the Programme did not amount to independent assurance of the Programme as a whole, nor did it constitute independent advice to the TSB Board.
- In view of the particular features of the Programme, the TSB Board required a much greater level of independent advice. These features included that:
  - the scope and scale of the Programme was unprecedented in the UK;
  - this was a major IT change programme of a type TSB had not undertaken before;
  - the Platform would be developed by TSB's new parent shortly after TSB had been acquired; and
  - significant responsibility for the Programme was concentrated in the TSB CIO.
- Such advice is likely to have made a difference to the decisions made by the TSB Board at key points in the Programme. In particular, had the TSB Board obtained independent advice on the evidence available to it to support the decision to Go Live, it might have identified, for example, the weaknesses in the NFT evidence and in the assurances of SABIS' readiness, and therefore that TSB was not ready to Go Live on the weekend of 20-22 April 2018.

## INTRODUCTION

22.1 The board of directors is collectively responsible for leading the company and directing its affairs. A board will typically discharge these responsibilities by establishing the company's strategy and values, and then delegating authority to the executive managers to implement that strategy and to promote those values. The directors oversee the exercise of any such delegated authority by scrutinising the actions of the executive managers and ensuring that important decisions are reserved to the board.

22.2 More particularly, in respect of the Programme, the TSB Board was responsible for:

(A) establishing the Programme's strategic aims;

(B) approving the governance structure for the Programme;

(C) overseeing the delivery of the Programme by the Executive;

(D) managing the Programme risks; and

(E) making key decisions over the life of the Programme.

22.3 Key Programme decisions included:

(A) committing to the Proteo Exit Option and to SABIS for its delivery (see chapters 6, 7 and 9);

(B) setting the Programme's initial timetable (the Integrated Master Plan) and determining its implementation approach (see chapters 6 and 8);

(C) accepting the need for a comprehensive Programme Replan and agreeing the revised timetable for delivery in the Defender Plan (see chapters 12 and 13); and

(D) assessing TSB's readiness to Go Live (see Chapter 18).

22.4 In the context of the Programme, it would not be reasonable to expect the TSB Board to have the experience and capability to make these decisions and discharge their responsibilities, including to provide effective oversight of and challenge to the Executive, without the benefit of advice and support from third party experts.

22.5 In this chapter, we:

(A) describe the advice and support the TSB Board received from the TSB Board Advisers and third party advisory firms, and assess its effectiveness; and

(B) set out our view of the type of external advice the TSB Board needed in light of the particular circumstances of the Programme, and consider how such advice would have made a difference at key points in the Programme.

## THE EXTERNAL ADVICE AND SUPPORT THE TSB BOARD RECEIVED

22.6 Based on our interviews of members of the TSB Board, we understand that the two principal sources of external advice upon which the TSB Board relied were: (i) the two individuals engaged as the TSB Board Advisers; and (ii) the various external firms providing advice and support to the Programme, particularly Deloitte. This section will consider each of these in turn.

### TSB Board Advisers

22.7 The TSB Board identified at the outset of the Programme that it would benefit from an external adviser who could assist the TSB Board members to discharge their obligation to oversee the Programme. In December 2015, the TSB CEO had recommended that the TSB Board appoint an external adviser who could provide an *"independent voice"* and help the TSB Board to *"ask the right questions of the Executive"* and *"discharge its oversight responsibilities effectively"* during the Programme. Two TSB Board Advisers were appointed

during the Programme. Further information about the experience of the TSB Board Advisers and their appointments is set out in an insight box in Chapter 5.

22.8 As the First TSB Board Adviser was not appointed until March 2016, the TSB Board was not supported by an adviser during the initial phase of the Programme. This was a crucial period during which the Programme's scope was determined and relevant timelines were set. There were three important TSB Board 'deep dives' in November and December 2015, at which the TSB Board received their first detailed insight into the scope of the Programme, including the complexity of the Proteo4UK Platform, and the risks of the Programme arising from its scope and complexity. This was also the period during which the Programme's predominantly single event implementation approach was set.

## The First TSB Board Adviser (March-December 2016)

22.9 The First TSB Board Adviser's work was primarily focused on the design and implementation of the Programme's 'assurance architecture'. For example, as part of this work, he proposed the division of responsibilities between the TSB Board Committees (see Figure 5.4).

22.10 The First TSB Board Adviser attended the 18 May, 22 June, 20 July, and 23 November 2016 meetings of the TSB Board and the 20 September and 14 November 2016 Audit Committee meetings. He also met separately with the NEDs to discuss his opinions on the Programme and the questions that the TSB Board members should be asking of the Executive.

22.11 The First TSB Board Adviser was contracted to work for six to seven days per month but, as it was difficult to predict exact requirements, it was agreed that his time commitment would be kept under review. The First TSB Board Adviser's invoices show that he worked the equivalent of two to three days a month (and less than half a day in October 2016). The First TSB Board Adviser left TSB at short notice in December 2016 due to other external commitments which meant that he could no longer devote sufficient time to continue assisting with the Programme.

22.12 We have limited insight on the exact activities of the First TSB Board Adviser and his perspectives on the Programme as he declined our requests to be interviewed.

## The Second TSB Board Adviser (April 2017 Onwards)

22.13 After the First TSB Board Adviser left in December 2016, a new TSB Board Adviser was not appointed until April 2017, meaning that the TSB Board was without independent advice for several months.

22.14 The Second TSB Board Adviser, who had been recommended to TSB by the First TSB Board Adviser, was engaged in late April 2017. In a meeting in June 2017, the TSB COO noted that the Second TSB Board Adviser's experience was in implementation and testing rather than governance, and therefore the engagement of the Second TSB Board Adviser would be beneficial to TSB during the later stages of the Programme.

22.15 The Second TSB Board Adviser's contract with TSB stipulated that he would work four to five days per month; however, his invoices suggest that he worked the equivalent of one to three days per month from April 2017 to April 2018.

22.16 The Second TSB Board Adviser attended most of the TSB Board and Audit Committee meetings from September to December 2017. In 2018, he attended the February and March 2018 Audit Committee meetings, and the 18 April 2018 TSB Board meeting, but not the 10 April 2018 TSB Board meeting. The Second TSB Board Adviser would also normally meet with the TSB Audit Committee Chair ahead of Audit Committee meetings.

22.17 The Second TSB Board Adviser seems to have engaged to a greater extent with the Executive than the First TSB Board Adviser had done. He regularly met on a one-to-one basis with the TSB CEO, TSB COO, TSB CIO and TSB CAO. The Second TSB Board Adviser explained to us that if he was going *"to talk intelligently to the board about what was coming to the board Audit Committee, clearly it was useful for [him] to spend time principally with [the TSB COO] and [the TSB CIO]"*, as they were *"driving the transformation"*. The Former TSB Chairman told us that the TSB Board wanted the Second TSB Board Adviser to interact extensively with the TSB COO and the TSB CIO to *"have a real feel for what was going on in the business"*.

## Overall Effectiveness of the TSB Board Advisers

22.18 Although both TSB Board Advisers had relevant experience, their appointments were not as effective as needed because:

(A) they had a very narrow mandate, which did not appear to entail providing independent advice, challenge or assurance on the Programme as a whole, but rather facilitating the Board, in particular, to "*ask the right questions*";

(B) the TSB Board Advisers spent a relatively small amount of time (fewer than 40 working days in aggregate) carrying out their roles, which was not sufficient to allow either of them adequate opportunity to consider all the relevant aspects of the Programme in sufficient detail, and was inadequate given the Programme's nature, scale and complexity; and

(C) no TSB Board Adviser was in place during the critical initial stage of the Programme (July 2015-March 2016), or in early 2017 when issues with the Programme were starting to emerge.

## Advice from Third Party Firms

22.19 Members of the TSB Board told us that they took significant comfort from the assistance the Programme received from external advisers with relevant experience of IT transformation programmes.

22.20 A number of external consultancy firms (including Deloitte, KPMG and EY) provided advice to TSB about different aspects of the Programme.

22.21 In addition, third party firms (including Deloitte and KPMG) also supplied a significant amount of resource to the Programme under 'co-source' arrangements. Such arrangements typically involve supplementing a client's team with appropriately skilled individuals to fill gaps in expertise or capacity, with the co-sourced resources working under the direction of the client (rather than providing independent advice to the client).

22.22 Some examples of this advice and support are summarised in Figure 22.1.

### Figure 22.1: Examples of Advice and Support Provided by External Consultancy Firms

| Third party | Examples of advice/support provided |
|---|---|
| Deloitte | • Reviews of (i) planning, (ii) management controls and governance, (iii) solution design and code quality, and (iv) target state for completeness and regular reporting to the Executive and the Audit Committee with general observations on the Programme.<br>• Co-source support to the customer operations Business Unit Control Function ("**BUCF**") team assisting on business assurance activities.<br>• Co-source support to Risk Oversight, including on specific 'deep dive' reviews. |
| KPMG | • Review of the Outsourced Services Agreement ("**OSA**")[1] and, more particularly, whether it was an improvement against the Transitional Services Agreement ("**TSA**") between TSB and LBG, how the OSA compared with market practice, and what capability TSB would need to manage and oversee SABIS in accordance with the OSA.<br>• Provision of incident response training to the Executive, both as part of training (May 2016 and March 2017) and specifically in preparation for the Main Migration Event (the "**MME**") (March 2018). KPMG also provided *"ad hoc support"*, including coaching on crisis management during and after the MME.<br>• Co-source support to a number of audits conducted by Internal Audit. KPMG's exact role differed between audits. In some instances it was limited to performing (part of) the fieldwork at the direction of TSB, in other cases KPMG personnel acting at the direction of TSB also assisted in providing draft wording of audit issues and views on RAG ratings. In February 2017, KPMG also designed, facilitated and participated in a brief (half-day) 'test yourself' challenge session, in which KPMG attendees provided TSB with high-level lessons learned from other programmes that the KPMG attendees had been involved with, and challenged preliminary thoughts on TSB Internal Audit's approach to the Programme. |
| EY | • Provision of a subject matter expert, the EY Director, on a part-time basis to provide expertise to Risk Oversight. He attended migration fora, engaged with key senior stakeholders and provided feedback, advice and insight to the TSB CRO and Risk Oversight team. |

## The Role of Deloitte

22.23 TSB Board members frequently identified Deloitte to us as the Programme's key adviser. We have therefore considered the extent and scope of Deloitte's involvement over the course of the Programme and the extent to which the TSB Board might reasonably have relied on Deloitte to provide independent advice on the Programme as a whole.

22.24 The Deloitte team, led by the Deloitte Partner, was initially (in November 2015) instructed to support risk management by the Programme Team, with Deloitte reporting to the TSB Head of Customer Operations BUCF, and ultimately to the TSB CIO. During this phase of Deloitte's engagement, the scope of Deloitte's work was decided and agreed by the TSB CIO and the TSB COO.

22.25 From August 2017 onwards, the Deloitte team was re-allocated to support Risk Oversight, and the Deloitte Partner reported to the TSB CRO. Deloitte continued to support Risk Oversight for the remainder of the Programme. During this phase of Deloitte's engagement,

[1] The Outsourced Services Agreement dated 19 April 2017, which is described in chapter 15.

the scope of Deloitte's work was decided and agreed by the TSB CRO and the TSB Head of Operational Risk.

22.26 The Deloitte Partner explained to us that his and Deloitte's involvement was limited to discrete 'point in time' reviews and that Deloitte was not engaged to (and did not) provide any overall review of the Programme. In our view, the evidence suggests that this is correct. There is no evidence which demonstrates that Deloitte was engaged to advise on the Programme as a whole.

22.27 However, there were a number of features of Deloitte's work which might have given the TSB Board the impression that Deloitte had a broader role. For example:

(A) although Deloitte's work orders specified discrete items of work to be completed, they sometimes contained a statement that Deloitte's role was *"that of an adviser to the Bank migration programme leadership"*, and that the scope of their engagement included *"Programme Review"*;

(B) Deloitte issued monthly 'programme review reports' on Deloitte-branded paper, and provided observations on the Programme more broadly. These were sent to the TSB CIO and TSB COO and were regularly discussed at the TSB Board or Audit Committee meetings until July 2017. Although these reports largely contained a summary of the first line assurance (and later Risk Oversight) activities of Deloitte, until July 2017 they sometimes also contained Deloitte's general observations on the Programme as a whole;

(C) while Deloitte was supporting the Programme Team, the Deloitte Partner generally attended TSB Board meetings (between December 2015 and June 2016), and thereafter Audit Committee meetings (between July 2016 and June 2017); and

(D) the Deloitte Partner told us that they sent weekly updates to the TSB CIO and TSB COO (and the TSB CRO after Deloitte's transfer to Risk Oversight). These weekly updates mainly provided an overview of the work in which Deloitte was engaged. However, the updates sent before the redeployment of Deloitte to assist Risk Oversight (in July 2017) sometimes also contained observations on the Programme more broadly.

22.28 However, the above features do not amount to independent assurance in respect of the Programme, nor did Deloitte's advice constitute independent advice to the TSB Board. In particular, if Deloitte had been engaged to provide independent assurance and advice above and beyond the specific work outlined in Deloitte's work orders, this would have been clear and they would have been instructed and paid accordingly.

## THE EXTERNAL ADVICE NEEDED BY THE TSB BOARD

22.29 Whenever a board is dealing with a significant transformational project, it must consider the extent to which it requires external support and advice in order to fulfil its responsibilities. Such assessment should take into account all the relevant factors, including:

(A) the board's experience and capabilities;

(B) the specific experience, technical knowledge, capabilities, and resource required to oversee the project successfully; and

(C) the key features of the proposed transformation and the risks inherent in the project.

22.30 Some of the features that presented particular challenges to effective oversight of the Programme, and which should have been taken into account by the TSB Board when considering the type and scope of external advice required, included the following:

(A) the overall scope and scale of the Programme was unprecedented in the UK market;

(B) it was a major IT change programme of a type that TSB had not undertaken before;

(C) the design, build and testing of the Platform was going to be carried out by TSB's new parent company and fellow subsidiaries, only a short time after TSB had been acquired; and

(D) significant responsibility for delivering the Programme was concentrated in the TSB CIO. As described in paragraph 9.49, the TSB CIO was not only responsible on TSB's behalf for managing SABIS as a supplier, but was also integral in delivering the services being provide by SABIS to TSB.

22.31 In light of the above features of the Programme, the TSB Board should have concluded that it needed to obtain significant advice covering the Programme as a whole. In our view, such advice would need to have been completely independent from:

(A) Sabadell, TSB's parent and (via SABIS) the Programme's key supplier; and

(B) the Executive, particularly in this instance because of the concentration of responsibility for the delivery of the Programme in the TSB CIO.

22.32 It is difficult to see how a single individual would be able to provide all of the advice that the TSB Board needed. In practice, only an external advisory firm would be able to: (i) call on the wide range of skills, experience and expertise required; (ii) commit sufficient time and resources to support its assurance activities; and (iii) be fully accountable and accept liability for its advice.

22.33 An external advisory firm could have been appointed to advise the TSB Board in one of three ways:

(A) to provide independent advice and assurance on the whole Programme, from start to finish;

(B) to provide independence advice and assurance on the whole Programme at key points (for example, at the time of the Integrated Master Plan, at the time of the Replan, and during TSB's assessment of its readiness to Go Live); and

(C) to act:

(i) first, as a central point of check and challenge on the Programme as a whole, making use of the work done by the Programme Team, Risk Oversight and Internal Audit, as well as by the external firms engaged by any of them on different aspects of the Programme; and

(ii) second, to supplement that work with additional advice and assurance as necessary.

22.34 In our view, such independent external advice might have led to different decisions at the following points of the Programme:

(A) Commitment to Proteo4UK Platform and SABIS – An external advisory firm is likely to have drawn the TSB Board's attention to the substantial new elements of the Proteo4UK Platform, and to the differences between SABIS' experience and what was required to deliver the Programme.

(B) The Migration Approach – An external advisory firm would have highlighted to the TSB Board the risks of proceeding with a predominantly single event migration, and the need to record those risks so that the Programme could keep track of them and then develop and execute appropriate mitigants.

(C) The Replan – An external advisory firm could have investigated the causes of the delays the Programme had faced to date, and the adequacy of the steps proposed to address those causes. This might have highlighted that the Programme was unlikely to have been "*migration ready*" by 15 March 2018.

(D) Go Live – An external advisory firm could have undertaken a critical review of the evidence that had been provided by the Executive to support the decision to Go Live. This might have identified, for example, the weaknesses in the NFT evidence and in the assurances of SABIS' readiness, and therefore that TSB was not ready to Go Live on the weekend of 20-22 April 2018.

# CHAPTER 23: THE SCOPE AND CONDUCT OF OUR REVIEW

## OUR TERMS OF REFERENCE

23.1 Our Review was conducted, and this Report was prepared, in accordance with our Terms of Reference, which are appended to this Report at Appendix 1.

23.2 The Terms of Reference were approved by the Independent Sub-Committee in July 2018. The FCA and the PRA have had sight of the Terms of Reference and were provided with the opportunity to comment on them. The Terms of Reference were also shared with the Treasury Select Committee of the House of Commons.

23.3 The scope of our Review is set out in paragraphs 3.1 to 3.4 of the Terms of Reference. We draw the reader's attention to the following aspects of our Review:

(A) Our Review did not consider the adequacy of the Platform, nor was it our role to identify the technical causes of the problems that occurred after Go Live. We were to have been provided with an independent analysis of these technical causes, in the form of one or more third party reports. The analyses with which we were in fact provided are discussed further in paragraphs 23.13 to 23.15, as well as in chapter 19 and Appendices 5, 6 and 7.

(B) The Terms of Reference specify that our Review would not draw any conclusions as to whether any individuals have acted in breach of regulatory requirements or any applicable TSB policies. This Report does, nevertheless, describe the actions of individuals in order to establish the factual narrative. It also refers to decisions made by individuals (particularly at the TSB Board or Executive level) which determined how the Programme would be executed by TSB. However, we have referred to individuals by their job titles rather than by name.

(C) For clarity, each individual has been allocated a title that is then used consistently throughout the Report, though we appreciate that certain individuals acted in different capacities at different times. For example, we refer to the Chief Operating Officer of Sabadell as "the Sabadell COO", notwithstanding the fact that he was also a director of TSB. Another example is that we refer to the former CEO of TSB as "the TSB CEO", despite the fact that he resigned in September 2018 and has since been replaced.

(D) The period covered by this Report spans from Lloyds TSB Group plc's acquisition of HBOS plc in 2008 up until 10 June 2018, seven weeks after Go Live. However, the substantive focus of our Review has been the three-year period between Sabadell's offer to acquire TSB in March 2015 and Go Live in April 2018.

(E) Following discussions between TSB and the FCA and PRA in January 2019, it was agreed that our Review would not look in detail at the way in which TSB handled the matters which arose in the period following Go Live. This Report therefore focuses on the events that took place prior to Go Live. However, the events that occurred after Go Live are briefly addressed in chapter 19, in order to provide context for the issues examined in this Report.

(F) The Terms of Reference cover only TSB and SABIS, and not Sabadell. Sabadell informed us early on in the process that it would not provide documents to assist our Review.

## CONDUCT OF OUR REVIEW

23.4 Figure 23.1, located at the end of this chapter, contains a timeline summarising the key stages of our Review, including the process undertaken to produce this Report.

### Expert Assistance

23.5 Due to the complex and highly technical nature of the Programme, we have required considerable technical support and assistance with our Review. We therefore engaged an independent technical expert, Matthew Edwards (who is a former Managing Director of Accenture), together with a team of independent experts from Ernst & Young LLP ("**EY**") led by a partner (Jason Mclean), who provided resource and analysis in respect of the technical aspects of our Review. Matthew Edwards and Jason Mclean were embedded within our team during our Review. They ensured that we had the necessary skill set to understand and assess all of the material in front of us. We could not have conducted our Review and written this Report without their experience and expertise, and we are very grateful for their contributions.

### Use of Evidence in our Review

23.6 The factual narrative contained in this Report is based on information provided by TSB, SABIS and others in response to requests for information and during the course of interviews.

23.7 In total, we received over 5 million documents during our Review, which were narrowed down by applying targeted searches and de-duplication, so that we ultimately reviewed just over 100,000 documents (including TSB Board and committee minutes and papers, technical documents, internal and third party reports, emails, and WhatsApp and other 'chat' messages).

23.8 We were provided with the WhatsApp and other 'chat' messages of selected TSB Board members and Executives. We have treated these with caution. Although in using chat messages individuals are communicating freely and unguardedly, which is important evidentially, they are also informal and casual conversations in which the participants may on occasions sacrifice accuracy for effect. We have therefore largely not relied on the chat messages to support our factual narrative, particularly where other evidence was available. Nevertheless, as will be evident in this Report, there are some occasions where the evidential value of a particular chat message is so strong we have felt it is important and appropriate that it be included in this Report.

23.9 We have generally assumed that the information provided to us is true, accurate and complete.

23.10 However, we have received some pieces of evidence that contradict each other. To the extent available, we have generally given greater weight to contemporaneous documentary evidence. There are inevitably gaps in the contemporaneous documentary evidence and

therefore we have, at times, had to draw inferences based on the documents we have seen (particularly where that inference is supported by interview evidence). We have also had to assess the credibility of the evidence provided to us, which we have taken care to do fairly and objectively. In all cases, we have sought to come to a reasoned and balanced conclusion.

23.11 We provided a confidential exposure draft of our Report (the "**Exposure Draft**") to TSB and SABIS and to certain third parties (including the (former) TSB CEO). The Exposure Draft contained footnotes that directed the reader to the evidence we relied on to support each statement of the factual narrative, and allowed them the opportunity to highlight any factual inaccuracies. We reviewed and considered the comments we received, and have amended the Report to take these into account where we have considered it appropriate. TSB and SABIS provided us with one consolidated set of comments, drafted such that it was not possible to tell which entity provided each comment. For brevity, we often refer to these comments as evidence received from TSB, though the input from SABIS should be noted.

23.12 Conducting our Review and producing this Report has been a lengthy and iterative process:

(A) While TSB has provided us with a large quantity of data and access to key senior individuals for interview, it was at times less responsive than we would have hoped. In particular, TSB's decision not to answer our follow-up questions on its comments on the Exposure Draft (submitted in order to try to clarify the most significant of its extensive, and at times unsupported, comments) was unhelpful.

(B) We faced extensive difficulties in accessing evidence from within SABIS and, as mentioned in paragraph 23.3(F), Sabadell declined to contribute to our Review. We experienced significant and repeated delays in receiving documents and information from SABIS, and it is still not clear that we received the complete set of the SABIS email data that we requested. In addition, we faced repeated issues in obtaining accurate or timely access from SABIS to the detailed Defect data required for our technical analysis (see chapter 17).

## Causation

### Technical Causes of the Issues Faced After Go Live

23.13 When we were engaged to conduct our Review, TSB's intention was that we would have access to a finalised analysis of the technical causes of the issues faced after Go Live, conducted by an independent third party with access to TSB, SABIS and Sabadell. We were informed in the early stages of our Review that such an analysis would be provided by a joint team from EY Spain and EY UK[1], who were jointly engaged by the Internal Audit functions of TSB and Sabadell.

23.14 The fieldwork required for this analysis was completed at the end of 2018. Following this, a report was finalised in April 2019 (the "**EY Root Cause Analysis Report**"). Unfortunately, although TSB wished to share the EY Root Cause Analysis Report with us in order to assist our Review, Sabadell refused to allow us to access the report for a number of months. We eventually received the EY Root Cause Analysis Report on 3 October 2019, at which point we

[1] Note that this team was separate and ring-fenced from the EY team that we engaged to assist us, referred to in paragraph 23.5.

were finalising this Report. Although the EY Root Cause Analysis Report was of some assistance to our Review, its evidential value to us has been seriously curtailed by Sabadell's refusal to provide it until such a late stage. In particular, we did not have the opportunity to discuss the EY Root Cause Analysis Report with the relevant people at TSB, SABIS or Sabadell, or with the EY team that conducted the analysis. We have endeavoured to factor the conclusions of the EY Root Cause Analysis Report into our analysis as best as we can in the circumstances.

23.15 Our Review has also been informed by a report produced by IBM, who was engaged in the days following Go Live to assist TSB with the stabilisation of its systems, the latest version of which is dated 3 July 2018 (the "**IBM Report**"). The IBM Report used an analysis of the key changes made to stabilise TSB's systems to make observations on some of the likely technical sources of the problems TSB faced. However, although the IBM Report has been a useful source since the early stages of our Review, it was never intended to be a comprehensive analysis of the technical causes of the issues faced after Go Live. Moreover, the IBM Report was never finalised and remains in draft form.

## Our Approach to Causation

23.16 TSB has argued for a narrow interpretation of causality, focused on a small number of unanticipated technical issues. On this basis, TSB has suggested that our observations on matters which could not be linked directly to the technical causes of the problems experienced by TSB's customers following Go Live are therefore irrelevant.

23.17 In our view, this is reductive and misunderstands the purpose and value of our Review. The causes of the issues that TSB experienced after Go Live cannot be reduced to a small number of technical faults.

23.18 The EY Root Cause Analysis Report summarises the technical causes of the problems experienced by TSB following Go Live and seeks to identify the stage of testing that could have identified those technical causes. The scope of our Review was broader than this: we considered the decisions and circumstances which led to the issues following Go Live, including the failures in governance and oversight. This required a much deeper analysis of the Programme in its entirety. We consider that this approach is more instructive than a narrow interpretation of causality which focuses on specific technical scenarios which may not be replicated in future programmes.

23.19 As a result of the process set out above, and notwithstanding some of the practical challenges we have encountered (certain of which are inevitable when conducting an independent review of this nature into very complex issues where the relevant evidence spans a number of years), we are confident that the factual narrative we have set out in this Report is an accurate summary of the evidence that we have examined in the course of our Review and that the observations made in this Report are fair, reasonable and balanced.

## Figure 23.1: Summary of Our Review Process

| Time period | Description of work undertaken |
|---|---|
| **Phase 1 – Engagement and scoping** | |
| April – May 2018 | Approach<br>• On 30 April 2018, TSB approached us about the prospect of undertaking an independent review.<br>• On 2 May 2018, our appointment was reported to the Treasury Select Committee. |
| June – July 2018 | Scoping meetings<br>• During June and July 2018, we conducted scoping meetings with key senior TSB and Sabadell employees. The purpose of these meetings was to give us an overview of the Programme and the key data sources that would be relevant to our Review.<br>Formal engagement<br>• On 31 July 2018, following the approval of the Terms of Reference, we issued our engagement letter to TSB. A protocol relating to data handling and interviews was also agreed. |
| **Phase 2 – Collection of evidence** | |
| May 2018 – February 2019 | Disclosure of documents<br>• We issued our first formal document request to TSB on 15 May 2018, and from 8 June 2018 we began to receive documents from TSB.<br>• We continued to receive documents, emails and other data (e.g. WhatsApp message data) in batches until late February 2019.<br>Interviews<br>• Between 12 September 2018 and 2 February 2019, we conducted 49 interviews with over 50 individuals from TSB, SABIS, Sabadell and other relevant third parties.<br>• Three individuals were interviewed multiple times (the TSB CEO, the TSB COO and the TSB CIO).<br>• Only one individual declined our invitation to be interviewed: the First TSB Board Adviser.<br>• We also submitted follow-up questions in writing and document requests to certain interviewees, including the TSB CIO, the Sabadell Group COO and a number of third parties.<br>• Due to delays in the receipt of documents, we were obliged to review documents and carry out interviews in parallel, with the result that we did not always have all the relevant materials available to us when some of the interviews were carried out.<br>JIRA access<br>• We requested access to JIRA (the tool that TSB and SABIS used to log and track Defects in the Proteo4UK Platform identified during testing) on 13 September 2018, and after experiencing access problems and technical issues for a number of weeks, we received from SABIS what we were told was the full data set on 22 November 2018. |
| **Phase 3 – Presentation of preliminary findings to TSB** | |
| November – December 2018 | Preliminary findings<br>• On 21 November 2018, at TSB's request, we presented the preliminary findings of our Review to the Independent Sub-Committee. |

| Time period | Description of work undertaken |
|---|---|
| | ‘Deep dive’ meetings<br>• Following the presentation on 21 November 2018, TSB asked us to conduct a series of ‘deep dive’ meetings to provide the Independent Sub-Committee with an in-depth analysis of key issues and findings identified at that stage of our Review. Four such meetings were held in December 2018. |
| **Phase 4 – The Exposure Draft** | |
| March 2019 | • On 13 March 2019, we provided TSB with a confidential exposure draft of the Report (the “**Exposure Draft**”), for the agreed purpose of allowing it to identify any factual inaccuracies.<br>• The Exposure Draft was also provided in full to the former TSB CEO (and his legal advisers) and to SABIS.<br>• We also provided relevant extracts of the Exposure Draft to all of the third party companies and firms who provided us with evidence. |
| **Phase 5 – Receipt of comments on the Exposure Draft** | |
| April – May 2019 | Receipt of third party comments<br>• The third parties who were provided with the Exposure Draft (or extracts thereof) all provided comments by the end of April 2019.<br>Receipt of TSB and SABIS comments<br>• On 31 May 2019, TSB and SABIS provided consolidated detailed comments on the Exposure Draft, which were over 700 pages in length. TSB also provided alongside its comments additional documents, some of which we had not previously seen.<br>• We were informed that one further paper, identifying the key issues that contributed to the events at Go Live (the “**Key Issues Paper**”), remained outstanding. |
| June – July 2019 | Engagement with TSB on next steps<br>• Following receipt of comments from TSB and SABIS on the Exposure Draft, we engaged with TSB to agree a work plan for us to consider these comments.<br>• However, in June 2019 TSB requested that we pause all substantive work until we had received the Key Issues Paper, which we received on 28 June 2019.<br>• On 5 July 2019, we provided TSB with a list of follow-up questions in relation to certain of its comments on the Exposure Draft, in order to try to clarify the most significant comments that were unclear or unsupported by contemporaneous evidence. On 12 July 2019, TSB replied, declining to answer any of these follow-up questions. |
| **Phase 6 – Collection of final evidence and preparation of this Report** | |
| July – October 2019 | Further evidence collection<br>• On 25 July 2019, a meeting took place between TSB’s technical subject-matter experts and our independent technical experts, to give TSB the opportunity to explain its position on the testing and Defects analysis contained in its comments on the Exposure Draft.<br>• An additional interview was held with the (former) TSB CEO on 5 September 2019, to gain clarity on certain of his comments on the Exposure Draft.<br>• On 3 October 2019, we received a copy of the EY Root Cause Analysis Report (dated 9 April 2019) from TSB.<br>Preparation of this Report<br>• Throughout July and August 2019, we reflected on the comments provided on the Exposure Draft and considered any new issues, arguments and evidence raised in those comments.<br>• Once the comments had been considered, we worked throughout September and October 2019 to produce this Report. |

# APPENDIX 1: OUR TERMS OF REFERENCE

## 1. Introduction

1.1 The board of TSB Bank plc ("**TSB**") has asked Slaughter and May to undertake an independent review of the issues following the migration of TSB's customer data from systems hosted by Lloyds Banking Group plc ("**LBG**") to a new IT platform developed by Sabadell Information Systems, S.A.U. and Sabadell Information Systems Limited (together "**Sabis**"). TSB and Sabis are companies that belong to the Banco de Sabadell, S.A. group ("**Sabadell**"), (the "**Review**").

1.2 Slaughter and May will provide the board of TSB with a report on the Review (the "**Report**").

1.3 The Prudential Regulation Authority (the "**PRA**") and the Financial Conduct Authority (the "**FCA**") have been provided with an opportunity to comment upon these Terms of Reference.

## 2. Background

2.1 Following a meeting of the whole board of TSB on 18 April 2018, the board of TSB approved the commencement of the migration of TSB's customer data to the new IT platform developed by Sabis, to commence on Friday 20 April 2018. In order to migrate the customer data, TSB suspended public access to its banking systems at approximately 16:00 on Friday 20 April 2018. The withdrawal of service covered all TSB banking systems, including branch-based, telephone and online banking systems. Public access was restored on the evening of Sunday 22 April 2018, following approval of a sub-committee of the board of TSB of the completion of the migration process.

2.2 Shortly afterwards, a number of issues were identified by TSB and reported by customers in relation to TSB's banking systems.

2.3 On or around 26 April 2018, TSB appointed IBM as support: (i) to identify the IT issues and (ii) to manage resolution of these issues as quickly and comprehensively as possible. This appointment (along with the appointment of Slaughter and May to carry out the Review) was reported to the Treasury Select Committee on 2 May 2018.

2.4 There continued to be issues with TSB's banking systems in the weeks following the migration.

2.5 The content of this background section will be expanded and verified as part of the Review.

## 3. Scope of the Review

3.1 Slaughter and May will review the following matters:

(A) The background and events associated with the decision to migrate TSB's customer data to the new platform developed by Sabis.

(B) On the basis of third party expert assistance and input, the circumstances of the IT issues, the implementation and oversight of the migration project, including the planning, testing and risk assessment, and the response to the IT issues.

(C) How any concerns and issues which were raised in respect of the migration project were escalated and addressed, and the consideration given to such concerns.

(D) TSB's developing awareness of these issues and the actions taken by it in response following the issues arising. This will include an examination of TSB's response, including its communications of the issues to its customers and relevant regulators and any public statements made.

(E) Decision-making and governance procedures across TSB in relation to each of the above matters, including the procedures followed by key functions, Senior Management and the board. As part of this, Slaughter and May will consider TSB's policies, procedures and practices and consider decisions taken by TSB. This will include: (i) consideration of the information made available to key decision-makers, (ii) an assessment of relevant governance processes and how they were complied with, (iii) consideration of whether engagements with third parties were appropriately managed, and (iv) TSB's response to any issues raised by the FCA or PRA in relation to the migration.

(F) The interaction with Sabadell, Sabis, LBG, IBM and, where relevant, other suppliers in respect of the above matters.

(G) The impact of financial drivers on decisions made in respect of the migration project, including as to its timing.

3.2 The Review will examine the issues listed in section 3.1 above in respect of the period up to the end of the week commencing 4 June 2018. At present, Slaughter and May considers that this is the appropriate time period for the Review. However, Slaughter and May may (with the agreement of the Committee (as defined in paragraph 4.7 below)) examine TSB's ongoing response after this initial period.

3.3 Slaughter and May's review will be limited to the matters identified at section 3.1 above. It will not otherwise consider the adequacy of the new platform developed by Sabis. It will also not otherwise consider TSB's general governance and compliance frameworks, its policies or procedures, or any other legal or regulatory issues. The Review will not include any assessment as to breaches of policies or regulatory requirements by individuals which shall be dealt with, if appropriate, under internal policies and procedures.

3.4 Following review of the issues described in section 3.1 above, Slaughter and May will make findings of fact in relation to those issues, together with any recommendations or lessons learned for consideration by the board of TSB. Slaughter and May's findings of fact will be sufficiently detailed to allow a determination of whether and what further action TSB should take. As noted in 3.3 above, Slaughter and May will not determine whether individuals have breached any bank policies or regulatory obligations.

3.5 In order to consider the above matters, Slaughter and May will require access to, and cooperation from, any third party technical experts, consultants or contractors engaged by TSB or Sabis (or its suppliers) in respect of the migration project and subsequent IT issues, including (but not limited to) IBM.

3.6 Slaughter and May will also require cooperation and information from the following advisers:

(A) Herbert Smith Freehills, who are engaged by TSB in respect of the situation more generally.

(B) A third party expert or experts, in order to understand the processes and preparation undertaken by TSB in anticipation of the migration project, the IT issues and the technical steps taken to resolve them. Slaughter and May may ask IBM and/or a third party expert or experts to prepare a report on these matters.

(C) Deloitte, who have been engaged by TSB to advise in respect of the customer redress programme.

(D) Any other external advisers or experts who Slaughter and May consider it necessary, with the prior approval of TSB, to consult with during the course of the Review.

## 4. The Report

4.1 Slaughter and May will provide the Report to the board of TSB.

4.2 It is envisaged that the Report will be structured so as to include the following sections: (i) Introduction and Purpose of the Report, (ii) Executive Summary/Key Findings, (iii) Factual Background, (iv) Findings, (v) any Recommendations, and (vi) Conclusions.

4.3 The Review will include interviews. Notes of each interview will be prepared and will be made available to:

(A) TSB (and Sabis where the Interviewees are Sabis officers or employees), unless Slaughter and May determines that this would be inappropriate (with Slaughter and May to outline in general terms the basis for that determination); and

(B) the FCA/PRA.

4.4 Slaughter and May, TSB and Sabis will agree written protocols with respect to data handling (including the treatment of privileged information) and interviews, such protocols also to address liability for breach in respect of such data handling. The PRA and FCA will be given an opportunity to comment upon these protocols in relation to the conduct of interviews.

4.5 The Report will append a list of the categories of source materials which Slaughter and May has had sight of during the course of the Review. The draft report will be verified to ensure factual accuracy.

4.6 Slaughter and May will seek to provide the board of TSB with the Report as quickly as reasonably practicable and will provide an indicative timeframe for completion of the Review and the preparation of the final Report once it has completed its initial scoping of the Review.

4.7 The board of TSB has authorised the formation of an independent sub-committee (the "**Committee**") for the purpose of the Review. Slaughter and May will provide the Committee with updates on: the progress of the Review, the feasibility of the anticipated timings for its completion and any material factual issues that have come to its attention, on a monthly basis and as otherwise required.

4.8 If Slaughter and May determines that it requires access to any data or individuals which is not anticipated by these Terms of Reference or the data handling and interviews protocols, it will raise this issue with the Committee.

4.9 At the request of TSB, Slaughter and May will redact the Report in order to protect from disclosure commercially sensitive information of TSB (and/or Sabadell) and third parties. Slaughter and May, TSB and Sabadell will agree a redaction protocol to govern requested

redactions in relation to Sabadell's commercially sensitive information. If relevant, Slaughter and May will discuss with the Committee the extent to which it may also be necessary to redact the Report in respect of privileged information.

4.10 Slaughter and May understands that the board of TSB will share a complete version of the Report with the boards of Sabadell and Sabis, and that the boards of TSB, Sabadell and Sabis may choose to share, on a non-reliance basis, a redacted version of the Report and/or the Key Findings section of the Report with: (i) TSB, Sabadell and/or Sabis' employees; and (ii) third parties including, external advisers, auditors, the FCA, the PRA, the Treasury Select Committee, HM Treasury, the ECB, the Banco de España, and/or any other relevant regulatory body, and that the Report and/or the Key Findings section of the Report may also be published, and consents to any such disclosure.

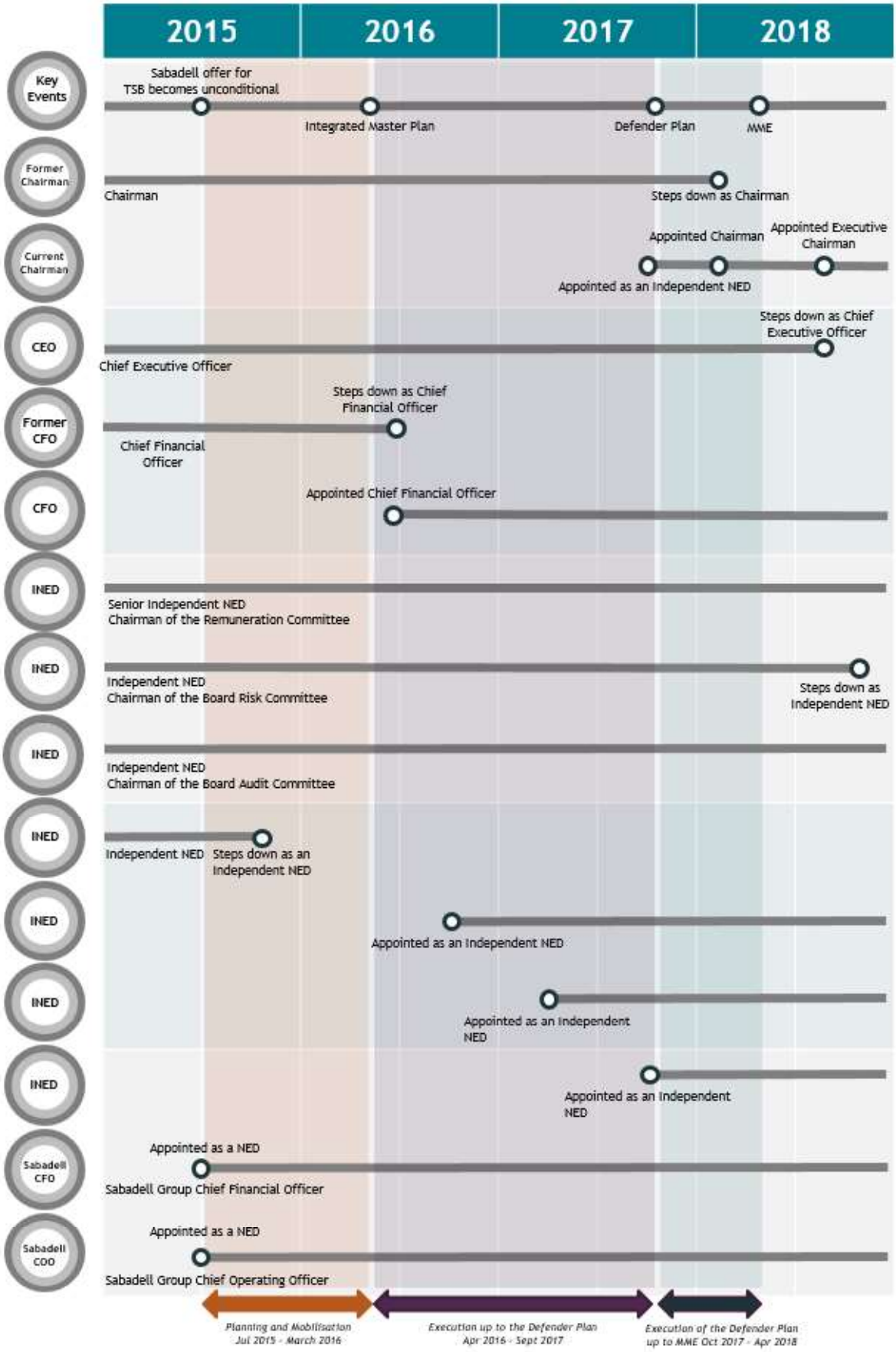
4.11 Unless otherwise agreed in writing between Slaughter and May, TSB and Sabis, Slaughter and May shall have no liability in relation to the Review or its Report other than to TSB, such liability to be subject to Slaughter and May's Terms and Conditions of Business.

## 5. Access to People and Data

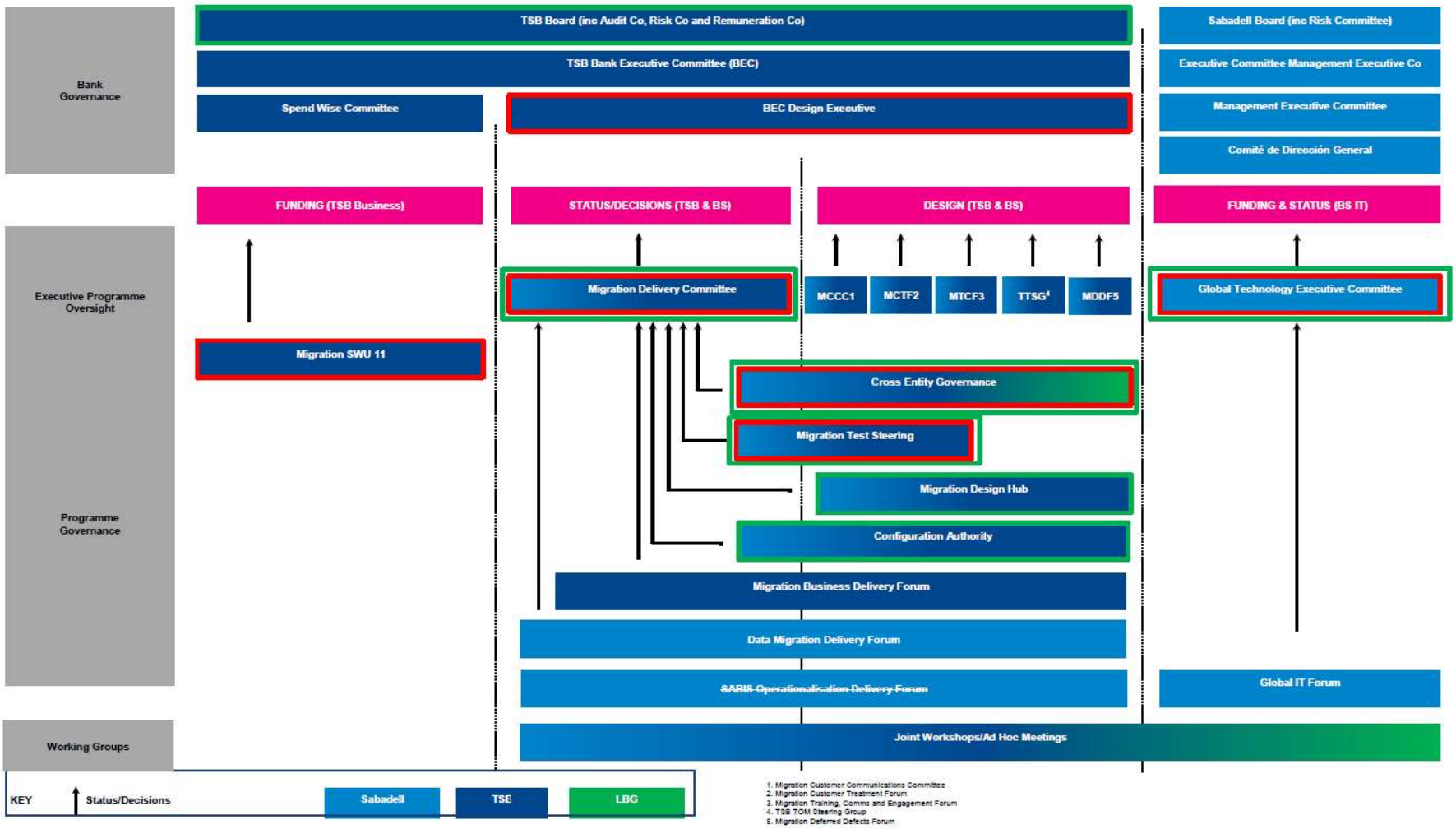
5.1 Slaughter and May shall have unfettered access to TSB and Sabis' data (except where it is protected by legal privilege, in accordance with the protocol referred to in paragraph 4.4 above), board members, employees and officers, to the extent that Slaughter and May reasonably determines such access is necessary for it to review the issues set out at section 3.1 and to prepare the Report.

5.2 TSB and Sabis will, at Slaughter and May's request, require relevant board members, employees and officers, and those over whom it otherwise has control, to attend interviews with Slaughter and May, and/or respond to any inquiries made by Slaughter and May.

# APPENDIX 2: TSB BOARD COMPOSITION OVER THE COURSE OF THE PROGRAMME



# APPENDIX 3: THE PROGRAMME'S GOVERNANCE FRAMEWORK AT GO LIVE[1]




1 The governance framework underwent several revisions during the course of the Programme. We do not consider these revisions to be material to the issues considered in this Report.

# APPENDIX 4: SET OF QUESTIONS FOR THE 'IT SERVICE PROVIDER CONTRACT' HORIZONTAL OF THE ASSURANCE MATRIX FOR THE MME

## 'Capability' Vertical

4a.i (*"Are all the in scope 3rd party services, KPI's and Service Levels clearly and correctly defined in the Service Schedule with SABIS (Outsourcing Services Agreement) and other directly, (TSB), held 3rd party IT supplier contracts?"*);

4a.ii (*"Has the Service Management model with SABIS been documented and understood by all parties involved and has the model been successfully tested?"*);

## 'Volumes' Vertical

4b.i (*"Is the operating model between TSB and SABIS for running the services documented, understood and tested with all resources trained and in place?"*);

4b.ii (*"Have the critical IT processes been documented in the OSA and are there supporting IT process handbooks / process flows to allow TSB staff to understand how to operate them?"*);

## 'Recovery' Vertical

4c.i (*"Do we have clearly set-out Business Continuity and Disaster Recovery obligations within the OSA with SABIS?"*);

4c.iii (*"Does the SABIS contract set out service level obligations to recover the services within specified timescales (Recovery Time Objectives)?"*);

4c.iv (*"For any services being provided by IT 3rd parties outwith the main SABIS contract (OSA), i.e. directly held TSB contracts, have you ensured the same level of rigour in respect of disaster recovery and business continuity has been applied?"*);

4c.v (*"If you have a SABIS business service live, do you understand the historic performance of that service from the monthly service and incident reporting data reviewed at the Services Executive Committee (SEC)?"*);

4c.vi (*"If you have a SABIS service that has fallen below service performance expectations, therefore requiring a formal Service Remediation Plan at SEC, are you satisfied that there is evidence that service performance levels have returned to target levels?"*);

## 'Compliance' Vertical

4d.i (*"Does the Sabis contract supporting the services provision meet the required UK regulatory requirements? (Business areas with directly held 3rd party IT contracts should confirm their compliance with Procurement.)"*);

4d.ii (*"Has the Sabis contract been reviewed by relevant legal and regulatory SMEs with BEC, and all the requirements are clearly documented?"*);

4d.iii (*"Has a Service Schedule been included in the OSA Business Service Catalogue referencing the correct 3rd party contracts (executed by SABIS) required to deliver the Service, and has this been signed off by BEC or BEC Deputy?"*);

4d.iv (*"For 3rd party IT contracts being exited, has the Service Exit Document been completed and signed off by BEC or BEC Deputy?"*).

# APPENDIX 5: POST-MME REPORTS

## Part A - Narrative Reports

| No. | Title | Author | Date | Draft / final form |
|---|---|---|---|---|
| 1. | Narrative of timeline of events during the first week following MME | TSB CAO | 1 May 2018 | Final (See Note A) |
| 2. | Narrative of timeline of events during the second week following MME | TSB CAO | 9 May 2018 | Final |
| 3. | Narrative of timeline of events during week three following MME | TSB CAO | 14 May 2018 | Final |
| 4. | IBM Services: TSB post-MME observations | IBM | 23 May 2018 | Final |
| 5. | TSB Migration Report (i.e. the SABIS Post-MME Report) | SABIS | 19 June 2018 | Draft (See Notes B to D) |
| 6. | Post-MME IT Incident Analysis | TSB CIO Technology Operations | 18 August 2018 | Final |
| 7. | TSB Post-MME (Main Migration Event) - IBM engagement: Update of IBM's Work To Date (the "**IBM Report**") | IBM | 3 July 2018 | Draft (See Note E) |
| 8. | Causes of the serious systems issues at TSB immediately post migration | TSB CEO | 25 July 2018 | Final |
| 9. | TSB Migration Programme: Working Paper - Post MME Functional Defect Analysis | TSB COO | 7 September 2018 | Draft (See Note F) |
| 10. | TSB Migration issues and causes, including Annex | Sabadell Group COO | September 2018 | Final |
| 11. | TSB Migration: The crisis from the inside | TSB CIO | 20 November 2018 | Draft (and incomplete) (See Note G) |
| 12. | Summary view of what happened at MME | Second TSB Board Adviser | November 2018 | Final |
| 13. | Post-Main Migration Event Issues: EY Root Cause Analysis (the "**EY Root Cause Analysis Report**") | EY | 9 April 2019 | Final |

## Part B - Technical Reviews

| No. | Review | Author | Date | Draft / final form |
|---|---|---|---|---|
| 1. | Network | IBM | 20 November 2018 | Draft (See Note H) |
| 2. | Core Oracle Databases | Nucli | 14 September 2018 | Draft (See Note I) |
| 3. | Core Virtualisation (Cloud) | VMware | 20 August 2018 | Final |
| 4. | Core Virtualisation (Faster Payments) | VMWare | 20 August 2018 | Final |
| 5. | Core Networking | CISCO | 5 October 2018 | Final |
| 6. | VDI Service | Citrix | 19 October 2018 | Final |
| 7. | Linux OS & Middleware | Red Hat | 26 October 2018 | Final |
| 8. | SQL Databases & Hyper V | Microsoft | 27 September 2018 | Final |
| 9. | Security Assurance | IBM | 8 October 2018 | Final |
| 10. | Alert & Monitoring Assessment | Dell | 25 January 2019 | Final |

## Notes: Comments Received from TSB or SABIS

**Note A:** *"It should be noted that these reports were prepared at short notice and under considerable time pressure and they have not been reviewed or audited and the supporting evidence has not been independently verified."*

**Note B:** *"We understand that the report was a draft which was never progressed or escalated to any governance committee and that [this] represents the most up to date draft. The draft was prepared by a 'consulting team' in SABIS, and not by individuals actually involved in the migration. It represented a 'collation' exercise to gather together SABIS' knowledge at the time, having reached out to various people at the bank. The drafting is likely to have been done by individuals at a fairly junior level."* Notwithstanding this, it is noted that the TSB Migration Report was provided to the Sabadell Group Data Migration Officer in advance of his interview.

**Note C:** *"SABIS is unaware of the purpose of the draft, but have not seen evidence that it has been through the kind of verification exercise which was undertaken for, say, [the Sabadell Group COO's] report, or documents which were escalated through internal governance fora within the bank."*

**Note D:** Subsequently, TSB provided us with comments on the SABIS Post-MME Report made by the TSB COO and the COO team. The comments were headed with the following: *"On review of the SABIS report titled 'TSB Migration Report', dated 6th June 2018, we would like to provide feedback on some information which has been omitted or captured incorrectly. **Note**: TSB has not completed a full review of the document to ensure it is factually accurate and true. The following response includes some clarification points, observations and feedback on some specific sections of the documents to provide HSF [Herbert Smith Freehills] with some greater context from TSB's perspective."*

**Note E:** *"No changes expected to the report, which will simply remain in draft form."*

**Note F:** *"This is the latest version - will remain in draft."*

**Note G:** *"No changes expected to the report."*

**Note H:** *"This is the only copy that we have received from TSB. We have asked whether a later draft is available."*

**Note I:** *"This is the only version we have currently been provided with. We will continue to check whether TSB has a later version."*

# APPENDIX 6: KEY DIFFERENCES BETWEEN THE IBM REPORT AND THE EY ROOT CAUSE ANALYSIS REPORT

1.1 As we explain in paragraph 19.31, the IBM Report and the EY Root Cause Analysis Report cannot be fully reconciled, as there are significant differences between IBM and EY's scope (including time periods covered), analytical approaches and methodologies.

1.2 The most significant differences between these reports are as follows:

(A) The IBM Report covers non-functional issues only, whereas the EY Root Cause Analysis Report covers functional and non-functional issues;

(B) IBM's review population was significantly larger: it reviewed all 632 non-functional changes within the parameters of its review, whereas EY reviewed a sample of 201 issues (made up of functional and non-functional issues);

(C) IBM's Report covered a period of 46 days from 4 May to 18 June 2018, whereas the EY Root Cause Analysis Report covered a wider period of 115 days from 4 May to 26 August 2018. The IBM Report is therefore focused more closely than the EY Root Cause Analysis Report on technical causes of issues that occurred closer to Go Live. However, the IBM Report and the EY Root Cause Analysis Report do not cover approved technology changes or post-Go Live issues (respectively) for the period immediately following Go Live from 22 May to 4 April; and

(D) EY determined the weighted impact of particular issues, taking into account its assessment of the priority of the issue, whether the issue was reported as having a regulatory impact and the number of customers impacted. IBM did not conduct a weighted impact assessment.

# APPENDIX 7: NON-FUNCTIONAL ISSUES - OBSERVATIONS IN THE IBM REPORT, THE EY ROOT CAUSE ANALYSIS REPORT AND THE TSB CIO REPORT

The table below contains extracts from the IBM Report, the EY Root Cause Analysis Report, and the TSB CIO report (dated 20 November 2018) in relation to issues caused by configuration, capacity and code errors. We have included a percentage figure which shows EY's determination of the proportion of weighted impact each of these technical causes had on non-functional issues, based on the sample that it received.

| | IBM Report extract | EY Root Cause Analysis Report extract | TSB CIO Report extract | EY weighted impact[1] |
|---|---|---|---|---|
| **Configuration** | *"Configuration was one of the initially identified areas and appeared in the Active/Active infrastructure, which manifested itself as customer and [employee] journeys being unexpectedly terminated."* | *"Errors in configuration such as duplicate IP in data centres, erroneous SSL certification installations, incorrect permissions on file systems, and incorrect firewall settings caused Non-Functional issues like agents not being able to hear each other when transferring calls, intermittent disconnections from the fraud solution, massive loss of calls and the Inability to validate customer security questions. Services impacted include ATM's, Telephony, Mobile banking and Faster payments."* | *"Inconsistent configuration: it's proven that the two datacenters [where the] Proteo4UK platform is hosted have been harmed by serious deficiencies in the configuration of some of their critical components, and in particular some of the essential network components (namely proxies, load balancers and firewalls), databases, as well as core components of the digital architecture (ie OpenAM,Context Manager, Consultative Microservices)."* | 38% |
| **Capacity** | *"Capacity issues have been observed; for example, in the network managed by Sabis and its suppliers which had neither the capacity nor required configuration to support the TSB channels."* | *"The Architecture, Infrastructure and Platform design is a detailed technical specification of what is needed to provide at the infrastructure layer the functionalities and performance described by the business.* | *"Though initially the cause of Digital outages it could have been explained as insufficient capacity, further observations have demonstrated that the fundamental reason for the problems experienced is with the inconsistent* | 27% |

[1] These figures are extrapolated from the figures provided by EY. Our calculations in this chapter only consider those root causes regarded by EY regarded as "key", which EY define as having over 5% weighted impact.

| | IBM Report extract | EY Root Cause Analysis Report extract | TSB CIO Report extract | EY weighted impact[1] |
|---|---|---|---|---|
| | | *Defects attributed to technical design issues caused Non-Functional issues relating to platform capacity, sizing of memory, response times between various applications, routing communications to a single data centre and performance of microservices."* | *configuration. However, there were significant capacity issues with the network and the IVR20 that have impacted our Telephony centers, as well as an insufficient capacity to cope with all our desktops in a Datacenter disaster recovery scenario (operating on a single Datacenter)."* | |
| **Code and Application design** | *"Technical Code Quality emerged as another primary driver of instability, as errors in the microservices code and front-end applications code became clear in their impacts across multiple channels."* | *"Defects at code level caused some Non-Functional issues regarding security or capacity issues."*<br>*"Defects attributed to application design also caused Non-Functional issues relating to application capacity."* | *"Some systemic issues with the code have been observed more profusely in the Proteo4UK Middleware that is used by all our channels (Digital, Branches, Telephony)…. some code quality issues had contributed to the instability of the Platform."* | 23%[2] |

[2] This incorporates the weighting given by EY to both code and application design.

# APPENDIX 8: RISKS ON THE PROGRAMME RISK REGISTER[1]

| Risk | Description |
|---|---|
| 1. Excessive complexity | The Programme may fail, or fail to deliver within the timeframe required by the end of 2017, because of excessive complexity created from over-ambitious customisation of the target platform |
| 2. Resilience | There is a risk to TSB's business if the target platform (and associated business processes) delivers a lower level of resilience than the current LBG arrangements |
| 3. Management stretch | Risk of relying on a relatively small number of key partners, particularly at a senior level, resulting in key person, expertise and capability risks coupled with insufficient succession |
| 4. Cost increases | Significant cost increases threaten completion – (e.g. inability to control costs if a fixed price cannot be agreed with LBG, unexpected complexity causes increases in build costs and / or test costs for Group, not all business impacts within TSB are budgeted for) |
| 5. Changes in migration strategy | Risk that changes in approach, (e.g. from a single event to product-by-product releases or technical advancement), cause delays in overall delivery and execution of migration |
| 6. Ineffective oversight | Risk that insufficient expertise, inadequate allocation of time and /or too high level papers inhibit Board oversight and understanding of impact on bank's risk profile and control environment |
| 7. External environment | External risks outside the control of the Programme. Examples include regulatory or legal changes, force majeure or market forces impacting the Programme |
| 8. Customer | There is a risk that customers are negatively impacted through: loss of existing services if not fully replicated on target systems; impact of transition from one platform to another; higher than normal systems outages during transition events |
| 9. Fraud | There is a risk that the TSB fraud controls are less effective, during and after the migration event, leading to higher than anticipated fraud losses |
| 10. Unclear roles and responsibilities | The risk of unclear accountabilities and ineffective governance within TSB and between TSB and Sabadell Group may put timely delivery or effective implementation at risk |
| 11. LBG relationship | TSB are unable to negotiate an effective relationship with LBG and/or work effectively |
| 12. Use of 3rd parties | The Programme may fail from lack of adequate expertise, failure to heed external advice, or ineffective inputs from third parties |
| 13. Inconsistent leadership | The Programme may fail because of loss of key individuals or change in organisational focus |
| 14. Planning | Lack of complete plan or effective planning (e.g. left-to-right planning, test strategy, clarity of scope) causes delay |
| 15. Reputational damage | There is a risk of reputational damage if Programme fails to meet delivery timescales, or incurs customer disruption |

[1] The first 18 Programme risks were initially set out at the second 2015 TSB Board Deep Dive in November 2015. Risks 19 to 22 were added over the course of 2016, with the full list of 22 Programme risks first set out in December 2016.

| Risk | Description |
|---|---|
| 16. Source platform | Risk that implementation is impaired due to not owning the source platform, and therefore an inability to control the timeliness and quality of required deliverables |
| 17. Financial synergies | There is a risk to TSB's financial performance if the expected ongoing financial synergies from the Programme are not delivered |
| 18. BAU change programme | There is a risk to the BAU change programme if this is not interlocked with the build and migration change programme |
| 19. Competitive position | There is a risk that TSB fails to deliver on its medium term plan, as the organisation is focused on the Programme |
| 20. Design | There is a risk that the functional design of the target applications and systems are not fit for purpose, leading to delays in implementation, additional costs and possible adverse customer impacts |
| 21. Data definition and lineage | There is a risk that some data relied upon for commercial decisions, IRB calculations and the setting of credit provisions contains complex LBG inherited manipulations, which cannot be fully or easily replicated in the target platform |
| 22. Payments landscape | A congested external payments landscape may lead to delays in implementation of the Programme, additional costs for TSB and possible adverse customer impacts |

# APPENDIX 9: RISKS NOT INCLUDED ON THE PROGRAMME RISK REGISTER

| Risks not included | Our analysis |
|---|---|
| The risk of going live with a new Platform following the adoption of a predominantly single event migration approach | A number of the 22 Programme risks did potentially cover some aspects of this risk. For example:<br>• Programme risk 2 (*"Resilience"*): *"There is a risk to TSB's business if the target platform (and associated business processes) delivers a lower level of resilience than the current LBG arrangements"*;<br>• Programme risk 8 (*"Customer"*): *"There is a risk that customers are negatively impacted through: loss of existing services if not fully replicated on target systems; impact of transition from one platform to another; higher than normal systems outages during transition events"*; and<br>• Programme risk 15 (*"Reputational damage"*): *"There is a risk of reputational damage if Programme fails to meet delivery timescales, or incurs customer disruption"*.<br>However, none of these sufficiently covered the specific risk of TSB going live with a new Platform following the adoption of a predominantly single event migration approach.<br>• Programme risk 5 (*"Changes in migration strategy"*): *"Risk that changes in approach, (e.g. from a single event to product-by-product releases or technical advancement), cause delays in overall delivery and execution of migration"*.<br>The focus of the Programme's reporting against this risk was on the change in implementation approach affecting the timetable of the Programme, rather than on the risks associated with the chosen approach. |
| The risk that SABIS would be unable to meet its obligations under the MSA to design, build and test the Platform to TSB's requirements.<br><br>The risk that SABIS would be unable to meet its obligations under the OSA to operate the Platform to TSB's requirements. | SABIS was the most critical supplier on the Programme. SABIS' capability to design, build, test and subsequently operate the Platform was not identified as a specific risk by the Programme Team. The evidence suggests that:<br>• References to SABIS were occasionally made in the context of Programme risk 10 (*"Unclear roles and responsibilities"*). However, these references did not appropriately communicate the importance of SABIS as a key supplier.<br>• Programme risk 20 (*"Design"*) did recognise the *"risk that the functional design of the target applications and systems are not fit for purpose, leading to delays in implementation, additional costs and possible adverse customer impacts"*. However, while the risk refers to the design not being fit for purpose, it does not describe the risk that SABIS would be unable to build the Platform in accordance with the design.<br>• There was a separate general risk for third parties (*"Use of 3rd parties"*), but SABIS was rarely mentioned by reference to Programme risk 12, and where it was mentioned, it did not appropriately communicate the importance of SABIS as a key supplier. For example, the Defender Plan notes in relation to risk 12 that *"[TSB is] dependent on SABIS for the IT delivery"*: a high-level statement which provided no commentary as to SABIS' ability to deliver and which did not cover SABIS' readiness to operate the Proteo4UK Platform. The fact that SABIS was not a separate Programme risk is also a surprising omission, given that LBG (another key third party) and the owner of the source platform, was assigned its own separate Programme risk (Programme Risk II). |

# APPENDIX 10: HEAT MAP OF RESIDUAL RISK SCORES FOR PROGRAMME RISKS AT KEY STAGES OF THE PROGRAMME

| Risk | April 2016<br>Early stages | October 2017<br>Defender Plan | March 2018<br>Before Go Live |
|---|---|---|---|
| **Programme Delivery - Grade 1**[1] | | | |
| 4. Cost increases | Key - 30 | Key - 40 | High - 22 |
| 7. External environment | Key - 27 | Key - 30 | Key - 33 |
| 8. Customer | High - 20 | High - 20 | High - 20 |
| 11. LBG relationship | Key - 27 | Key - 33 | High - 22 |
| **Programme Delivery - Grade 2** | | | |
| 1. Excessive complexity | Medium - 14 | Medium - 14 | Medium - 14 |
| 5. Changes in migration strategy | Medium - 12 | Medium - 12 | Medium - 12 |
| 6. Ineffective oversight | Medium - 14 | Medium - 14 | Medium - 14 |
| 10. Unclear roles and responsibilities | Medium - 12 | Medium - 12 | Medium - 12 |
| 12. Use of third parties | Key - 27 | Key - 33 | Key - 33 |
| 16. Source platform | High - 24 | Medium - 16 | Low - 8 |
| 21. Data definition and lineage | High - 18 | High - 20 | High - 20 |
| 22. Payments landscape | Not reported | Key - 27 | Key - 27 |
| **Programme Delivery - Grade 3** | | | |
| 13. Inconsistent leadership | Medium - 12 | Medium - 14 | High - 21 |
| 14. Poor Planning | Medium - 16 | Key - 30 | High - 20 |
| 20. Design | Key - 30 | Key - 30 | High - 20 |
| **BAU - Grade 1** | | | |
| 2. Resilience | Medium - 16 | Medium - 16 | Medium - 16 |
| 15. Reputational damage | High - 20 | High - 20 | Key - 30 |
| 17. Financial synergies | Medium - 14 | Medium - 14 | Medium - 14 |
| 19. Competitive position | Low - 8 | Low - 8 | High - 21 |
| **BAU - Grade 2** | | | |
| 3. Management stretch | Key - 27 | Key - 27 | Key - 27 |
| 9. Fraud | High - 18 | High - 18 | High - 18 |
| 18. BAU change programme | Low - 8 | Low - 4 | Medium - 12 |

[1] The 22 Programme risks were categorised as grade 1, 2 or 3 risks. Grade 1 risks were existential risks to TSB, grade 2 risks were risks unique to the way TSB chose to execute the Programme, and grade 3 risks were risks that could be expected on a programme of this complexity and pace. Grade 1 and 2 risks were reviewed at the Board committees (Risk Committee, Audit Committee and Remco, as appropriate) whereas grade 3 risks were allocated to the Migration Delivery Committee.

# APPENDIX 11: GLOSSARY

| Term | Definition |
|---|---|
| 2014 IT Strategy Reports | The reports produced by a leading consultancy firm in November and December 2014, reviewing the different strategic options available for TSB to exit its transitional service arrangements with Lloyds Banking Group plc. |
| 2015 TSB Board Deep Dives | Collectively, the **Programme**-related 'deep dives' conducted by the **TSB Board** on: (i) 10 November 2015; (ii) 30 November 2015; and (iii) 14 December 2015. |
| Actimize | A **Back-end Application** within the **Proteo4UK Platform** used to manage fraud. More specifically, it is a fraud detection system used to provide comprehensive monitoring of the entire payment lifecycle from transaction origination to the point of exit. |
| Active/Active | A system configuration designed to provide greater resilience than other configurations such as **Active/Passive**. **Applications** are hosted in two data centres and transactions can be serviced in either data centre at any time. In the event of a failure in one data centre, the transactions are all directed to the remaining data centre with only minimal loss of service. |
| Active/Passive | A system configuration designed to provide greater resilience than the use of a single data centre, but not as much resilience as an **Active/Active** configuration. **Applications** are hosted in two data centres and transactions are normally serviced in only one of these, the 'Active' data centre. In the event of a failure in the 'Active' data centre, transactions are re-directed to the other data centre (which becomes active), with a loss of service greater than for an **Active/Active** configuration. |
| Amazon Web Services | A subsidiary of Amazon providing computing services across the internet using **Cloud Infrastructure**. These services were used by TSB to support communications between the **Mobile App** and the **LBG IT Platform** prior to the **Main Migration Event**. |
| Applications | Collections of software programs which support a set of business functions. In respect of the **Proteo4UK Platform**, Applications can be divided into three tiers: **Back-end Applications**, **Middleware** and **Front-end Applications**. |
| Assurance Matrix | The principal first line tool used by TSB to assess the **Programme**'s readiness to 'go live' with three of the **Transition Events** and the **Main Migration Event**. The Assurance Matrix is described further in chapter 16. |
| Attestation | The declaration required to be given before the **Main Migration Event** by each of 12 Bank Executive Committee members to confirm that his or her business area was ready to 'go live'. These were included in Appendix 16 of the **T3 Memo**. |
| Audit Committee | The audit committee of the **TSB Board**. |
| Audit Committee Migration Deep Dive | The **Audit Committee** 'deep dive' into the **Programme**'s progress and the steps remaining for TSB to become 'migration ready', which took place on 22 January 2018. |
| Automated Call Distribution or ACD | A system used to distribute calls to contact centre agents in the **Telephone Channel**. |
| Automated Teller Machine or ATM | A device which allows customers to carry out self-service transactions, including the withdrawal of cash. |

| Term | Definition |
|---|---|
| Back-end Applications | These **Applications** master and store customer and account data, as well as the data required for internal management and administration. Examples would include **UFSS** for mortgage servicing, the mainframe elements of **Proteo** for customer data and current accounts, and **Actimize** for fraud. |
| Bankers' Automated Clearing Services or BACS | The central payment system used in the UK to process several different types of electronic payments, predominantly direct debits and direct credits. |
| Batch Processing | A time-based data processing technique where a group of records is processed as a single unit. For example, a bank would batch process all its account records overnight to calculate and apply interest. |
| Branch Event | A part of **Performance Testing** which involved TSB employees simultaneously logging on to the branch platform, running a number of enquiry transactions, and exercising branch peripherals. |
| Business Unit Control Function or BUCF | A function within each of TSB's business areas that supported the Bank Executive Committee member responsible for that business area with their risk management responsibilities. |
| Carve-out Exit Option | One of the exit options provided for under the **LBG Agreements**, under which Lloyds Banking Group plc would be required to create a clone of the **LBG IT Platform** to be operated by a third party service provider for TSB's independent use. |
| Change in Control Application | The change in control application prepared by Sabadell for the Prudential Regulation Authority and the Financial Conduct Authority in respect of its acquisition of TSB, dated 16 April 2015. |
| Change Requests or CRs | Changes to the agreed scope of the **Proteo4UK Platform** and associated activities. |
| Channel | A medium through which a customer interacts with their bank. This is sometimes also referred to as a 'distribution channel'. Different Channels include the branch Channel, the **Telephone Channel**, the **Digital Channel** and the **ATM** Channel. The Channels are described in further detail in chapter 7. |
| Citrix | A software provider and component that allowed TSB employees to work and collaborate remotely across the branch and head office locations by providing a virtual desktop. Citrix is used both in TSB's branches and its **Telephone Channel**. See also **Virtual Desktop Infrastructure**. |
| Clearing House Automated Payment System or CHAPS | A same-day automated high value payment system used for wholesale and retail payments within the UK (sterling only). |
| Cloud Infrastructure | Virtual **Infrastructure** provided by a private network or via the internet, rather than data centre hosting. Examples within TSB included the Microsoft provision of Office 365 and BT's provision of **Applications** to support the **Telephone Channel**. |
| Configuration Management Database or CMDB | A database that contains all relevant information about the hardware and software components used in an organisation's IT services and the relationships between those components. |
| Continuity Testing | A type of **Non-functional Testing** designed to ensure that a system is resilient and can recover in accordance with recovery time and recovery point objectives in response to a major incident disrupting facilities, systems, key personnel or key suppliers. |
| Current Account Switch Service or CASS | The UK service designed to assist customers to switch their current accounts to an alternative bank. |

| Term | Definition |
|---|---|
| Customer Relationship Management or CRM | This typically refers to the processes and **Applications** used by an organisation to manage its customer relationships. In TSB's case, it refers to one of the **Applications** used to support the servicing of customers through the **Telephone Channel**. |
| Defect | Anything identified during testing that was seen as a deviation from business or technical requirements. This included flaws or weaknesses in the **Proteo4UK Platform** that caused unintended or unwanted behaviours and **Change Requests** for missing functionality or technical improvements to functionality previously requested. |
| Defender Plan | The updated **Programme** plan prepared as part of the **Replan**, presented to the **TSB Board** on 24 October 2017. |
| Definitive Notice of Migration | A notice served on Lloyds Banking Group plc on 12 April 2018, which had the effect of: (i) committing TSB to exit the **LBG Agreements**; (ii) removing TSB's right to request a fixed fee carve-out of its **Infrastructure** from Lloyds Banking Group plc; and (iii) committing Lloyds Banking Group plc to pay TSB £450 million, minus costs incurred by Lloyds Banking Group plc. |
| Digital or Digital Channel | The collective term for TSB's **Mobile App** and **Internet Banking Channels**. |
| Digital Event | A part of TSB's **Performance Testing** which involved running automated test scripts to generate volumes of synthetic users both logging on and performing a number of transactions on the **Internet Banking** platform and the **Mobile App** in the **Production Environment**. |
| Dossiers | The set of documents that captured TSB's functional requirements and the designs for individual elements of the **Proteo4UK Platform**. The Dossiers were organised in a standard structure based on Sabadell's experience on previous migration programmes. |
| Dress Rehearsals or DRs | A version of **Migration Acceptance Cycles**, in which each stage of the **Extract, Transform and Load** process was performed and tested in real time (i.e. in the time allocated for the **Main Migration Event**). In effect, DRs were a practice run of the data migration process that would be carried out at the **Main Migration Event.** |
| Early Cutovers | Specific services which were taken live to all of TSB's customers before the **Main Migration Event** (i.e. before the majority of the functionality of the **Proteo4UK Platform** was taken live). See chapter 10. |
| Environment | A particular configuration of hardware and software used for the development, testing and operation in production of an IT platform. Environments used throughout the **Programme** included an Environment for development, an Environment for conducting **User Acceptance Testing**, the **GOS Environment** and the **Production Environment**. |
| Executive | A member of the Bank Executive Committee or, more commonly, a collective term for all of the members of the Bank Executive Committee. |
| Executive Gold Team | Comprised of the TSB CIO, the TSB COO, and the Sabadell Group CIO. The Executive Gold Team provided the recommendation to the **MME Board Sub-Committee** about whether to initiate the **Main Migration Event**, and whether to make the decision to **Go Live**. |
| Exposure Draft | The confidential exposure draft of this Report, delivered to TSB, SABIS and Sabadell on 13 March 2019. |
| Extract, Transform and Load or ETL | The software and procedures used to transfer data from one platform to another. In this case, the data was transferred from the **LBG IT Platform** to the **Proteo4UK Platform**. |

| Term | Definition |
|---|---|
| EY Root Cause Analysis Report | A report produced by a joint team from EY Spain and EY UK titled 'Post-Main Migration Event Issues: Root Cause Analysis' dated 9 April 2019. This report was intended to identify the technical causes of the events during and following **Go Live** and to determine which controls in the **Programme** could have identified those technical causes. The report was jointly commissioned by the **Internal Audit** functions of TSB and Sabadell. |
| Faster Payments | The Faster Payments service, which is a UK banking initiative designed to reduce the time taken to make electronic payments between customer accounts at different banks. Payments arrive within two hours (normally almost immediately). |
| Front-end Applications | **Applications** that are directly accessed, and interacted with, by the end users (in TSB's case, its employees and customers) within a particular **Channel**. These include **Applications** supporting the different **Channels** (i.e. branch, telephone, **ATM** and **Digital**). |
| Full-time equivalent or FTE | The hours worked by one employee on a full-time basis. |
| Functional Testing | Testing intended to validate whether a piece of functionality delivered during the build phase satisfied the business requirements outlined for that piece of software. Functional Testing included both **User Acceptance Testing** and **Migrated Data Testing**. |
| Funding Agreement | Letter agreement between TSB and Sabadell dated 26 July 2016, setting out Sabadell's commitment to TSB in relation to the costs and liabilities associated with the migration of TSB's data onto the **Proteo4UK Platform**. |
| Go Live | The point at which TSB reopened access to its online banking systems following the **Main Migration Event** (ultimately 18:00 on Sunday 22 April 2018). |
| GOS Environment | A test **Environment** built as a simplified version of the **Production Environment**. It was used primarily to carry out testing of the software used to migrate data (**Extract, Transform and Load**) and to carry out tests on data that had been migrated, such as **Migrated Data Testing** and **Production-like Assurance**. |
| Guiding Principles | The 15 principles set out in the **Defender Plan**, used to *"guide and test"* the **Replan** approach. |
| IBM Report | The draft report dated 3 July 2018 produced by IBM, which was commissioned by TSB to analyse non-functional technology changes approved by TSB for implementation into the **Proteo4UK Platform** between 4 May 2018 and 18 June 2018, in order to identify some of the likely technical causes of instability after **Go Live**. |
| Image Clearing System | A new system for cheque clearance in the UK that began rolling out in 2017. The new system aims to speed up the cheque clearing process significantly with the goal being to clear cheques by the subsequent weekday, in place of the six weekday processing times of the paper-based system. |
| Immediate Deposit Machines or IDMs | The self-service devices located in TSB's branches that allow customers to deposit cash and cheques. |
| Independent Sub-Committee | The independent sub-committee of the **TSB Board** set up for the purposes of our Review. |
| Infrastructure | The hardware and systems software used to host the **Application** software, including the mid-range infrastructure and mainframe infrastructure hosted in the data centres and the distributed infrastructure used in branches and head office sites. |

| Term | Definition |
|---|---|
| Infrastructure Testing | A type of **Non-functional Testing** which tests whether the **Infrastructure** is working according to its design. Infrastructure Testing occurs before conducting any non-functional tests on the performance of **Applications** or business continuity. |
| Integrated Master Plan | The integrated master baseline plan for the **Programme**, first presented to the **TSB Board** on 15 March 2016. The Integrated Master Plan evolved as the **Programme** progressed, however in the Report this term is used to refer to the plan as at March 2016, unless otherwise specified. |
| Intelligent/Interactive Voice Recognition or IVR | An automated voice system that allows a computer to interact with humans through the use of voice and tones generated by the phone. |
| Internal Audit | TSB's third line of defence, which provided independent assurance on the effectiveness of the risk management activities of the **Programme**. |
| Internet Banking | TSB's internet banking website that allowed users to access their bank accounts and carry out transactions. This was one of TSB's **Digital Channels**. This website required users to log on (unlike the **Public Website**). |
| IT Defects | IT or coding **Defects** leading to a piece of functionality not performing as intended. |
| IT Infrastructure Library or ITIL | ITIL was formerly an acronym for 'Information Technology Infrastructure Library' and describes a set of detailed practices for IT service management (ITSM). |
| Items of Functionality | A term used by TSB to describe functionality comprising groups of test cases and unresolved **Defects** that had not completed **Functional Testing** by the end of January 2018, in order to assess whether such functionality could be deferred until after the **Main Migration Event** (for example, functionality that would allow customers to apply for loans through the **Digital Channel**). This is different from a **Defect**, as some Items of Functionality were linked to multiple **Defects**. |
| JIRA | A system used by the **Programme** to manage **Defects**. JIRA also provided management information and reporting dashboards of the underlying **Defect** data. |
| Kelly Report | Report dated 30 April 2014 resulting from Sir Christopher Kelly's independent review into the events leading to the Co-operative Bank's capital shortfall. |
| Key Issues Paper | Paper drafted by TSB titled 'Reflections on the Main Migration Event (MME)', sent to us on 28 June 2019 to be considered as part of our Review. |
| LBG Agreements | The collective term for the **Transitional Services Agreement** and **Long Term Services Agreement**. |
| LBG IT Platform | The IT platform provided by Lloyds Banking Group plc, which TSB used until it moved onto the **Proteo4UK Platform**. |
| Live Proving | Validating a platform in the **Production Environment** using real users and real data, but at a scale such that failures can be managed relatively safely. TSB carried this out in two stages: (i) 'scripted' proving (i.e. users conducting transactions using scripts); and (ii) 'unscripted' proving (i.e. **TSB Beta**). See chapter 10. |
| Long Term Services Agreement or LTSA | Long Term Services Agreement entered into by Lloyds Bank plc and TSB Bank plc dated 9 June 2014, which was to have governed the use by TSB of the **LBG IT Platform** from 1 January 2017 until 1 July 2024. |
| Main Migration Event or MME | The migration of TSB's customer data from the **LBG IT Platform** to the **Proteo4UK Platform**, ultimately taking place over the weekend of 20-22 April 2018. This was also referred to as **T3**. |

| Term | Definition |
|---|---|
| May 2017 UAT Replan | The replan of the **User Acceptance Testing** workstream of the **Programme**, carried out in May 2017 to accommodate delays in the delivery of functionality. |
| Middleware | Middleware is the software that links the **Back-end Applications** (where data is stored and managed) and the **Front-end Applications** (which display the data and services to customers and employees). |
| Migrated Data Testing or MDT | **User Acceptance Testing** of functionality requiring real data that had been migrated from the **LBG IT Platform** in order to confirm whether TSB's functional requirements had been satisfied. |
| Migration Acceptance Cycles or MACs | A type of **Testing of Data Migration** used to analyse the quality of the data migration software and associated processes by assessing the output of each stage of the **Extract, Transform and Load** during a simulated data migration process. Different MACs were scheduled throughout the **Programme** and identified by number, for example 'MAC 4'. |
| Migration Exit Option | One of the exit options under the **LBG Agreements**, under which Lloyds Banking Group plc would assist TSB in moving off the **LBG IT Platform** onto a third party platform. |
| Migration Services Agreement or MSA | Migration Services Agreement entered into between TSB Bank plc and SABIS Spain dated 19 April 2017, defining the approach to the build of the **Proteo4UK Platform** and the migration of TSB's data from the **LBG IT Platform**. SABIS UK acceded as a party to this agreement on 22 May 2018. |
| MME Board Sub-Committee | Sub-committee of the **TSB Board** (consisting of the Current TSB Chairman, the Sabadell Group COO, the TSB Audit Committee Chair, and the TSB CEO) which granted approval to the **Executive Gold Team** to initiate the **Main Migration Event** and make the decision to **Go Live**. |
| MME Weekend | The period of Friday 20 April 2018 to Sunday 22 April 2018 during which the **Main Migration Event** (i.e. the migration of TSB's customer data from the **LBG IT Platform** to the **Proteo4UK Platform**) took place. |
| Mobile App | TSB's customer banking **Application** for mobile devices. |
| Mortgage Broker Channel | The **Channel** consisting of third party mortgage brokers, who sell and originate TSB mortgages using the IRESS **MSO Application**. |
| MSO Application | The Mortgage Sales and Origination **Application** supplied by the software company IRESS, which was used to support the sale of mortgages up to the point of granting a mortgage loan. Mortgages were then administered using **UFSS**. |
| Network | The communications hardware and systems software that connects the different parts of the **Infrastructure** and allows them to share information. For the **Proteo4UK Platform**, this would include the networking within the data centres, networking between the data centres and networking to external links (e.g. branches, contact centres and head office). |
| NFR Target | The defined execution condition and result (for example, load and response time) for which a particular **NFT** test would be considered passed. |
| NFT Events Report | A document prepared to consolidate the evidence of **Performance Testing** and some **Continuity Testing**, required to support the sign-off of the **Assurance Matrix** and the decision to **Go Live**. |
| NFT Final Report | The final version of the **NFT Events Report** (version 5.0), dated 17 April 2018. |
| NFT Memo | The **Non-functional Testing** memo provided by the TSB CIO on 17 April 2018. |

| Term | Definition |
|---|---|
| Non-functional Requirement or NFR | The requirements that specify how an IT system is supposed to operate, rather than its specific functionality. This includes requirements for performance, such as peak log in volumes and the required response times. |
| Non-functional Testing or NFT | The testing of a system's **Non-functional Requirements** to determine operational readiness. In this case, this meant the readiness of the **Platform** to support TSB's entire customer base following the **Main Migration Event**. NFT included **Infrastructure Testing**, **Performance Testing**, **Continuity Testing**, **Security Testing** and **Operational Acceptance Testing**, and is described further in chapter 14. |
| Offer Document | Sabadell's offer document for its proposed acquisition of TSB, published on 17 April 2015. |
| Operational Acceptance Testing | A production approval process conducted on all new IT services to test processes required to deliver a reliable service, including management of events, incidents, requests, changes, problems, configuration and back-up/capacity. Operational Acceptance Testing is one of the components of **Non-functional Testing**. |
| Outsourced Services Agreement or OSA | Outsourced Services Agreement entered into between TSB Bank plc, SABIS Spain and SABIS UK, dated 17 April 2017, defining how SABIS would provide the IT services needed to operate the **Proteo4UK Platform**, and the IT processes that would be carried out to support those services. |
| Performance Testing | A type of **Non-functional Testing** on **Applications**, to ensure that they are able to support the expected load of customers that may be using the **Application** or system at one time. |
| Personal Current Account | A personal bank account which customers can withdraw money from at any time using a cheque book, bank card or self-service device. |
| Platform | See the definition of **Proteo4UK Platform**. |
| Post-MME Reports | The TSB, SABIS, and third-party reports concerning TSB's migration onto the **Proteo4UK Platform** in April 2018 and the events that followed, produced after the **Main Migration Event**. |
| Pre-production Environment | A separate **Environment** which is a copy of the **Production Environment**, and allows planned changes to the **Production Environment** to be tested safely without impact on the users of the **Production Environment**. |
| Production Environment | The **Environment** in which live services, accessible to end users, ran during the **Programme** and in which the **Platform** would run after **Go Live**. This **Environment** was being used to run the **Transition Events** prior to the **Main Migration Event**. |
| Production-like Assurance or PLA | Testing conducted to provide assurance on the **Batch Processing** elements of the **Proteo4UK Platform** with migrated data. |
| Programme | TSB's IT platform transformation and migration programme, including in respect of IT and business change. |
| Programme Team | The operational management (i.e. the relevant **Executives** and employees) engaged in delivering the **Programme**. |
| Programme Test Strategy | The overall testing strategy broadly covering the scope of testing activities for the **Programme**, approved by the Bank Executive Committee Design Executive on 17 January 2017. |
| Proteo | Sabadell's proprietary IT platform software and the supporting **Infrastructure** and **Network**. |

| Term | Definition |
|---|---|
| Proteo Exit Option | The option available to TSB (following its acquisition by Sabadell) to exit the **LBG Agreements** through: (i) the development of the **Proteo4UK Platform**; and (ii) the migration of TSB's data from the **LBG IT Platform** to the **Proteo4UK Platform**. |
| Proteo3 | The existing version of **Proteo** (as at the point of Sabadell's acquisition of TSB). |
| Proteo4 | The upgraded version of **Proteo3**. |
| Proteo4UK Platform or Platform | The new version of the **Proteo IT** platform that was created for TSB and designed for the UK market. For a fuller description, please see chapter 7. |
| Public Website | The parts of TSB's website (accessible at www.tsb.co.uk) that do not require a user to login, and which provide information about TSB and its products. |
| RAG | A traffic light colour rating system ('red', 'amber' and 'green') used in project management for indicating the status of a task or milestone. There is some variation in how the RAG system is used, but broadly 'green' means 'on track', 'amber' means 'at risk' and 'red' means 'behind schedule'. |
| Read-only Transactions Decision | The decision to restrict **Performance Testing** in the **Production Environment** to transactions that do not update data (for example, logins and balance enquiries). |
| Remuneration Committee or RemCo | The remuneration committee of the **TSB Board**. |
| Replan | The replan of the entire **Programme** that took place throughout late September and October 2017. |
| Replan Memo | The memorandum dated 23 October 2017 from the TSB CEO to the **TSB Board**, summarising the approach taken by the **Executive** and **Programme Team** to the **Replan**. |
| Risk Committee | The risk committee of the **TSB Board**. |
| Risk Oversight | TSB's second line of defence, providing an independent opinion on the risks associated with the **Programme** and oversight of risk management by the **Programme Team**. |
| Sabadell Board | The board of Banco de Sabadell, S.A. |
| Sabadell Group | The group of companies of which Banco de Sabadell, S.A. is the ultimate holding company. |
| Sabadell NEDs | A collective term for the **Non-executive Directors** on the **TSB Board** who had been appointed by Sabadell, namely the Sabadell Group CFO and the Sabadell Group COO. |
| Sabadell's Initial Timeline | An early timeline for the **Programme** which was included in the regulatory business plan submitted as part of Sabadell's **Change in Control Application** in April 2015. |
| SABIS JIRA Extract | The extract of **JIRA,** originally received from SABIS on 16 November 2018 and updated on 22 November 2018, provided to inform our Review. |
| Security Testing | A type of **Non-functional Testing** designed to reveal any security flaws in **Applications'** security mechanisms and to test the functionality of specific security **Applications**. |
| Severity | **Defects** can be categorised in terms of their 'Severity', meaning the seriousness of the **Defect's** impact on the business. TSB applied a descending 1-5 Severity scale, where Severity 1 and 2 **Defects** had the most serious impact on the business. |

| Term | Definition |
|---|---|
| Single Data Centre Decision | The decision to restrict **Performance Testing** in the **Production Environment** to only one data centre (see chapter 14). |
| System Integration Testing or SIT | Testing multiple functional units of code together in order to detect **Defects** in the interfaces between these functional units. Testing of this kind was carried out by SABIS, before the software was handed over to TSB for **User Acceptance Testing**. |
| T0 | The launch of TSB's new **Mobile App**, which was the first customer-facing **Transition Event**. See chapter 10. |
| T1 | The **Transition Event** that was a **Live Proving** exercise, which would validate the **Proteo4UK Platform** using real users and live data in two stages: a 'scripted' phase (i.e. users conducting transactions using scripts) and an 'unscripted' phase (i.e. **TSB Beta**). See chapter 10. |
| T2a | The mortgage sales and origination transition, which involved an early launch of the **Proteo4UK Platform**'s functionality for the processing of new mortgage applications, which used the **MSO Application**. See chapter 10. |
| T3 | Another term used by TSB to describe the **Main Migration Event**. |
| T3 Memo | The memorandum dated 17 April 2018 which was submitted to the **TSB Board** by the TSB CEO. The memorandum recommended the initiation of the **Main Migration Event** on Friday 20 April 2018, together with its appendices. |
| Technology Operations | The process of managing an IT platform. This covers the process of platform build and testing, as well as management of the platform after it has gone live. |
| Telephone Channel | The combination of systems and Infrastructure used to provide service to TSB customers on the telephone. The systems used included **Intelligent/Interactive Voice Recognition (IVR)**, **Automated Call Distribution (ACD)**, **Customer Relationship Management (CRM)**, **Web On Behalf Of (WOBO)**, and the Infrastructure included the **Network** and the **Virtual Desktop Infrastructure (VDI).** |
| Teller Cash Recyclers or TCRs | Devices used in retail banking for the disbursement and deposit of bank notes. |
| Terms of Reference | The terms of reference for our Review. See chapter 23. |
| Testing Delivery Forum | The Programme forum where overarching governance and decision-making for **User Acceptance Testing**, **Migrated Data Testing** and **Non-functional Testing** occurred, also known as the 'Testing Steerco'. This forum was attended by members of both TSB and SABIS. |
| Testing of Data Migration | A type of testing, which includes **Migration Acceptance Cycles**, **Dress Rehearsals** and **Production-like Assurance**, used to examine the effectiveness of the software tools and processes that would be used to transfer data from the **LBG IT Platform** to the **Proteo4UK Platform**. |
| Transition Event | The entry into production of parts of the functionality of the **Platform** in advance of the **Main Migration Event**. See chapter 10. |
| Transitional Services Agreement or TSA | Transitional Services Agreement entered into by Lloyds Bank plc and TSB Bank plc dated 9 June 2014 governing the use by TSB of the **LBG IT Platform.** |
| TSB Beta | The second stage of **Live Proving** conducted without scripts ('unscripted proving'). See also the definition of **T1**. |
| TSB Board | The board of directors of TSB Banking Group plc. |
| TSB Board Advisers | Collectively, the First TSB Board Adviser and the Second TSB Board Adviser. |
| TSB Board Committees | The **Audit Committee, Risk Committee**, and **Remuneration Committee** of the **TSB Board**. |

| Term | Definition |
|---|---|
| TSB CAO Narratives | The reports prepared by the TSB CAO about the events that occurred during the first three weeks following **Go Live**. |
| TSB Defects Analysis | The **Defects** analysis conducted by TSB in response to our **Exposure Draft**, sent to us on 31 May 2019 to be considered as part of our Review. |
| TSB INEDs | The independent non-executive directors on the **TSB Board**. |
| Unisys Financial Services System or UFSS | UFSS offers a portfolio of **Applications** that supports mortgage administration, from sales enquiries and mortgage application processing to arrears management and redemptions. Unisys provided TSB with UFSS services and fraud detection services. |
| Unit Testing or UT | The testing of each functional unit of the **Application** code in an isolated manner to confirm that it works according to its specifications and to identify bugs and security vulnerabilities. This was carried out prior to **System Integration Testing**. |
| User Acceptance Testing or UAT | Testing the **Proteo4UK Platform** to confirm whether TSB's functional business requirements had been met, the TSB business users and stakeholders were satisfied, and that TSB's end-to-end business processes had been tested. This type of testing was also referred to as 'UAT1' during the **Programme** and involved testing using synthetic data (as opposed to using migrated data from the **LBG IT Platform** – see definition of **Migrated Data Testing**). |
| Verde | The code name for the business which was separated out from Lloyds Banking Group, and which ultimately became TSB. |
| Virtual Data Room or VDR | A collection of electronic documents used to store the evidence that supported the completion of the **Assurance Matrix**. |
| Virtual Desktop Infrastructure or VDI | The **Infrastructure** used to support the virtual desktop. The virtual desktop is a computer operating system that does not run directly on the endpoint hardware from which a user accesses it. The Virtual Desktop Infrastructure that TSB used was supported by **Citrix**. |
| Web On Behalf Of or WOBO | Functionality that allows contact centre agents to use the TSB website to execute transactions on behalf of customers. |
| Wide Area Network or WAN | Any telecommunications network or computer network that extends over a large geographical distance. |

| Acronyms and abbreviations | |
|---|---|
| **Key entities** | |
| LBG | The Lloyds Banking Group (Lloyds Banking Group plc and its subsidiaries) |
| Sabadell | Banco de Sabadell, S.A. |
| SABIS | Sabadell Information Systems, S.A.U. and Sabadell Information Systems Limited |
| TSB | TSB Banking Group plc and its subsidiaries |
| TSBBG | TSB Banking Group plc |
| **TSB and SABIS/Sabadell committees** | |
| BEC | Bank Executive Committee |
| BEC DE | Bank Executive Committee Design Executive |
| GTEC | Global Technology Executive Committee |
| MDC | Migration Delivery Committee |
| MDDF | Migration Deferred Defects Forum |
| **Titles** | |
| CAO | Chief Audit Officer |
| CEO | Chief Executive Officer |
| CFO | Chief Financial Officer |
| CIO | Chief Information Officer |
| COO | Chief Operating Officer |
| CRO | Chief Risk Officer |
| CTO | Chief Technology Officer |
| GC | General Counsel |
| INED | Independent Non-executive Director |
| NED | Non-executive Director |
| **Other acronyms** | |
| BAU | Business as usual |
| FCA | Financial Conduct Authority |
| PRA | Prudential Regulation Authority |
| SEPA | Single Euro Payments Area |