BANCO DE ESPAÑA EVALUATION PROGRAMME

EXTERNAL EVALUATION OF THE USE OF TECHNOLOGICAL INNOVATION IN THE PRUDENTIAL SUPERVISORY FUNCTION

Banco de España

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EXTERNAL EVALUATION OF THE USE OF TECHNOLOGICAL INNOVATION IN THE PRUDENTIAL SUPERVISORY FUNCTION

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The views expressed are those of the authors and not necessarily the views of the Financial Conduct Authority or the Bank for International Settlements

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1 Executive Summary

Overall, the Banco de España (BdE) has made significant progress in its SupTech journey. It is comparable with its peers on most SupTech practices but is ahead of many financial authorities when it comes to establishing an explicit SupTech roadmap that guides their journey and enables the BdE to have a targeted and structured approach. Support from the top for Suptech work is clearly there as manifested by involvement of senior management in its governance and the allocation of dedicated resources. In addition, there is an established and clear process for the identification, exploration and development of potential Suptech tools, as well as a strong coordination, especially at the working level, between the Directorate General of Banking Supervision (DGBS) staff doing Suptech work and with staff from other the BdE functions involved in the institution-wide digitalisation agenda.

The BdE needs to translate this progress in the development of SupTech tools to a more effective deployment of said tools in supervision work. These tools should be embedded and become critical to day-to-day supervision. This entails strengthening resources and capacity development activities of the BdE to acquire not only the requisite skills but also the necessary digital mindset among supervision staff. There should be conscious efforts to enhance accessibility of the tools and formally integrate them into supervisory processes. Given close links with the Single Supervisory Mechanism (SSM), there should be closer coordination not only in developing SupTech tools but, equally important, in deploying them.

Looking to the future, there may be scope to have more flexibility in exploring a range of Suptech tools to respond to a changing financial system landscape. Here, further leveraging synergies with other functions within the BdE, beyond DGBS, which may be exploring or using similar tools, could help and address the inherent resource constraints.

We provide below (Table 1) a summary list of all our recommendations in bullet points – with the main ones in bold, grouped according to how findings are structured in the report and whether the recommendations may be done in the short or medium to longer term. Further elaboration is in the main body of the document.

Table 1

Recommendations

	In the short term	In the medium to longer term
The BdE SupTech Roadmap	— Socialise the SupTech Roadmap to relevant officials in other Directorates General (DGs) to ensure broad support for future projects that require their collaboration	**— Expand the range of SupTech tools being explored beyond those for credit risk**
	— Formalise the coordination arrangement and information exchange on SupTech and other innovation initiatives at the middle to senior management level across different DGs	— Develop Agile product backlog to help identify the range of needs and prioritise delivery
	— Invite on a permanent basis each relevant unit in the BdE (e.g. the Data Analysis Hub) to the SupTech Network meetings	— Create a BdE-wide data science workbench to help raise awareness of data science projects across the BdE and accelerate their delivery
	— Leverage the large data science community in the BdE to foster information exchange among staff across the BdE who might be doing similar things	
Governance	— Review the balance of the number of staff and tasks assigned to the Information Analysis and SupTech Division (GAIST) to ensure sufficient buffer, for example, to mitigate staff turnover	— Introduce SupTech data analytics career paths and secondments from other units within the BdE to support GAIST's work both in the short- and long-term
	— Identify, document and agree the data lifecycle using the common entrance and exit points across key data	**— Enhance the Data Management Policy**
Introducing new technologies, usage of tools and awareness	**— Enhance the accessibility of existing SupTech tools by:** - Ensuring user-friendly interfaces; - Making available to onsite and/or offsite supervisors the tools that would be potentially useful to them; and - Formally integrate SupTech tools in supervisory processes	— Provide a single platform to access all data sources, all SupTech tools and other supervisory applications
	— Track usage and feedback on the various SupTech tools	
Development of supervisory capabilities	— Ensure SupTech work is viewed as a core enabler for main supervisory responsibilities	— Establish a BdE-wide digital skills programme to enable all colleagues to work in a digital manner
		— Establish an executive coaching programme to enable the digital mindset
		— Strengthen resources and capacity development activities by: - Pursuing the plan to establish a structured training programme on data analytics for supervisors; - Integrate training on existing SupTech tools in the supervision training programme; and - Integrate introduction to existing SupTech tools in the induction programme for new staff
Continuing to benefit from the SSM's SupTech work	**— Improve coordination with the SSM in the deployment of the SupTech tools**	— Develop a more active or leading role in regional and international SupTech work
	— Reexamine the efficiency opportunities in adopting SSM SupTech tools in the BdE	

SOURCE: Banco de España.

2   Introduction

In 2018, the Basel Committee for Banking Supervision (BCBS) defined Supervisory Technology (SupTech) as "the use of technologically enabled innovation by supervisory authorities". The Financial Stability Institute (FSI) of the Bank for International Settlements (BIS) subsequently qualified this definition by specifying that use of these new technologies is for the purpose of supporting supervision work; given that supervisory authorities

could use innovative technology in other internal processes as well, e.g. Human Resources.[1] The FSI further clarified this definition by including in the scope the use of innovative technology by financial authorities in general.[2] Whilst there continues to be a broad acceptance that the definition of SupTech evolves, it does centre on the application of big data, Artificial Intelligence (AI) and emerging technologies.

The opportunities presented by SupTech are enabled by the substantial increase in availability, complexity and granularity of data through new infrastructure – e.g. Cloud, Application Programming Interface. Supervisors have the opportunity to now collect, store and analyse large data sets in a more effective way to support financial stability. The Financial Stability Board[3] identifies the ability to gain new insights from data could improve oversight, surveillance and analytical capabilities, and generate real-time indicators of risk to support forward looking, judgement based, supervision and policymaking. In particular, advances in generative AI and its potential uses within supervision will be a growth area for many jurisdictions particularly in gaining new insights and efficiencies in processing data.[4]

In this regard, a SupTech survey conducted by the BIS in July 2023 showed that only three of the 50 central banks and other financial authorities (collectively called "financial authorities") that responded are not currently pursuing SupTech work initiatives.[5] This means that work on – and, presumably, use of – SupTech tools is now common across financial authorities in different jurisdictions.

Furthermore, the evolution of supervision is underway with a clear shift in technologies, data and skills within the BdE. This evolution has become a significant element in how supervision is undertaken due to a number of factors, including the global financial crisis, the COVID-19 pandemic and the advancement in technologies. Moreover, the digitalization from the regulated firms in terms of products, services and exploitation of big data has presented new risks and insights.

The rise of data and technologies in daily supervisory lives has presented the BdE an opportunity to reflect and evolve to meet the digital era. In this sense, the Strategic Plan 2024[6] sets out both, a clear mandate for the BdE to be a leader in prudential supervision especially in terms of credit and technology risk, and the promotion of technological innovation through digital transformation and a data governance programme.

To further these strategic objectives of this plan, the two authors of this report were commissioned to evaluate the use of technological innovation in the prudential supervisory function of the BdE. In particular, the report sets out clear recommendations for the BdE to consider on its continued SupTech journey.

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1   See Broeders and Prenio (2018).
2   See di Castri et al (2019). There could be financial authorities, such as Anti-Money Laundering (AML) authorities, that has no supervision mandates.
3   See FSB (2020).
4   The Monetary Authority of Singapore, for example, demonstrated a generative AI tool at the recent UK Financial Conduct Authority (FCA) Data and Innovation Conference.
5   This is a joint survey of the BIS's Financial Stability Institute (FSI) and Innovation Hub (BISIH). The survey was sent to members of the FSI's Informal Suptech Network and the BIS Innovation Network.
6   For further details, see the Strategic Plan 2024 on the BdE website.

3 Evaluation approach

This External Evaluation report sets out the opportunities and challenges for the BdE on its use of technological innovation in the prudential supervisory function, with a clear set of recommendations.

More specifically, the main goals of the External Evaluation consist in assessing and documenting:

a) The alignment of the "Banco de España Suptech Strategy" with the digitalisation objectives in the Strategic Plan 2024 and the systems strategy (ETI24).

b) The governance of the processes to develop and incorporate SupTech (internal arrangements, coordination, processes and controls), including the provision of resources and the incentives to innovate.

c) The process to introduce new technologies into supervisory processes (identification, development, implementation, use, etc.).

d) The maturity of SupTech at present and in the medium term, considering the expected developments.

e) The development of supervisory capabilities in the SupTech arena. The training provided to supervisors on SupTech and large-scale data processing, and other learning opportunities. The strategies for hiring and retaining professionals with SupTech profiles.

f) The coordination and interaction with the SSM in the SupTech arena (this facet would be evaluated specifically, on the basis of information available at the Banco de España).

The Evaluators had a number of interviews with a range of the BdE colleagues,[7] whose input was pivotal to the success of the Evaluation. In addition to the interviews, the Evaluators went through a number of demos of key SupTech tools, which is an important element to understand the user journey and the breadth of SupTech tools.

4 A global view of SupTech

This section discusses some of the main SupTech practices across different jurisdictions. Various FSI papers on the topic[8] have shed light on key challenges and measures or practices financial authorities put in place to address these challenges.

Many financial authorities do not have explicit SupTech roadmaps.

As mentioned, almost all financial authorities are pursuing some SupTech initiatives but many still do not have a SupTech strategy or roadmap in place. A 2022 survey of 134 financial authorities conducted by the

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7   Including: senior management, supervision staff, including those closely involved in SupTech work; and staff from other relevant departments within and outside of DGBS, such as the training unit of the DGBS, Human Resources department and Information Systems department.

8   See Broeders and Prenio (2018), Coelho et al (2019), di Castri et al (2019), Crisanto et al (2020), Beerman et al (2021), Garcia Ocampo et al (2022).

Cambridge Suptech Lab showed that only 23% have a SuptTech strategy or roadmap.[9]

Two approaches to establishing a SupTech strategy were identified by the FSI: (i) a specific or stand-alone SupTech strategy/roadmap; and (ii) an institution-wide digital transformation programme.[10]

These approaches are not necessarily pursued in isolation. For example, an institution-wide digital transformation programme can subsume a SupTech roadmap. This was the approach taken by, for example, the Deutsche Bundesbank and the Australian Prudential Regulation Authority. The former was developing a bank-wide digitalisation strategy to which the banking supervision department contributes, while the latter had a data transformation program in which context SupTech solutions were explored.[11]

Other examples include the Financial Conduct Authority (FCA)[12] in the UK which has set out a public ambition to become a data led regulator through its data strategy to spot and stop harm faster, and also the SSM, which recently published its 'Digitalisation BluePrint'[13] that sets out a clear digital innovative agenda, focused on its role to lead and implement cutting edge technologies for SSM members with a clear portfolio of deliverables.

Financial authorities benefit from governance arrangements around SupTech work and the provision of dedicated internal resources.

The need for an appropriate governance arrangement to clarify roles and responsibilities when it comes to SupTech is clear benefit to financial authorities. The absence of established governance could lead to redundancies in SupTech efforts across the organisation[14]. Related to this is the need for dedicated internal resources for SupTech development. According to the July 2023 BIS survey, 81% of financial authorities that are currently pursuing SupTech work initiatives have internal resources dedicated to building SupTech tools. When asked to identify where in the organisational structure these resources are located, majority responded "Other" (Chart 1). Examining the explanations for the "Other" responses reveal that many financial authorities spread SupTech development work across different units within the organization. In the absence of more information (e.g. whether there are identified staff within each unit that are involved in SupTech work or whether staff time is explicitly allotted to SupTech work), it is unclear how "dedicated" these resources are.

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9   See Cambridge Suptech Lab (2022).

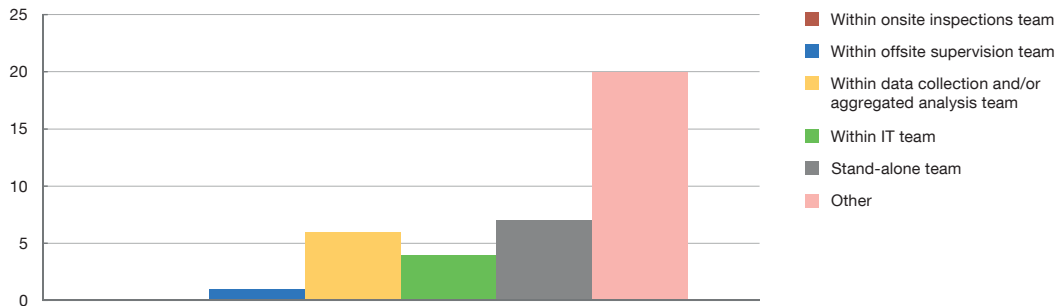10 See di Castri et al (2019).

11 ibid.

12 See FCA (2022).

13 See ECB-SSM (2023).

14 See Beerman et al (2021).

If you have internal resources dedicated to building SupTech tools, where in the organization structure are these resources located?

Legend:
- Within onsite inspections team
- Within offsite supervision team
- Within data collection and/or aggregated analysis team
- Within IT team
- Stand-alone team
- Other

SOURCE: BIS

Financial authorities typically involve supervision staff throughout the SupTech life cycle.

Financial authorities recognise that supervisory staff need to play critical roles in every stage of the SupTech life cycle to achieve buy-in and, thus, successful deployment of SupTech tools.[15] Supervisory staff are the source of ideas for what SupTech tools to develop based on their experience doing supervision work. Supervisors are the testers and the ultimate users of SupTech tools and, thus, provide continuous feedback for further enhancements. Moreover, when deploying SupTech tools, financial authorities recognise the importance of making supervisors aware that such tools exist. This can be an important component for successful deployment.[16]

Financial authorities are exploring various SupTech use cases.

As mentioned, financial authorities recognise the importance of engaging supervisory staff in, among others, the identification of SupTech tools to develop. This results in a wide variety of SupTech tools that financial authorities are developing and/or using. This is reflected, for example, in the multitude of use cases presented in various FSI papers on the topic. In the July 2023 BIS survey, respondents were asked what their most widely used SupTech tools were. Responses range from tools for: (i) regulatory reporting and analysis, including data visualisations; (ii) text analysis of various regulatory filings and other documents through the use of natural language processing (NLP); (iii) process automation including integrated supervisory solutions; (iv) financial risks assessment, including not just for credit risk but other risks as well; and (v) monitoring relatively newer supervisory issues, such as cyber risk and cryptoasset exposures.

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15 See Beerman et al (2021).

16 ibid.

Resourcing and digital skills challenges are common across financial authorities.

The resource and skills challenges have been mentioned in almost all FSI papers on SupTech. The lack of the right digital skill set within financial authorities is a common acknowledged challenge. Therefore, financial authorities in general are shifting their hiring strategy to attract more people with stronger digital skills, in addition to the more traditional supervisory skills and background. This includes increasing the hiring of staff with innovation-related background and skills, such as on Information Technology (IT) and data science (Chart 2). They are also ramping up their training efforts in these areas.[17]

Chart 2
Hiring practices of financial authorities
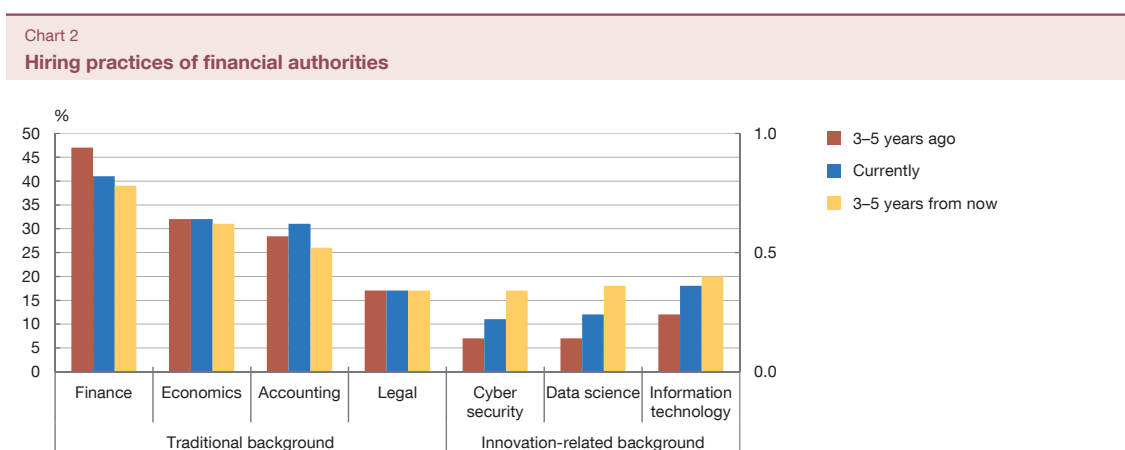
SOURCE: Crisanto et al (2022).

The resource challenge is not just limited to having staff that can develop SupTech tools but also the digital mindset in the new technology era. Financial authorities also recognise the need to develop basic digital skills and literacy of all supervisory staff because these aid in the greater acceptance of new SupTech tools. While financial authorities do not expect their supervisors to have a high level of technical expertise in data science, they expect them to have at least the basic skills, e.g. data cleaning, visualisation, etc.

Financial authorities are interested in cross-border collaboration in the area of SupTech.

FSI papers have pointed out that international collaboration can help accelerate SupTech development.[18] The FSI's Informal Suptech Network (ISN) was established in 2018 to contribute to this objective. This was followed by ad hoc groups in global financial standard-setting bodies (e.g. the BCBS and the FSB) and a dedicated working group in the BIS Innovation Network (BISIN). Responses to the July 2023 BIS SupTech survey confirm the significant interest in international collaboration among financial authorities, with knowledge-sharing and capacity building activities as the two most preferred form of international collaboration (Chart 3).

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17 See Broeders and Prenio (2018); Beerman et al (2021); Crisanto et al (2022).
18 See Broeders and Prenio (2018); di Castri et al (2019).

%

- ■ Actively co-develop SupTech prototypes with other authorities
- ■ Knowledge sharing activities (e.g. participating in events or conferences to discuss common issues and opportunities).
- ■ Capacity building activities (e.g. participating in technical trainings, hackathons or TechSprints where we could actively work together with others on proofs of concepts).
- ■ Joining an enviroment where we could have accesss to open source code with other authorities.
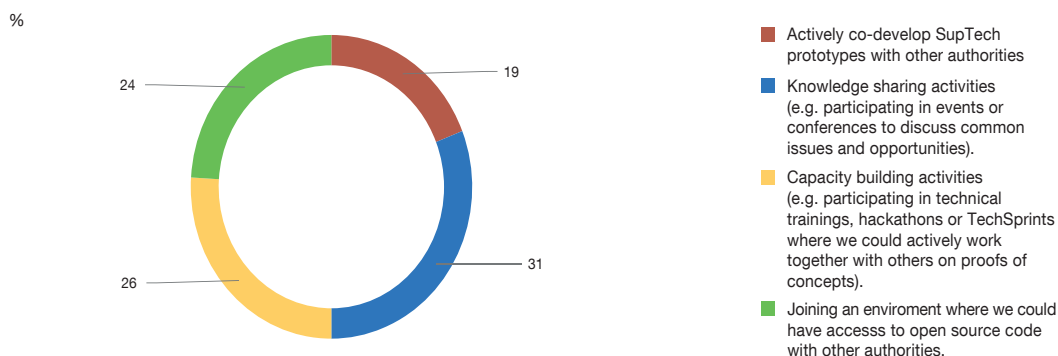
SOURCE: BIS.

5   Findings and Recommendations

The evaluators identified five thematic findings during the evaluation which form the basis for the recommendations. This report has intentionally grouped the findings and recommendations into common themes to optimize the discussion and insights.

    I   The BdE Suptech Roadmap

    II   Governance

    III Introducing new technologies, usage of tools and awareness

    IV   Development of supervisory capabilities

    V   Continuing to benefit from the SSM's SupTech work

I   The BdE SupTech Roadmap

The BdE's Strategic Plan 2024 five strategic objectives[19] are empowered by the digital era. The SupTech roadmap was developed as part of the initiative 4.2.ii "Positioning the Banco de España as a leading prudential supervision institution, especially in terms of credit and technology risk".[20] This makes the BdE one of a small number of financial authorities with an explicit roadmap.

This roadmap is related to other initiatives of the second strategic objective ("Modernising Banco de

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19   These objectives are as follows: (i) to improve the capacity to identify and react promptly to risks to economic and financial stability; (ii) to modernise the Banco de España in order to make it more efficient, flexible and innovative; (iii) to promote excellence through talent management and commitment to employees; (iv) to increase the Bank's influence over its areas of activity; and (v) to generate greater confidence in the Banco de España and greater value for society.

20   The initiative 4.2.ii falls within the fourth strategic objective ("To increase the Bank's influence over its areas of activity").

España to make it more efficient, flexible and innovative") that promotes technological innovation at the BdE through digital transformation, integrated information management and by managing the growing risk posed by cybersecurity. The Information Systems Department (ISD) under the Directorate General of Services takes the lead on these related initiatives, that encompassed the creation of the Data Analysis Hub (DAH) as part of the department. It is therefore important that activities under the SupTech roadmap are closely coordinated with the ISD.

Explore new tools

The BdE's SupTech roadmap is mainly focused on credit risk. In particular, the work focuses on creating tools that leverage the granular credit-related information contained in CIRBE[21] that has long been used in the BdE supervision work. This way, supervision work can optimise the use of granular data available to the BdE.

While the existing Suptech tools of the BdE are quite similar to the tools for credit risk analysis/assessment being used/developed in other financial authorities[22], as mentioned, other financial authorities are also using/exploring a wider variety of other tools. Nevertheless, there is interest among the BdE management and staff in exploring Suptech tools other than those used for credit risk. This is driven by a recognition that supervisory issues are evolving. For example, recent bank failures in other countries point to issues related to business model sustainability, resilience to changes in economic variables, etc. Hence, in discussions with the BdE management and supervision staff, tools for analysing business model sustainability (e.g. forecasting P&L depending on evolution of different variables) is commonly mentioned as something that would be useful. BdE has also started using or exploring tools for other areas, such as NLP for operational risk. Other potential tools mentioned include those in the area of corporate loans, internal models assessment (e.g. having benchmark models to banks' models), assessment of the quality of appraisal reports of mortgage portfolios, climate-related financial risks, governance and analysis of qualitative information more generally.

Recommendations

In the medium to longer term:

Expand the range of SupTech tools. The predominant focus on credit risk tools allows resources to target areas that management deems important. Whilst there is movement in exploring tools for other areas, such as for operational risk, there is significant scope to expand further to other important areas. This would allow a more forward-looking approach in identifying the tools that may be useful as the financial system evolves, as well as to have the flexibility to adapt to new challenges in the financial system. There are already some ideas from both management and staff on potential SupTech tools or on areas where SupTech tools might be useful.

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21 CIRBE (Central de Información de Riesgos de Banco de España) or Central Credit Register is a database including information on loans (direct exposure) and guarantees/collateral (indirect exposure) granted by banks to their customers. It provides reporting agents with monthly aggregate information on borrowers with a cumulative exposure in excess of €1,000.

22 See Beerman et al (2021) highlights of some of the BdE tools.

Develop Agile product backlog. The BdE might consider developing an Agile product backlog based on ideas from supervisors on SupTech needs. An Agile product backlog is a list of products that an organisation wishes to develop or to have in the future. In the case of SupTech tools, this can help identify the range of needs of management and supervision staff and guide the prioritisation of delivery.

Foster coordination

There seems to be not enough awareness of the SupTech roadmap outside of DGBS. In this sense, ISD senior management is not familiar with the SupTech roadmap. It is acknowledged that there was constant contact with relevant DGBS units but there has been no clear communication as to what the SupTech roadmap was about.

There is a formal coordination between the Information Systems Department and all units of the Bank – not just DGBS – which will all be impacted by the technological innovation action plan. Specific to SupTech, there seems to be close coordination at the working level, particularly between the DAH and the Information Analysis and SupTech Division (GAIST, for its acronym in Spanish) and the IT Risk Inspections Division (GIRT, for its acronym in Spanish) of the DGBS. Members of staff of the DAH are invited to selected meetings of the Suptech Network, which the GAIST/GIRT runs.

In addition to this close coordination, the DAH provides guidance (e.g. if GAIST/GIRT develops analytics tools on their own, DAH provides guidance on best practices); capacities (DAH provides resources to help GAIST/GIRT develop its tools, for example tools for CIRBE data analysis); and technology (e.g. Dataiku[23]) to the supervision team.

Recommendations

In the short term:

Socialise the SupTech roadmap to relevant officials in other Directorates General (DGs). This will not only complement the close collaboration at the working level, but it will also ensure broad support for future projects that require coordination and collaboration among different DGs.

Formalise the coordination arrangement and information exchange on SupTech and other innovation initiatives at the middle to senior management level across different DGs. This will also complement the close collaboration at the working level, as well as help identify synergies across similar projects.

Invite on a permanent basis each relevant unit in the BdE (e.g. DAH) to the Suptech Network meetings. This will help staff in relevant units become more familiar with SupTech initiatives in other financial authorities and, in the process, they can help identify technological synergies and alliances.

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23   A technological environment or platform suited to the needs of the SupTech work. This platform empowers the GAIST/GIRT to develop their analytics tools, provides governance and foster the collaboration among their team members.

Leverage the data science community

The use of data science tools – and the use of AI and Machine Learning (ML) in particular – also happens in other parts of the BdE, not just DGBS. It seems there is coordination among the different units within the BdE that use similar tools.

There is an active data science community which encourages all data scientists to be involved with a range of initiatives. The value of this large data science community seems well appreciated by DGBS staff involved in SupTech work. This made them aware of data science projects in other DGs. However, they mentioned that they were not offering as much information as the staff at other DGs because of the perceived confidentiality of information within DGBS.

The evaluation identified SupTech as an organic hub and spoke model to support the overall SupTech ambitions. However, a number of opportunities to strengthen the pockets of enthusiasm for SupTech were identified. The BdE could benefit from further increasing the inclusion of all SupTech and data science enthusiasts with a wider initiative, noting this may require additional effort to fully embrace and benefit.

Recommendations

In the short term:

Leverage the large data science community in the BdE by inviting all interested the BdE staff to presentations, workshops, demos, etc. on SupTech tools. This will make SupTech work more visible outside of DGBS, thus further fostering information exchange among staff across the BdE that might be doing similar things.

In the medium to longer term:

Creation of BdE-wide data science workbench. GAIST/GIRT are already using Dataiku. This could be opened up to other data scientists in the bank so everyone can access and use common tools, languages, apps and data. This can accelerate delivery of data science projects, increase knowledge, enable the sharing of codes and minimise repeatable activities.

II Governance

Balance the number of staff and tasks

The Director General of DGBS serves as the SupTech 'sponsor' by fostering and allocating resources to the SupTech initiative. The role of a visible and influential sponsor is important to address the challenges and achieve the benefit of SupTech.

Delivering the BdE SupTech strategy is a multi-pronged approach. Internally within DGBS, there is a

Suptech Committee composed of the Director General and the two Associate Directors General. The heads of the two groups responsible for the operational aspects of the SupTech function – GAIST and GIRT – report to the SupTech Committee on the key milestones of the SupTech work.

GIRT focuses on SupTech coordination/interaction with the SSM. Internally, GIRT represents the DGBS in coordinating the digitalisation initiatives under the Strategic Plan 2024, which are interrelated to the SupTech work. Within GIRT, two staff are dedicated to SupTech work, while the rest focus on their core IT risk inspections responsibility.

GAIST handles the development of SupTech tools for the BdE. This comes with other responsibilities as well, such as raising awareness among staff of the new tools, training staff to use the tools and responding to questions from staff about the tools. In addition, as its name suggests, GAIST is responsible for centralised information analysis within DGBS. More concretely, GAIST manages supervisory databases and provides information and analyses to senior management and other units to support decision making.

GAIST and GIRT manages the SupTech Network, composed of interested staff within the DGBS. This is the main informal forum to disseminate the SupTech initiatives. SupTech Network serves a key channel to engage colleagues on SupTech. This network gives colleagues the opportunity to help shape and direct the future SupTech roadmap. In addition, it gives the opportunity to provide feedback and prioritisation of SupTech tools to ensure the users continue to be at the core of the delivery journey.

Recommendations

In the short term:

Review the balance of the number of staff and tasks assigned to GAIST. The group's limited staff are doing multiple things – from developing SupTech tools (including the other tasks it entails, e.g. training staff, responding to queries) to providing centralised information analyses. It is not unusual for the SupTech function to be embedded in the information analysis function. Other authorities are doing the same. At the same time, it is important to ensure that appropriate buffer is in place, for example, to mitigate staff turnover.

In the medium to longer term:

Introduce SupTech data analytics career paths and secondments from other units within the BdE. This could be a way to ensure a pipeline of personnel doing SupTech work in the long term, as well as provide staff support to GAIST in the short term.

Data governance

The growth of data collected by firms plus data created by colleagues show a steep trajectory of the data underpinning supervisory decisions. Similar to other financial authorities, the focus has widened to how data is created, trusted, relied upon and central to decision making.

As part of the BdE's Strategic Plan 2024, the initiative 2.4.iv "Data governance programme"[24] aims to set a data governance model that ensures efficiency, integrity, quality and transparency in the management of the BdE's data. As a consequence of this initiative, the current data management process is being improved. However, the BdE has not yet a comprehensive and strong Data Management Policy in place.

Recommendations

In the short term:

Identify, document and agree the data lifecycle using the common entrance and exit points across key data. The data lifecycle should be carefully articulated to ensure all colleagues understand the journey and the relevancy of their roles.

In the medium to longer term:

Enhance the Data Management Policy. The BdE is facing a common challenge with growth of data purchased, created and collected from firms. There is an opportunity for the BdE to fully optimise its data by ensuring a strong Data Management Policy is in place. This Policy should underpin all stages of the Data Management lifecycle.

III   Introducing new technologies, usage of tools and awareness

Identification, decision and implementation of projects

Identification of potential SupTech tools was initially done through a stocktake of users' needs. Now, the Suptech Network is the main source of ideas of potential SupTech tools to develop. Supervision staff that are not members of the Suptech Network can also contribute ideas through the Confluence platform.[25].

There is an established process for deciding on SupTech projects. First, ideas of potential SupTech projects come in two forms:

a) A specific need is identified that can be potentially addressed by a SupTech tool. In this case, the SupTech team will do a cost-benefit analysis (i.e. difficulty of developing a tool vs expected benefits).

b) A tool is currently being developed by a DGBS unit. In this case, the SupTech team will provide support in terms of expertise in developing the tool and the infrastructure, as well as help in scaling the tool.

Identified projects are then prioritised based on whether they are aligned with the strategic plan, availability of resources, experience on similar projects, etc.

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24 The initiative 2.4.iv falls within the second strategic objective ("Modernising the Banco de España to make it more efficient, flexible and innovative").

25 This is a platform where users can have a comprehensive view of all the available SupTech tools, including information about the tools, and accessing to actually using the tools.

After the identification and decision of projects, the SupTech team will assess whether the project will be done:[26]

a) Within DGBS, if there are enough resources and knowledge about the topic.

b) To be jointly developed with the BdE's IT, if there are not enough resources in DGBS or if there is a need for an IT infrastructure to support the tool.

c) To be jointly developed with the SSM, if the idea is worth sharing or if someone else within the SSM is working on a similar project.

Usage and awareness of Suptech tools

There seems to be an organic appetite to use SupTech tools. The organic appetite is a strong indicator of a workforce ready to evolve its use of SupTech tools in the digital era. The aforementioned appetite is and should continue to be heavily supported by all grades in the BdE to ensure the embedding of a digital organisation is successful in the long term.

Interviews with actual users of the SupTech tools show that these are greatly appreciated. This is particularly the case when it comes to the CIRBE dashboards. The dashboards enable them to make comparisons across different banks, challenge banks' claims, see trends and even check the quality of banks' data.

Whilst the Evaluators did not have the opportunity to explore all of the SupTech projects and initiatives that are not yet finished, it was clear that there is a considerable number of them. This is both an opportunity and challenge for the BdE. It is an opportunity because it shows strong engagement from colleagues that demonstrates the need for SupTech. However, the challenge is to meet and balance the needs of colleagues which is a consistent act of prioritisation.

It is our understanding that there is some straight-through processing (STP), with the Confluence platform being connected to the data sources, so users can access and use the SupTech tools from the platform without having to manually import the required data. STP is a common need that some authorities are still working on.[27]

The GAIST and GIRT are active in conducting workshops on how to use the SupTech tools, as well as live demos, forums, engagement initiatives, etc. However, there is an impression that awareness of the tools is still mostly through word of mouth.

There is already some level of awareness of the SupTech work in general, but it is not fully comprehensive. For example, many know about the Confluence platform, but most of the interviewees view the platform mainly as a training tool. This can be explained by the fact that some of the interviewees are responsible for things like AML, liquidity and market risks, while the SupTech tools are focused on credit risk.

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26 So far, there have been 40 SupTech projects in various stages (experimentation, development and operational).

27 See Expert Group (2023).

In addition, there seems to be confusion between statistical or programming software that has a wide variety of uses (e.g. Python, R, Tableau, etc.) and SupTech tools (which are basically tailor-made applications for supervision purposes using statistical/programming software). When asked about SupTech tools, interviewees refer to the former.

In that sense, despite the aforementioned organic appetite to use SupTech tools, many supervisors interviewed expressed a preference for and confidence in using Excel, rather than the newer statistical/programming software. Since they are more familiar with Excel, using it saves them time and enables them to meet deadlines. They learned about the new software in training courses, but the challenge is in applying them to their work. This highlights the importance of providing support to supervisors in terms of making the tools more accessible and providing upskilling opportunities (see "IV. Development of supervisory capabilities" below).

Recommendations

Enhance the accessibility of existing SupTech tools. There are a number of things that the BdE may consider:

In the short term:

a) Ensure friendly user interfaces. In this regard, it might be worthwhile to reexamine how to make outputs of network graphs more approachable to users. By exposing supervisors to user-friendly advanced analytical tools, this could also foster interest among them in data analytics in general. In the long term, this could establish a pool of data savvy supervisors. So this is a gradual approach to changing existing mindset and culture by making it easier for people to try new things.

b) Make available to onsite and/or offsite supervisors the tools that would be potentially useful to them. The transition matrix, for example, is one potentially useful tool particularly for offsite supervision because it is able to slice and dice data by banking group and by portfolio. Yet, this is used only for "central monitoring". It would be useful if this tool gets used by supervisors and for them to provide feedback on whether the tool's output corresponds to what they are seeing on the ground. This can also help improve the tool further.

c) Formally integrate the tools in supervisory processes. This could be done by having guidance as to which point in the supervisory process a tool has to be used. For example, there could be guidance as to when exactly supervisors should look at the CIRBE dashboards or the network graphs, etc. Integration within the Supervisory Handbook could further embed the use of SupTech tools. This would ensure that the tools are used and not forgotten once deployed and that all the resources that went into developing the tools are not put to waste.

In the medium to longer term:

d) Provide a single platform to access all data sources, all SupTech tools and other supervisory applications. Currently, all SupTech tools apparently can be accessed through the Confluence platform, but other supervisory applications seem to be accessed separately. Having a single platform will make it more efficient for supervision staff to find the right information and the right tools. This would increase usage, maximise data and help gain more insight for supervision.

Tracking the usage

With regard to tracking effectiveness or usage of the existing tools, key performance indicators (KPIs) are not formally established. It does not seem like usage of the tools by supervisors is being monitored and/or feedback from users systemically collected. One indicator of "success" pointed out was the designation of the BdE by the European Central Bank (ECB) as a "SupTech center" for two of the tools.

Recommendations

In the short term:

Track usage of and feedback on the various SupTech tools. This is a simple way to gauge how useful (or not) these tools are to supervisors and whether there are some improvements that need to be made.

IV   Development of supervisory capabilities

Digital mindset

One common theme observed during the Evaluation was the emerging digital culture. Whilst there are pockets of advanced digital culture, the overall levels vary in terms of open mindset and skills. The Evaluators engaged a variety of end users and found whilst most were aware of SupTech, the integration with daily life varied considerably. It should be highlighted how the BdE intends to embrace a digital mindset, for example moving to a default position of real-time feeds for senior briefings rather than a static PowerPoint; or reliance on automated data to make decision making without human interaction. The move to a more digital mindset is a considerable undertaking for the BdE noting that similar central banks are also early on the journey.

In this regard, it is worth highlighting that the Bank of England and the ECB have introduced executive coaching programmes to enable the digital mindset. These coaching and learning experiences are designed to accelerate the future of supervision and shape the future culture. It is an opportunity for the BdE to consider how the leadership programmes could be expanded to embrace this initiative.

Recommendations

In the medium to longer term:

Establish a BdE-wide digital skills programme to enable all colleagues to work in a digital manner. This should be carefully articulated to cater for all colleagues in different roles to confidently use different tools and demonstrate digital behaviors.

Establish an executive coaching programme to enable the digital mindset. The BdE should formally consider reviewing and creating a leadership programme to enable digital leadership.

Capacity development activities

There is a need to support Supervision through both internal and external certified training, and a growing appetite to learn and develop advanced skills, e.g.: SQL, Python, R, and visualization techniques. Similar to other financial authorities, the range of levels of training need to meet both a typical supervisor (non-technical) and a data/technology colleague.

During the Evaluation, it was clear the traditional of multidisciplinary teams which now include SupTech skills is an important step to a digital modern workplace. Evaluators understand a skills survey has been undertaken to assess the use of data tools and languages and this could be repeated to assess the growth of the skills.

Digital skills should be seen as a multi-faceted offering, covering mentoring; independent learning; certified learning; workplace culture and ways of working. The multi-faceted offering enables a long-term embedding of a digitally skilled workforce to meet the SupTech challenge. It should however have clear measurement of success, through usage of tools; surveys and shifts in behaviours.

HR has built a clear list of skills using courses taken and identified interests. This skills list will be invaluable as the BdE grows its digital skills ambitions to fully exploit the investment in data and technology. HR should continue to engage SSM to leverage the existing digital skills programme to gain further benefits and insights.

HR also now conduct a yearly survey on training to support priorities of different the BdE functions, including supervision. This survey directly feeds into the design and prioritisation of training. It is important to note that the 2023 survey focus is SupTech and IT risk. The insight from the survey should feed into the 2024 SupTech training programme to fully exploit and align the needs of supervisory users to tech investment.

It is worth highlighting that supervision staff can take advantage of the many training opportunities on data analytics and data science provided by the the BdE HR (as mentioned, it now has a formal process for consulting on the training needs of different the BdE units), DGBS, the ISD (particularly its Data Hub) or by the SSM. In addition, specialised master's programmes are also offered to key staff. The training unit within DGBS also organises tool-specific trainings or awareness sessions once a SupTech tool is deployed.

However, there is no structured training programme on data analytics yet that is targeted specifically to supervision staff. The training unit of DGBS is planning to develop one, with the first potential cohort consisting of supervisors that are known to have interest in this area.

A further positive development is the offering of mentoring to colleagues on specific SupTech tools. Mentoring is a good practice to provide customized and often highly positive experiences for colleagues. It is important to note that mentoring is focused on particular subjects not by grades or particular career groups. The objectives of mentoring should also be clear and sufficient resources and time should be

allocated. This is the industry standard so it is important to continue to evolve mentoring subjects based on evolving demand. The mentoring should consider how to grow in size to fully meet the expected demand by supervisory colleagues.

When it comes to skills, the introduction of SupTech tools needs to be accompanied by a corresponding data expertise and mindset in order for the institution to become more data driven[28]. In general, the impression from the interviews is that young supervisors are already able to manage and use data on their own (ie they are comfortable using data analytics tools). However, this skill may need to be embedded with the rest of the supervision staff. Retaining staff with the right skills is another challenge because of competition from banks and international organisations. For retained staff, they need to be provided regular training as well to keep their skills updated.

The resource challenge – from having the time to having the right skills – is a common theme across all the interviews. For general supervision staff, finding time to study new tools can be challenging. The continued need for strong data skills as well as skilling up all colleagues is a multi-year large investment which should be undertaken as a joint embedded initiative with HR.

Recommendations

Strengthen resources and capacity development activities. The following may be considered in trying to address the challenges:

In the short term:

    a) Ensure SupTech work is viewed as a core enabler for main supervisory responsibilities. SupTech is designed to help supervisory processes more efficient and effective, not to complicate them. As such, sufficient time should be allocated for staff to learn about new SupTech tools, which should be distinct from the time they use for actual supervision work.

In the medium to longer term:

    b) Pursue the DGBS training unit's plan to establish a structured training programme on data analytics for supervisors. This structured programme should have different tracks depending on the type of supervision staff. A basic programme may be sufficient for general supervision staff, while a more technical and detailed programme is needed for specialist staff, such as those involved in developing SupTech tools.

    c) Integrate training on existing SupTech tools in the supervision training programme. For example, when learning about supervision work or processes at the BdE, staff should also learn about the various tools at their disposal including SupTech tools. This can accomplish two things: one, it will raise awareness among supervision staff of the various SupTech tools available and how these can be helpful in their work; and second, it will help embed SupTech tools in supervision work and avoid the current situation where supervision staff do not find time to learn and explore these tools.

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28 See di Castri et all (2019).

d) Integrate introduction to existing SupTech tools in the induction programme for new staff. New DGBS staff undergo a three-month induction programme. It will be a good opportunity to introduce SupTech tools and how they are used for supervision work. Like above, this will raise awareness about the tools and help embed them in supervision work.

V Continuing to benefit from the SSM's SupTech work

The BdE staff is actively involved in the development of SSM SupTech tools and their deployment within the BdE, as a result of the close coordination within the SSM on different levels:

a) Steering Committee for Digital Agenda (SCDA): provides strategic guidance on the SSM's digital initiatives including Suptech; the BdE is represented in the SCDA by the Deputy Governor.

b) Supervision Innovators Forum: coordinates all the work related to digital innovation and SupTech, contributes to the identification of business needs and evaluates new and ongoing initiatives and use cases; the BdE is represented in this forum by the heads of GAIST and GIRT.

c) SSM Innovation Teams: bring together supervision, IT and SupTech experts from across the SSM to work on specific projects.

In this regard, there are two consistent themes that emerge:

First, it was clear that colleagues used the SSM tools and felt confident in using them in a regular manner. However, all the SSM tools are not fully deployed to relevant the BdE staff. In fact, some SSM tools or features could not be accessed by the BdE staff, and the access process or who was in charge for access was not very clear. The move from "proof of concept" to "product delivery" is an important step on the SupTech journey. Similar to other financial authorities, the gap between these two stages are wide and often constraint by lack of capabilities and/or capacity. However, for the BdE to fully gain the benefits of the SSM tools, there needs to be a focus to deploy the products on a continued and effective basis.

Second, the ability to tailor to the BdE needs was limited in most the SSM SupTech tools. This needs to be examined further to fully understand whether the tools do need tailoring or whether this is an opportunity to adjust the BdE processes.

Furthermore, a recent development in the SSM is the move away from centralising development of the SSM tools and having staff at national competent authorities (NCAs) be seconded to the SSM for this purpose. "Suptech Centers" will instead be identified who will then take the lead in developing tools that will be used for the whole the SSM.[29] In this regard, for two of the tools – coropleth maps and network graphs – the BdE has been confirmed as a Suptech Center, which could be seen as an outcome from strong influence at different levels of the SSM coordination and provides considerable benefits to advancing the BdE SupTech agenda.

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29 This change is meant to address the impact on NCAs' resources. For example, so far, six the BdE staff have been seconded to the SSM to help develop specific tools.

As the BdE continues to drive SupTech as an enabler for its Strategic Plan, there is opportunity in widening its influence globally. It is worth noting the increasing active engagement of the BdE staff in the FSI's ISN and BISIN Regtech & Suptech Working group.

Furthermore, as the BdE continues to prioritise the SupTech vision through the SSM SupTech Centre and beyond, there is an opportunity for BdE to take a more active or even leading role in international SupTech discussions The BdE has an opportunity to showcase their leadership in SupTech through various regional and international fora.

It should be noted that the ECB are due to refresh their current digital strategy in 2024. Therefore, continued alignment to drive further synergies should be a key theme of work both within the BdE and the SSM.

Recommendations

In the short term:

Improve coordination with the SSM in the deployment of SupTech tools. This coordination in terms of identifying and developing SupTech tools appears well established. However, coordination with the SSM when it comes to deployment of the tools may need to be improved. The comments from supervision staff with regard to accessibility of some the SSM tools/features should be investigated and addressed. It could well be that the SSM and other NCAs' staff also have problems accessing BdE-shared tools. This could be due to a number of reasons, including possibly IT security policies that may not be aligned. These policies are important to be aligned when moving from a closed environment during the development stage to a shared environment during the deployment stage.

Reexamine the efficiency opportunities in adopting SSM SupTech tools in the BdE. The evaluators identified a number of limitations in the adoption of SSM tools at various levels to meet BdE processes. To increase efficiency in the tools, it could be considered that this is an opportunity to adjust the BdE processes instead of changing the tool which takes significant effort and time. The BdE should consider reviewing core common processes to see whether these can be aligned to the SSM tools and therefore reduce the effort in tailoring. The end-goal is to try to reduce FTE effort by examining this current situation.

In the medium to longer term:

Develop a more active or leading role in regional and international SupTech work. The BdE can leverage its strategic role as one of the SSM SupTech Centres by taking on a more active or leading role in regional and international SupTech discussions, as well as in potentially coordinating or collaborating on international SupTech work.

6 Conclusion

Overall, the BdE has made significant progress in its SupTech journey. It is comparable with its peers on most SupTech practices but is ahead of many financial authorities when it comes to establishing an explicit SupTech roadmap that guides their journey. This enabled the BdE to have a targeted and structured approach to its SupTech initiatives and is well placed for becoming a SupTech leader.

Support from leadership for Suptech is clearly present as manifested by involvement of senior management in the governance of Suptech work and the allocation of dedicated resources. This evaluation work is also testament to this support from leadership of the BdE.

This evaluation report will hopefully provide some useful inputs in continuously refining the SupTech roadmap, as well as further impetus that will sustain the momentum observed so far in the BdE's SupTech work programme.

Abbreviations

AI	*Artificial Intelligence*
AML	*Anti-Money Laundering*
BCBS	*Basel Committee for Banking Supervision*
BdE	*Banco de España*
BIS	*Bank for International Settlements*
BISIN	*BIS Innovation Network*
CIRBE	*Central de Información de Riesgos de Banco de España*
DAH	*Data Analysis Hub*
DG	*Directorate General*
DGBS	*Directorate General of Banking Supervision*
ECB	*European Central Bank*
FCA	*Financial Conduct Authority*
FSI	*Financial Stability Institute*
GAIST	*Information Analysis and SupTech Division*
GIRT	*IT Risk Inspections Division*
HR	*Human Resources*
IT	*Information Technology*
ISD	*Information Systems Department*
ISN	*Informal Suptech Network*
KPI	*Key Performance Indicator*
NCA	*National Competent Authority*
NLP	*Natural language processing*
SCDA	*Steering Committee for Digital Agenda*
SSM	*Single Supervisory Mechanism*
STP	*Straight-Through Processing*