Summary table of the Bank of England's response to the van Steenis recommendations

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<tr><td>1.1 PRODUCE A ROADMAP FOR PAYMENTS OPTIONS</td><td>The Bank should:
• Join a group of regulators (including non-financial ones such as Ofcom) and the private sector convened by the Treasury to fashion a co-ordinated response to society's shift to digital, without leaving anyone behind. In effect, a national payments strategy council.
• This could include a roadmap to:
- foster cost-effective and resilient payments for the future;
- understand dependencies such as broadband and mobile coverage;
- ensure that no one is left behind through 'digital exclusion';
- consider with the private sector options to improve the sustainability of the cash payment model, including potential merits of a 'utility' distribution model similar to Finland, Sweden and the Netherlands; and
- contribute to a longer-term debate about whether cash distribution may require state support if the current model becomes uneconomic for the private sector.
• Explore any hurdles to faster, cheaper and more widespread peer-to-peer and inter-bank payment options — especially those powered by mobile apps — with the Financial Conduct Authority and the Payment Systems Regulator. This should include the role of appropriate fees for PSD2 transactions.</td><td>The Bank is already:
• Convening relevant stakeholders to develop a new system for wholesale cash distribution that will support the UK in an environment of declining cash volumes, consistent with the Access to Cash Review (ACR) recommendations. Alongside that, working with the cash industry to further understand how it can best support innovation.
• Participating in the HM Treasury (HMT)-chaired Joint Authorities Cash Strategy Group, which will co-ordinate work to support nationwide cash access and help safeguard cash for those who need it.</td><td rowspan="2">The Bank will:
• Consult in 2020 on the appropriate level of access to the Bank's payments infrastructure and balance sheet, including necessary safeguards. Launch a forum to explore the future of money in an increasingly digital economy.
• Fully engage in HM Treasury's (HMT's) National Payments Strategy review in order to maintain UK leadership, and unite innovators, businesses, policymakers and infrastructure providers. Alongside the Financial Conduct Authority, Payment Systems Regulator and other relevant authorities, help drive forward the review of payments regulation led by HMT.</td></tr>
<tr><td>1.2 CONTRIBUTE TO THE NEXT GENERATION OF PAYMENT REGULATION</td><td>The Bank should:
• Suggest the Treasury lead a cross-authority review of payments regulation to evaluate:
- the appropriateness of the regulatory framework for the risks posed by different payment activities, including tiering of firms;
- how to ensure effective supervision of the overall payments value chain;
- the role of data-sharing between platforms and payment companies; and
- ways to reduce fragmentation and complex regulation in the UK.</td><td>The Bank is already:
• Reviewing the systemic importance of payment systems on a regular basis as part of the Bank's regular horizon-scanning exercises to determine whether systems have become systemically important and advise HMT on whether a change to the regulatory perimeter is required.
• Jointly with HMT enhancing the Bank's ability to supervise payment systems effectively, for example by HMT bringing critical service providers and a wider range of payment systems within the Bank's supervisory remit.</td></tr>
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1.3 DEVELOP THE INFRASTRUCTURE TO MAKE CROSS-BORDER PAYMENTS MORE EFFICIENT AND CHEAPER	**The Bank** should: • Implement richer messaging standards and common identifiers to facilitate more effective and accurate global co-ordination. • Open access to a broader range of payment providers who operate across borders. • Continue to work with international bodies, such as the Committee on Payments and Market Infrastructures, to explore opportunities to make cross-border payments more efficient and cheaper. • Keep abreast of digital tokens and explore greater interoperability with other central banks to improve payments for households and companies.	**The Bank** is already: • Harmonising ISO20022 messaging standards with other major RTGS providers (eg European Central Bank (ECB), Federal Reserve) for efficiencies, including in cross-border Know Your Customer (KYC)/Anti-Money Laundering (AML) checks. • Supporting synchronisation, including through exploring use cases for cross-border payments. • Promoting the adoption of Legal Entity Identifiers (LEI) as a digital means of identification for corporates. • Contributing to international efforts to promote KYC utilities, including through the Financial Stability Board (FSB), Committee on Payments and Market Infrastructures (CPMI) and the Wolfsburg Group. • Collaborating with the Monetary Authority of Singapore (MAS) and the Bank of Canada to explore opportunities to make cross-border payments more efficient.	**The Bank** will: • Partner with other central banks to explore how high-value payments systems could be used to deliver instant settlement in different currencies, which would empower private innovations in cross-border finance. • Raise the importance of a continued focus on cross-border payments through international work with other central banks (eg in the Bank for International Settlements (BIS)).
2.1 BUILD AN INNOVATIVE PAYMENT INFRASTRUCTURE TO ENABLE ALTERNATIVE PAYMENT METHODS	**The Bank** should: • Consider how alternative providers might access the Bank's infrastructure including balance sheet and payment systems, and an appropriate package for obligations which come with these rights. This will need to dovetail with new payments regulation to ensure any new members are appropriately capitalised and supervised. Careful thought would also need to be given to the implications for monetary and financial stability of any further extension. • Create an API to allow improved information retrieval and sharing from payment systems.	**The Bank** is already: • Implementing a world-leading regime to grant central bank settlement accounts in RTGS to eligible non-bank payment providers, allowing them to offer real-time retail and wholesale services. • Having consulted on a common credit message (CCM) for the UK, working with Pay.UK and industry to encourage widespread adoption of ISO20022 messaging standards. • Working with industry to understand how synchronisation services could be designed in the renewed RTGS system, which might enable more diverse and integrated settlement models. • Designing an API that enables the Bank to allow access to and share data on transactions executed through the renewed RTGS system. • Continuing to research the implications of providing wider access to central bank money, including by exploring the potential benefits and risks of a central bank digital currency.	**The Bank** will: • Consult in 2020 on the appropriate level of access to the Bank's payments infrastructure and balance sheet, including necessary safeguards. • Implement ISO20022 messaging and APIs as part of delivery of the renewed RTGS service. • Work with the Government to encourage adoption of the LEI as a digital identifier for UK corporates, starting by illustrating use cases that could deliver benefits for the real economy. • Work with Pay.UK and EUI to assess the feasibility and benefits of building a shared Public Key Infrastructure (PKI) for the main UK payment and settlement systems. This could offer enhanced security standards and reducing the barriers to joining multiple payment systems. • Explore how to enable re-routing between different payment systems, to improve operational resilience.

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2.2 CHAMPION TRUSTED DIGITAL IDENTIFICATION	**The Bank** should: • Engage with the financial sector to establish its requirements for a digital ID, including discerning the features that would: - help reduce fraud in financial transactions; - reduce costs of on-boarding new customers and anti-money laundering and Know Your Customer processes; and - expand access to those excluded from the financial system. • Champion these requirements in broader engagement with public and private sector participants. The government should consider the merits of secure and efficient information gateways to trusted official sources, so the private sector can improve the effectiveness of identification verification.	**The Bank** is already: • Monitoring developments in digital identification and authentication through the horizon-scanning work of the Fintech Hub.	**The Bank** will: • Engage with the financial sector and government on the requirements for a digital ID. • Undertake research on the benefits of a digital ID. • Advocate greater collaboration with HM Government and firms to facilitate better means of digital identification.
2.3 EMBRACE SAFE CLOUD USAGE	**The Bank** should: • Work with the private sector to help firms realise the benefits of public cloud usage without compromising resilience by: - understanding and mapping concentration risks and interoperability, as well as building expertise within the Bank; - testing operational resilience, including to cyber-risk; - setting standards and guidelines for cloud usage; and - collaborating with international regulators on a longer-term approach to cloud oversight.	**The Bank** is already: • Reviewing its policy and approach to outsourcing in general and cloud in particular. • Making use of the European Banking Authority's (EBA) Guidelines on Outsourcing, having helped to develop them. • Engaging with firms, cloud service providers and overseas regulators on best practice governance and risk management of cloud usage. • Developing its approach to operational resilience jointly with the Financial Conduct Authority (FCA).	**The Bank** will: • Publish a supervisory statement in 2019, describing the PRA's modernised policy framework on outsourcing arrangements, including a focus on cloud technology, and setting out conditions that can help give firms assurance on its use. • Continue to work with firms to manage the risks associated with cloud outsourcing, including concentration risk and lack of substitutability; and to understand any tipping points for systemic risks from wider adoption. • Work with international standard-setting bodies, such as the Basel Committee on Banking Supervision (BCBS) and International Association of Insurance Supervisors (IAIS), to develop and adopt international standards.
2.4 SUPPORT AN 'AIR TRAFFIC CONTROL' OF MAJOR PROJECTS	**The Bank** should: • Argue for a new forum with all major regulatory bodies to map and identify critical junctures for ongoing and new regulatory projects. These include: The Payment Systems Regulator, the Financial Conduct Authority, the Open Banking Implementation Entity and the Competition and Markets Authority. While respecting each institution's statutory duties, sharing information on the timing and impact of major projects would reduce risk to operational resilience. It would also limit the risk of crowding out innovation through the bunching of regulatory initiatives. Indirectly, it may build a richer roadmap of tech transformation for financial infrastructure.	**The Bank** is already: • Developing ways to co-ordinate and ensure greater coherence of the Bank's work across different areas of payments. • Co-ordinating with the FCA (in line with the Memorandum of Understanding (MoU) between the PRA and the FCA) and international regulatory authorities on the development and implementation of regulatory initiatives.	**The Bank** will: • Play a full role in any forum commissioned by the Government, bringing together all relevant regulators and Government departments to consider any scheduling bottlenecks arising from new projects.

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3.1 PROMOTE THE RESPONSIBLE USE OF MACHINE LEARNING AND AI	**The Bank** should: • Establish a public-private financial sector working group with the Financial Conduct Authority to: - monitor developments in the use of machine learning to understand possible micro and macroprudential implications of widespread adoption; - develop principles, and share best practice, for the responsible, explainable and accountable use of machine learning in finance; - explore the intersection with current rules (including Senior Managers Regime) and where old rules need updating; and - feed into the Centre for Data Ethics and Innovation's work on maximising the benefits of artificial intelligence and managing the risks in finance. • A wholesale working group (or subgroup) should also involve or could be championed by the Fixed Income, Currencies and Commodities Markets Standards Board.	**The Bank** is already: • Providing supervisory guidance to firms on the risk management of machine learning techniques and AI through its supervisory statement on algorithmic trading. • Working to understand the scope of algorithmic decision-making through engagement with the Centre for Data Ethics and Innovation (CDEI) and a joint survey of regulated firms with the FCA on the use of machine learning and AI.	**The Bank** will: • Establish a public-private working group with the FCA and firms to further the dialogue on AI innovation, and explore whether principles and guidance could support safe adoption of these technologies. • Feed in any findings to the Government's consultation through the CDEI. • Accelerate its own work programme on AI through research and horizon scanning.
3.2 SUPPORT BETTER CREDIT FILES FOR SMES	**The Bank** should: • Use its knowledge of LEIs in finance to support wider adoption. • Contribute analysis on the value of better credit files for small and medium-sized enterprises and individuals. This could include considering permissioned access to high-level company tax data. The Treasury may wish to establish a competition for private innovators to help build better credit files for the gig and sharing economy.	**The Bank** is already: • Promoting the adoption of LEI as a digital means of identification for corporates. • Creating an API interface that enables the Bank to allow access to and share data on transactions run through the renewed RTGS system.	**The Bank** will: • Help small businesses harness the power of their own data, by developing the concept of a portable credit file, to give greater access to more diverse and competitive financing options, including for global trade. • Respond to the Government's Smart Data Review with recommendations for how data standards and technology can promote an open platform for finance and deliver greater choice and keener pricing for businesses and individuals. • Champion the LEI as a globally recognised and unique identifier for all businesses in the UK, including integrating the LEI in the Bank's new RTGS service and mandating its use in payment messages.

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II SUPPORT MAJOR TRANSITIONS			
4.1 CHAMPION GLOBAL STANDARDS	**The Bank** should: • Promote strong public sector standards and deep supervisory co-operation, including through maintaining and optimising influence in forums such as the Financial Stability Board, the Basel Committee on Banking Supervision and the International Monetary Fund. • Convene and catalyse private sector standards through discussions on road blocks to more effective finance, particularly in post-trade and deepening supervisory co-operation. A good place to start would be the swap and collateral markets along the lines of the International Swaps and Derivatives Association common domain protocols. The Fixed Income, Currencies and Commodities Markets Standards Board can play a useful role on this.	**The Bank** is already: • Contributing to international efforts to improve the availability of information on markets and firms, including the creation of the FSB's Common Data Templates reporting standards, reference data such as the LEI and defined data elements for OTC derivatives trades, such as the CPMI and International Organization of Securities Commissions's (IOSCO's) Critical Data Elements (CDE).	**The Bank** will: • Continue to contribute to a broad range of international fora, including the FSB and the G20, to promote a robust approach to identifying and responding to emerging vulnerabilities. • Convene a Post-Trade Technology Market Practitioner Panel to explore how market participants can leverage technological improvements to deliver a more efficient and resilient post-trade ecosystem. • Continue to support the mission of the FICC Markets Standards Board (FMSB) to enhance standards of behaviour in FICC markets by developing clear standards and guidelines.
4.2 ENGAGE ON THE EVOLVING NEEDS OF EMERGING MARKETS	**The Bank** should: • Continue to engage internationally to explore ways in which the UK, as a global financial centre can use its expertise to meet the needs of international markets. This includes through providing green finance, greater insurance for cyber-risk and offshore local currency bonds.	**The Bank** is already: • Supporting renminbi clearing in London, following the success of London's issuance of the first Chinese sovereign RMB bond. • Delivering a joint programme with the Department for International Development (DFID) to provide training and technical assistance to central banks in emerging and developing countries, covering supervision, banking resolution and monetary and macro-financial policy.	**The Bank** will: • Engage bilaterally and multilaterally to foster international collaboration to ensure the safety and soundness of cross-border wholesale business and avoiding market fragmentation, including as a result of technological innovation. • Continue its partnership with DFID and scale up its technical assistance programme to a wider set of emerging and developing country central banks and supervisory authorities.
4.3 ENGAGE WITH FUTURE OF FINANCIAL SERVICES INITIATIVES	**The Bank** should: • Contribute within the scope of its mandate, if the Treasury wants to explore pro-growth changes to financial services regulation and other policies to be a competitive vibrant centre of financial services and be a leader in fintech, not least as Brexit choices become clearer.	**The Bank** is already: • Supporting HM Government's objectives for growth, within the scope of its secondary objectives, as set out in the remit letters to FPC, MPC and PRC. • Encouraging innovation and competition in the financial sector and supporting a vibrant fintech environment in the UK.	**The Bank** will: • Continue to engage openly with industry, including through supervision, policy and other outreach. • Maintain and enhance the programme of horizon scanning, policy evaluation and dynamic adjustment. • The PRA will continue to take action in line with its secondary competition objective, as embedded in its supervisory practice.

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5.1 ADVANCE THE ADOPTION OF CLIMATE CHANGE DISCLOSURE	**The Bank** should: • Encourage widespread adoption of the Task Force on Climate-related Financial Disclosures' (TCFD) recommendations. • Monitor climate-related disclosures among supervised firms. • Work with the Department for Business, Energy and Industrial Strategy and relevant authorities to explore the merits of making climate-related financial disclosures mandatory in mainstream financial disclosures, ideally within five years. • Consider climate disclosure for its own operations.	**The Bank** is already: • Setting expectations for disclosure by firms with its April 2019 Supervisory Statement on the management of financial risks from climate change. • Developing best practice on disclosure through the joint Climate Financial Risk Forum with the FCA. • Committed to disclosing how it manages its own climate-related financial risks in the Bank's 2019/20 *Annual Report*.	**The Bank** will: • Continue to encourage TCFD disclosures by UK financial institutions and companies to provide better information on climate-related risks and opportunities. We expect by 2022 that all listed companies and large asset owners will be disclosing this information. • Lead by example by increasing transparency over the Bank's exposures to climate risks and approach to managing them, and adopt best practice to reduce its own carbon footprint. • Support the quality of disclosures by developing best practice for climate scenarios to be used for the assessment of climate-related risks; and develop benchmark scenarios jointly with the Network for Greening the Financial System (NGFS) that may inform future climate-related stress testing. • Support IAIS/Sustainable Insurance Forum (SIF) initiatives on identifying and advocating for best practice on disclosures in insurance companies. • Support disclosure initiatives across all other industries by sharing perspectives from the financial sector.
5.2 EMBED CLIMATE RISK MANAGEMENT	**The Bank** should: • Ensure that the firms the Bank supervises are embedding scenario analysis in their risk management. • Engage internationally to develop templates for scenario analysis. • Facilitate the sharing of best practices in the management of climate-related financial risks. • Include a new climate-risk scenario for the Biennial Exploratory Scenario (BES).	**The Bank** is already: • Guiding firms with its April 2019 Supervisory Statement on the management of financial risks from climate change. • Including an exploratory climate change scenario in its 2019 stress testing of UK insurers. • Developing ideas with other central banks for how to integrate climate-related risk into supervision and financial stability monitoring through the NGFS. • Developing best practice on scenario analysis and risk management through the joint Climate Financial Risk Forum with the FCA. • Setting out targets to reduce its own carbon emissions.	**The Bank** will: • Conduct a climate stress test for UK financial institutions in 2021, to help mainstream climate risk management across the financial system. • To facilitate scenario design, publish a discussion paper in the autumn of 2019 and work with industry and other authorities through the Climate Financial Risk Forum and NGFS. • Monitor PRA-regulated firms' management of the financial risks from climate change through supervision. • Review the regulatory framework to consider how financial risks from climate change may be included in prudential capital requirements.
6.1 CONSIDER FORCES DETERMINING SECURITY IN RETIREMENT	**The Bank** should: • Consider what opportunities finance presents to share longevity risk. • Explore any regulatory impediments to security in retirement, starting with the treatment of risk-sharing products and products that help protect savers from outliving their savings if they live longer.	**The Bank** is already: • Monitoring and, where they link to the Bank's and PRA's statutory objectives, contributing to initiatives by other authorities, such as the Government's recent initiative on collective defined contribution schemes and consultation on superfunds, to allow individuals to share longevity risks better.	**The Bank** will: • Continue to monitor developments in pension legislation and, where appropriate, provide analytical support to the relevant authorities to monitor risks to the system and drive the best outcomes for consumers, while continuing to protect policyholders. • Continue to advocate for areas where the European Solvency II Directive framework could be adapted to improve outcomes for policyholders and firms, for example in adjusting the design of the risk margin to reduce its sensitivity to movements in interest rates.

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6.2 SUPPORT WIDER INVESTMENT CHOICES	**The Bank** should: • Provide its expertise to help challenge firms and authorities to consider what financial products or protections gig and sharing economy employees may need and the implications for firms' risk management. • Assess how firms are responding to the changing investment desires of younger demographics and whether they are strategically resilient to changing preferences. • Share expertise from climate-disclosure work to help investors develop principles for broader sustainability metrics.	**The Bank** is already: • Assessing how firms respond to changing investment preferences through 'business as usual' supervision of firms' business models and strategy. • Supporting government consultations on facilitating greater long-term investment, such as the Patient Capital Review.	**The Bank** will: • Continue to monitor and understand firms' response to changing investment preferences through horizon scanning, market surveillance, supervisory business model analysis and through the Bank's Agency network. • Take a keen interest in understanding how firms innovate to serve the needs of changing demographics and any role for Bank policy to support this. • Consider repeating its 2016/17 survey of finance available for investment to explore ways to support productive investment.
III INCREASE RESILIENCE TO NEW RISKS			
7.1 ENSURE REGULATION AND INFRASTRUCTURE KEEP PACE WITH INNOVATIVE BUSINESS MODELS	**The Bank** should: • Remain vigilant to developments in the financial system and be ready to act to protect resilience when needed. To do so, regulatory approaches and macroprudential tools may need to evolve. This report can provide suggestions on topics and risks to watch closely. • Evaluate the appropriate level of access to central bank infrastructure, including its balance sheet, for non-banks in order to support greater innovation while safeguarding monetary and financial stability.	**The Bank** is already: • Offering settlement accounts in RTGS to non-bank payment service providers (NBPSPs). • Providing a bespoke approach to authorising new banks and insurers through its New Bank and Insurer Start-up Units. • Taking a forward-looking approach to new risks through the FPC's horizon scanning of the regulatory perimeter. • Engaging in a dialogue with firms on risks to their business models, building on the 2017 BES, which explored the potential impact of low rates and fintech competition.	**The Bank** will: • Make a strategic pivot in its approach to horizon scanning and monitoring the regulatory perimeter, as we move away from the post-crisis era, to focus more on financial innovation and evolutions in the UK financial system. To keep ahead of new risks, the FPC will use its annual review of risks beyond the core banking sector to evaluate changes in the shape of the UK financial system, including new business models or interconnections. Across the Bank, continued close monitoring of developments and analysis of such innovations will take into account new opportunities and benefits to the UK financial system as well as the possibility of new risks. This will hardwire the lessons from the Future of Finance review into the Bank's business as usual. This work will include: - evaluating the resilience benefits of greater diversity in the financial system; and - considering regulation from the perspective of the activities being carried out, regardless of the entity involved.
7.2 FOSTER A DYNAMIC AND RESPONSIVE REGULATORY REGIME	**The Bank** should: • Establish a dedicated 'regulatory evaluation and response' unit to assess the effectiveness and impact of major policies across their life cycles. This includes anomalies, unintended consequences and continued relevance.	**The Bank** is already: • Undertaking regular reviews to ensure that regulations are working as intended, while addressing new challenges through regular horizon-scanning exercises. • Working with international regulatory bodies and standard setters to evaluate and update regulations to keep them relevant.	**The Bank** will: • Continue the programme of policy evaluation and horizon scanning established by the PRA; and reflect on the experience and lessons learned to progressively deepen and broaden the framework. This will focus on policies which have unintended consequences, could be optimised through adjustment have become stale or are at risk of arbitrage. Such adjustments may be to tighten or relax policies. • Advocate a UK legal framework in financial services that allows the Bank to undertake policy adjustments in a responsive and timely way where the evaluation processes reveal the case for such adjustments.

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7.3 CONTRIBUTE TO AN OPEN BANKING POLICY FRAMEWORK	**The Bank** should: • Work with the Financial Conduct Authority to suggest a Treasury-led review of lessons learned from the first 18 months of Open Banking. The Bank should consider how to mitigate risks and galvanise opportunities, including the implications of unclear liability for data loss and failed payments.	**The Bank** is already: • Closely monitoring developments, through regular engagement with the FCA and the supervision of PRA-regulated firms, exploring the impact of Open Banking on business models and firms' liquidity. • Analysing the potential impact from Open Banking on the safety and soundness of the firms we regulate. • Considering the potential impact from Open Banking on financial stability through the annual assessment of risks beyond the banking sector.	**The Bank** will: • Research the potential benefits and implications of Open Banking. • Continue to analyse the potential impact from Open Banking on the safety and soundness of regulated firms, as well as on financial stability. • Respond to the Government's Smart Data Review with recommendations for how data standards and technology can promote an open platform for finance and deliver greater choice and keener pricing for businesses and individuals.
8.1 ENHANCE DATA RECOVERY	**The Bank** should: • Map the mechanisms for data recovery and the potential for firms 'stepping in' in the event of a major cyber-incident. • Consider the merits of the US private sector 'Sheltered Harbor' initiatives.	**The Bank** is already: • Within the CIO Forum sitting under the Bank's and UK Finance's Cross-Market Operational Resilience Group (CMORG) reviewing suitable options for data recovery from malicious cyber-attacks, including solutions, such as: - Sheltered Harbor; - the Single Customer View (SCV) file; and - bilateral buddy bank arrangements.	**The Bank** will: • Commit to work with industry and the relevant authorities to, within the next 12 months, identify an approach for data recovery from malicious attacks for the UK financial system, setting out: - a practical solution to data recovery (eg Sheltered Harbor, Single Customer View (SCV) files, etc.); - how the data could be stored; and - legal implications around data restoration (eg under GDPR).
8.2 CONDUCT CYBER-EXERCISES	**The Bank** should: • Enhance the frequency of domestic and international cyber-penetration tests. Growing focus should be on payments from traditional and new entrants and the full value chain of providers.	**The Bank** is already: • Encouraging firms to enhance their resilience to cyber-attacks, including through state-of-the art threat-lead penetration testing using its CBEST framework. • Conducting sector-wide exercises, including the SIMEX initiative, that tests industry-wide scenarios. • Working with its counterparts and the G7 to conduct joint testing exercises with other jurisdictions, including through the Resilience Shield Exercise conducted jointly with the US in 2015 and the G7 Cyber Exercise undertaken this year. • Working with the Financial Sector Cyber Collaboration Centre (FSCCC) launched last year, the Authorities Response Framework and the National Cyber Security Centre (NCSC) to enhance co-ordination and response capabilities.	**The Bank** will: • Consider aligning the frequency of regulator-led, threat-led penetration testing through CBEST to a three-year cycle, including for financial market infrastructure firms and evaluate the merits of reducing this to two years. • Move to developing and scoping of threat-led penetration tests by certified third parties. • Conduct a pilot cyber stress test in 2019, which will explore a hypothetical stress scenario that assumes the systems supporting firms' payments services are unavailable. It will use this to gather evidence on what factors affect firms' ability to restore activity quickly, whether doing so might have unintended consequences and what would happen if contingency measures were unsuccessful. • Work with international counterparts and the G7 to explore greater opportunities for joint cyber-simulation exercises, including whether to move to annual rehearsals within the G7.

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8.3 ENCOURAGE BETTER INFORMATION SHARING	**The Bank** should: • Encourage better disclosure on cyber-threats domestically and internationally to help develop the data required for developing a more effective cyber-insurance market.	**The Bank** is already: • Collaborating with the National Cyber Security Centre (NCSC), the Authorities Response Framework (ARF), HMT and the FCA to enhance information sharing between authorities. • Encouraging firms to share information through initiatives such as Financial Sector Cyber Collaboration Centre (FSCCC)/Strider. • Engaging with international counterparts and the G7 to increase information sharing between jurisdictions.	**The Bank** will: • Resume discussions with HMT and other authorities to encourage greater cyber-incident data sharing and identify barriers to the development of better cyber-insurance. • Encourage the work of initiatives such as FSCCC/Strider to increase the availability of cyber-threat information between firms. • Designate NCSC in an 'advise and assist' capacity to remove legal barriers to information flows.
9.1 CONSULT ON A NEW DIGITAL DATA STRATEGY	**The Bank** should: • Develop and consult on a medium-term regulatory data strategy, ideally for three to five years, with specific initiatives to embrace data-driven and intelligence-led risk monitoring. • Foster data science capabilities and deliver a medium-term roadmap for its digital transformation. This includes a recruitment and training strategy that meets the need of a central bank of the future. • Consider making its rulebook machine-readable so it can be interpreted more efficiently and accurately. • Consider not just the cost of its own regulatory functions but the total cost of regulation for the UK financial system.	**The Bank** is already: • Modernising and improving the resilience of its services through the Data Centre Migration Programme (DCMP). • Has rolled out standardised technology for defining and collecting regulatory/statistical data across data collection. • Deploying practices like resource pooling and improved online digital collaboration to make the Bank more agile.	**The Bank** will: • Launch a review in consultation with banks, insurers and financial market infrastructures to explore a transformation of the hosting and use of regulatory data over the next decade. The review will seek ways to both decrease the burden on industry and to increase the timeliness and effectiveness of data in supporting supervisory judgements. • Review its recruitment and training needs, including building data science capabilities by launching a training programme to upskill staff and embedding machine learning experts into business areas.
9.2 ENHANCE RISK MONITORING THROUGH DIGITALISATION OF SUPERVISION	**The Bank** should: • Consider which new regulatory and supervisory technologies could make the data capture and analysis of information from firms less resource-intensive. • Increasingly automate routine tasks and so free up resources to focus more on value-added processes. • Over the longer term, make a choice about reaching out for data rather than ask for it to be submitted.	**The Bank** is already: • Investing in internal digitalisation – for example through initiatives such as Data Analytics, Cyber2020 and how it manages firms through Risk and Work Manager. • Considering how supervisors need to adapt to a more digital world as part of the PRA Target Operating Model 2025. • The One Bank Service Transformation (OBST), a three to five-year programme, also addresses internal processes. Staff are encouraged to improve their digital literacy, for example through the Digital Ninja Network. • The Bank has done proofs of concepts with fintechs to automate analysis of unstructured data. And it is exploring whether parts of its rulebook can be made machine-readable with small-scale pilots.	**The Bank** will: • Identify and implement readily available improvements in the PRA's use of data in the next one to three years, such as using better tools for peer analysis, and beginning to exploit the benefits of machine learning and AI. • Explore proofs of concept to deliver interim improvements over the next three years, for example integrating multiple data sources for market monitoring and automating parts of the authorisations process for new firms. • Complete the process of making the PRA Rulebook machine-readable over the next three to five years, with the aim of simplification and removing redundancies.