Financial Stability
Institute

FSI Insights
on policy implementation
No 58

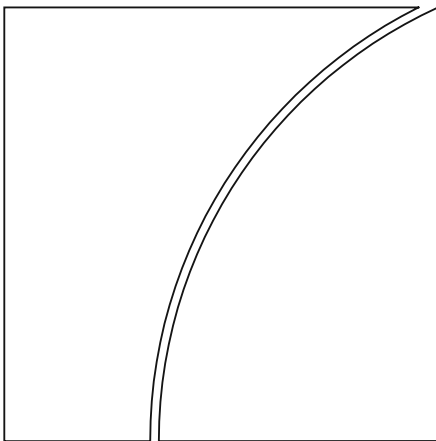Peering through the hype –
assessing suptech tools'
transition from
experimentation to
supervision

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June 2024

BANK FOR INTERNATIONAL SETTLEMENTS

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Executive summary

Recent episodes of banking stress underscore the need for supervisors to identify issues at an early stage and ensure that financial institutions address them adequately. However, a lack of adequate resources, such as effective tools, affects supervisory authorities' ability to act in a timely manner. To address this, aside from making continuous investments in human resources, authorities are also continuing to explore and develop new supervisory tools enabled by new technologies.

In this context, much hope is pinned on the promise of supervisory technology (suptech) to help enhance supervisory ability. Suptech is defined as innovative technology used by supervisory authorities to support their work. Many supervisory authorities have been experimenting and developing suptech tools for several years. The development of generative artificial intelligence (GenAI) technology provides further fodder for experiments and an additional boost to the potential of suptech as a transformative force in financial supervision.

An increasing number of suptech tools have been deployed over the years, but whether they have been effectively embedded in supervisory processes, ie whether they have become critical to supervision, remains unclear. While the FSI has produced several papers on suptech, the focus has been more on experimentation and development. This has resulted in an understanding of good practices in these areas. When it comes to deployment, some evidence points to challenges that prevent deployed tools from being effectively embedded in supervisory processes. It is important therefore to identify practices that could address these challenges.

This paper identifies factors that could contribute to making suptech tools critical to supervision. It synthesises insights from the existing body of work of the FSI on suptech, responses from 32 supervisory authorities to a survey focused on suptech deployment, and interviews with selected authorities. The aim is to help supervisory authorities maximise the potential of their deployed suptech tools to enhance the efficiency and effectiveness of their supervisory processes.

Successfully deploying a tool does not necessarily translate to the tool becoming critical to supervision. Supervisory authorities use a range of measures in assessing successful deployment of a tool. These include the level of usage and the time saved by users. When it comes to defining a tool's criticality to supervision, supervisory authorities are practically unanimous: suptech tools that are critical to supervision are those that are indispensable in carrying out a supervisory process or parts of it.

Only about half of respondent authorities reported having suptech tools that have become critical to supervision. This is far fewer than the almost three quarters of respondents that reported having successfully deployed tools. Not surprisingly, the top areas where successfully deployed or critical tools can be found are the same areas where most suptech tools have been deployed so far. These areas are data visualisation, regulatory reporting, financial risk assessment and supervisory automation. Interestingly, fewer than half of the authorities with successfully deployed suptech tools reported having such tools for financial risk assessment, but almost two thirds of authorities with critical tools reported

having them for the same purpose. This implies that while it may be challenging to successfully develop and deploy financial risk assessment tools, the impact on supervision could be significant when implemented effectively.

Supervisory authorities with a suptech strategy are more likely to have suptech tools that are critical to supervision. Survey responses show that more authorities with a suptech strategy reported having such critical tools, while the opposite is true for authorities without a strategy. The same observation can be made when it comes to successfully deployed tools.

Suptech tools that have not become critical to supervision face common problems. These tools typically have limited user accessibility, either because they do not have direct user interfaces or because it takes specialised skills to run these interfaces. Other issues relate to data and on-premises computing power. The latter is influenced in turn by authorities' approaches to their IT infrastructure. Other tools are also very use-case specific and needed to be tweaked for other uses.

Suptech tools that have become critical to supervision fit naturally into existing supervisory processes by addressing specific pain points. Tools that add an additional step to supervisory processes or that create another process tend to receive – at best – a lukewarm reception from supervisors. This is especially the case if supervisors do not have an appreciation of the value of these additional steps/processes from the start. This highlights the important role that supervisors should play in identifying suptech tools to develop. At the end of the day, suptech tools should address the needs of supervisors and not introduce things that may only be considered as "nice to have".

Critical suptech tools tend to be seamlessly integrated into systems used to carry out supervisory processes. This allows for straight-through processing of information, with the data collection system able to interface with different analytics applications and tools. This highlights the importance for supervisory authorities of having a holistic and forward-looking approach in planning the IT infrastructure, systems, applications and tools that support supervision, ie their supervision IT ecosystem. The development and deployment of suptech tools should be viewed in the context of this overall ecosystem and not in isolation.

Critical suptech tools leverage granular data. Financial authorities that have collected granular data historically are able to develop tools that make it more efficient to organise, interrogate and analyse these data. This in turn makes it easier to extract useful insights from them. Hence, it is important for financial authorities to enhance their data collection practices first before pursuing the benefits of data analytics tools.

Suptech tools that are critical to supervision are easily accessible by users who have confidence in using them. Suptech tools that do not have direct user interfaces and require intervention by specialist staff or that do not have user-friendly interfaces create unnecessary "barriers to entry" to their use. In this regard, supervisory authorities are turning to new technologies, such as GenAI, to make suptech tools more accessible to users. However, making sure that suptech tools can be easily accessed by supervisors is not sufficient on its own. Supervisory authorities also need to foster confidence among supervisors to encourage them to use the tools. This involves ensuring that supervisors understand the objectives of the tools, their capabilities and their limitations.

These insights point to the importance of a process-focused rather than an issues-focused approach to suptech work at the international level. International experimentation work on suptech is focused on issues like climate-related financial risk and cryptoasset monitoring, which are helpful in illustrating how tools might be developed for specific issues. However, the degree of usability by national authorities could be limited if there is limited consideration of how they supervise these issues. For each issue of interest, it might be important to have a clear understanding of the common steps in supervisory processes and the common challenges national supervisors face in working through these steps. A clear understanding of supervisory process could be useful in the identification of suptech experiments at the international level.

Section 1 – Introduction

1.   **Recent episodes of banking stress have highlighted the importance of supervisors' ability to act in a timely manner.**[2] Supervision needs to up its game and identify weaknesses at an early stage and act forcefully to ensure that banks address them.[3] The ability to act, however, is affected by an authority's resources. Inadequate resources can lead to delays and deficiencies in internal processes relating to assessment, escalation, reviews and decision-making.[4] Indeed, there appear to be resource constraints at many authorities, with major financial centres appearing to face more significant constraints.[5] Many authorities are trying to address this through continuous investments in human resources. Many are also complementing these efforts with investments in tools enabled by new technologies.

2.   **Supervisory technology (suptech) has been touted as being able to help enhance supervisory ability.** Suptech is defined as innovative technology – ie big data, artificial intelligence (AI) or machine learning – used by supervisory authorities to support their work.[6] Suptech tools can automate supervisory authorities' data collection and data analytics processes, making them more efficient and contributing to their effectiveness. Developments in GenAI technology have provided a further boost to the potential of suptech as a transformative force in financial supervision.

3.   **Supervisory authorities have been experimenting and working on the development of suptech tools for several years.** The term "suptech" was coined in 2017.[7] Since then, the FSI has produced several papers on the topic, which extensively cover suptech experimentation and development work. These papers were informed by contributions from members of the Informal Suptech Network (ISN), which was established by the FSI in 2018 as a forum for sharing suptech practices and experiences. The papers therefore identified good practices in authorities' suptech work.[8] These include obtaining management buy-in and support; involving supervision staff throughout the suptech life cycle (ie during the identification, development, testing and deployment of the tools); creating a culture of innovation; ensuring the availability of relevant staff skills; and following a well-defined suptech strategy.

4.   **However, it is not clear so far whether deployed suptech tools have actually had an impact on supervision and realised their transformative potential.** Over the years, supervisory authorities have deployed suptech tools. Previous FSI papers cover these but do not really examine how embedded these tools have become in supervisory processes. As an increasing number of suptech tools are moving from experimentation through development to deployment, teasing out how these tools have actually benefited supervision is important. This could provide lessons for more effective deployment.

5.   **Some evidence points to challenges in deploying suptech tools.** Suptech analytics tools may have been successfully developed, but their use may still rely on manual processes to extract and analyse data since there are no mechanisms in place to allow easy extraction of customised datasets from the data warehouse.[9] Progress in the development of suptech tools may need to be accompanied by efforts to

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[2]   Supervisors' willingness to act, however, is another issue and one that suptech cannot help with.

[3]   Carstens (2023).

[4]   Adrian et al (2023).

[5]   Coelho and Guerra (2024).

[6]   di Castri et al (2019).

[7]   Menon (2017). It is worth noting, however, that while the term "suptech" is relatively new, financial supervisors have always used different generations of technology to support their work (see di Castri et al (2019)).

[8]   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).

[9]   Dahlgren et al (2023).

more effectively embed these tools and make them critical to day-to-day supervision.[10] Discussions with ISN members also allude to some deployment challenges, such as acceptance by supervision staff.

6.   **This paper identifies the factors that could contribute to effectively embedding suptech tools and making them critical to supervision.** It aims to complete the picture by complementing the previous papers, which focused more on suptech experimentation and development, with a paper that focuses on deployment. It identifies the types of suptech tools that have so far been effectively embedded in supervisory processes and those that have not, their characteristics and the deployment practices that may have contributed to the outcomes. It is hoped that this will help supervisory authorities to deploy suptech in a way that optimally exploits its potential to enhance the efficiency and effectiveness of financial supervision.

7.   **The paper synthesises insights from several sources of information.** It benefited from a review of the existing body of work by the FSI on suptech, as well as from a survey of ISN members on suptech deployment-related issues. The survey was conducted in February and March 2024 and received 32 responses.[11] Interviews with eight authorities supplemented the survey by examining authorities' experiences in deploying specific suptech tools.[12] These authorities were chosen because they have active suptech work in place that is covered in previous papers. Section 2 provides the survey results. Section 3 describes supervisory authorities' experiences in deploying specific suptech tools. Section 4 profiles suptech tools that have become critical to supervision. Section 5 concludes the paper.

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[10]   Packard and Prenio (2024).

[11]   See Annex 1 for a list of respondent authorities.

[12]   Annex 1 also indicates which authorities were interviewed.

Section 2 – Survey results on deployment of suptech tools

8.   **Many supervisory authorities have now deployed suptech tools.** In a survey of 50 supervisory authorities conducted by the FSI and the BIS Innovation Hub in 2023, only three reported that they did not have ongoing suptech initiatives.[13] Of those that have ongoing suptech initiatives, only three reported that they had not deployed any suptech tools (Graph 1). This indicates that supervisory authorities have now largely progressed from experimenting –to fully implementing their suptech tools, or at least some of them.

Deployment of suptech tools   Graph 1
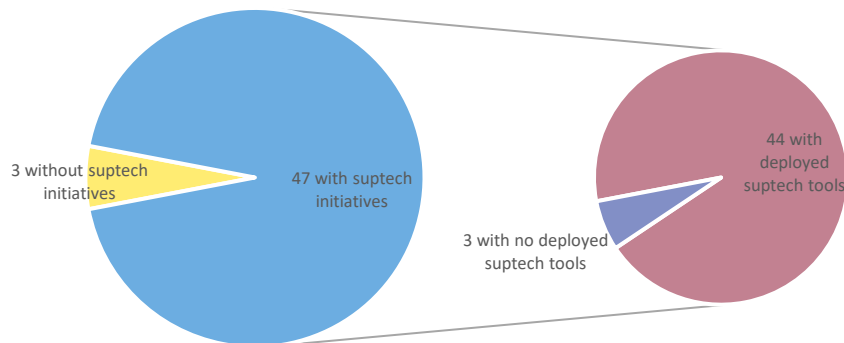
Source: FSI and BIS Innovation Hub.

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9.   **Supervisory authorities conduct a number of activities after deploying newly developed suptech tools.** These activities are meant to promote the uptake of the new tools. Almost all authorities accompany the deployment of a suptech tool with corresponding training for supervisors, particularly those using the tool (Graph 2). Most but not all authorities conduct information campaigns and develop written guidance on how to use the tool. Respondents also mentioned collecting user feedback, monitoring user activities, providing ongoing user support and sharing key insights from the tool on a periodic basis to drum up interest.

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[13]   Prenio et al (2024).

Activities conducted once a suptech tool is deployed   Graph 2
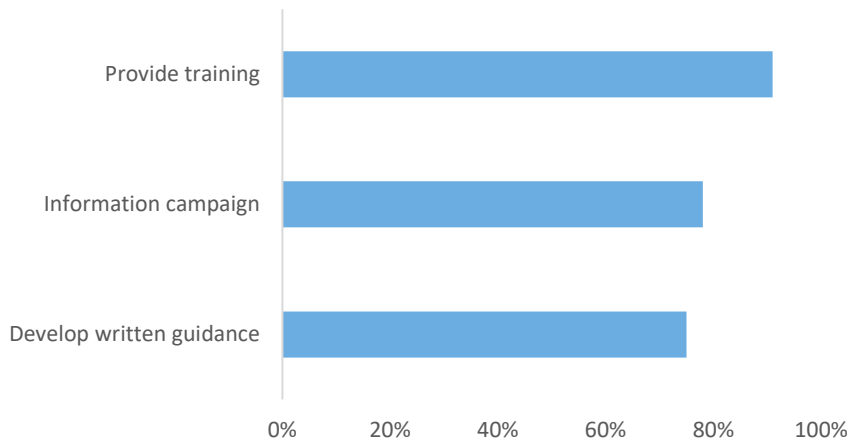
Source: FSI.

10.   **A majority of authorities explicitly assess the success of the deployment of suptech tools.**
More than a third of respondents indicated that they do so (Graph 3, left panel). Among authorities that
conduct such assessments, almost all consider the level of usage as an indicator of success (Graph 3, right
panel). More than a third view time saved as a success factor, while about half look at target user
awareness. Only a small minority of respondents deem the number of supervision issues identified by the
tool as a measure of success. This highlights the fact that most of the deployed tools are meant more to
enhance the efficiency of supervisory processes rather than the effectiveness of supervision.

Assessment of success of suptech tool deployment   Graph 3

Do you assess success of suptech tool deployment?   What measures of success do you use?
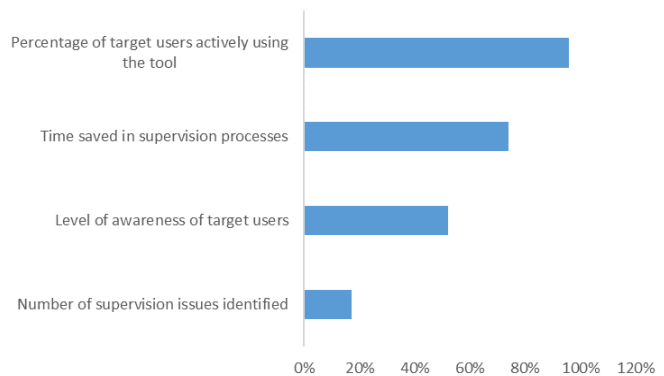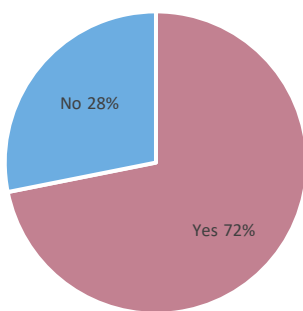
Source: FSI.

11.   **All authorities that assess deployment success indicated that they have at least one suptech
tool that they consider as successfully deployed (Graph 4, left panel).** Based on the measures of
success reported above, this means that target users are now actively using the deployed tools.
Supervisory authorities that have deployed these tools have presumably also benefited from more efficient
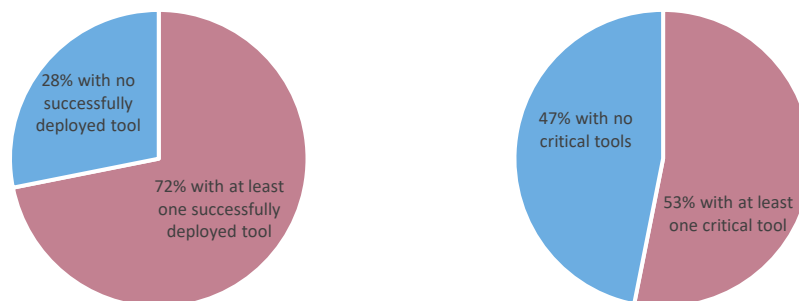supervisory processes because of suptech.

12.   **A significantly smaller percentage of authorities reported having at least one suptech tool that has become critical to their supervisory processes (Graph 4, right panel).** When asked if they have suptech tools that have become critical to their supervisory processes, 53% of the total respondents responded positively. This means that two thirds of the authorities that reported having successfully deployed tools consider these tools to be critical to supervision.

13.   **Supervisory authorities consider suptech tools as critical to supervision if they have become indispensable to carrying out a supervisory process or parts of it.** This was the response by almost all survey respondents. This contrasts with the more diverse measures of success reported by respondents. This more consistent measure of "criticality" is the measure used in the next section in discussing tools that have become effectively embedded in supervision and that thus have a greater impact on it.

Successfully deployed vs critical suptech tools   Graph 4

Source: FSI.

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14.   **Financial risk assessment, data visualisation and automation of supervisory processes are the main areas where critical suptech tools can be found.** Among supervisory authorities that reported having successfully deployed suptech tools, data visualisation came out on top as the main area where these tools can be found, followed by the automation of supervisory processes (Graph 5). Fewer than half of the supervisory authorities reported their financial risk assessment tools as successfully deployed. However, among supervisory authorities that reported having critical suptech tools, financial risk assessment came out on top. This implies that while it may be challenging to successfully develop and deploy financial risk assessment tools, the impact on supervision could be significant if this is done.[14] Not surprisingly, the top areas where successfully deployed or critical tools can be found are the same areas where the most suptech tools have been deployed so far.[15]

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[14]   See paragraph 16 of Section 3 for broad descriptions of some of these financial risk assessment tools.

[15]   See Prenio et al (2024).
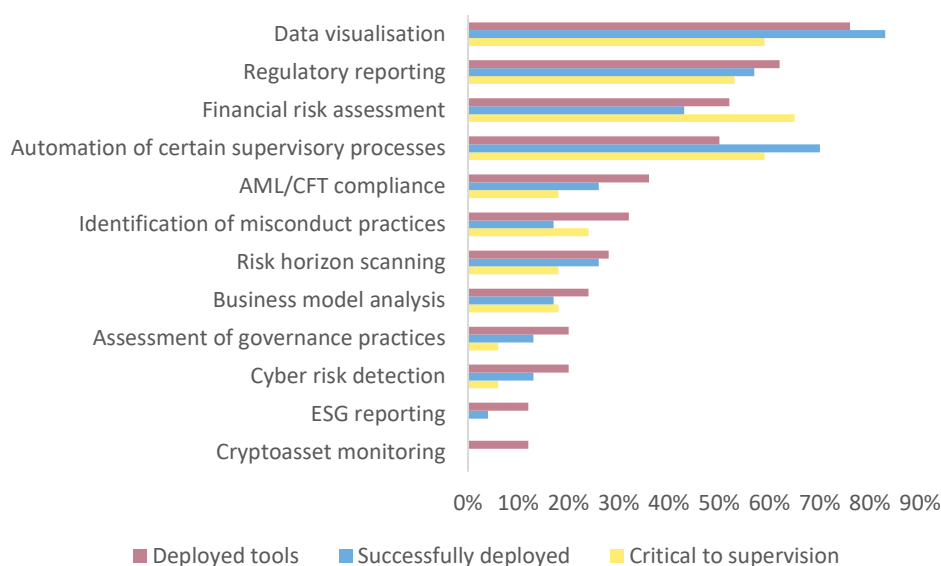
Source: FSI and BIS Innovation Hub.

Section 3 – Experiences of supervisory authorities in deploying suptech tools

15.   **To supplement the survey responses, interviews were conducted with supervisory authorities to discuss their experiences in deploying specific suptech tools.** Interviewees were asked to identify specific suptech tools they have that they consider as effectively embedded in their supervisory processes or that have become critical to these processes, as well as the tools that have not been effectively embedded. The discussions then focused on these tools, how they were deployed and what elements differentiated those that were considered to have become critical and those that were not.

16.   **Many of the suptech tools that were mentioned as being effectively embedded in supervision or as having become critical to supervision automate specific steps in a supervisory process.** Examples of these tools are:

- **A machine-learning–based tool to help supervisors identify credit exposures that small banks and non-bank financial institutions have incorrectly classified based on their expected losses.** The tool can examine the entire credit portfolio of a supervised institution significantly faster than can be done manually or even using random sampling. Given the large number of small banks and non-bank financial institutions in the jurisdiction in question, the tool has therefore become critical in the work of the unit supervising these institutions.

- **A visualisation tool to analyse key aspects of newly granted mortgages, such as loan-to-value ratio, age, interest rate and purpose.** The tool is able to leverage and optimise the use of granular credit-related information contained in a credit database that has long been available to supervisors. As such, the tool enables supervisors to make comparisons across different banks, see trends and even check the quality of banks' data.

- **A network analytics tool that analyses suspicious transaction reports.** The tool can identify clusters of individuals/entities that have exhibited suspicious behaviours, as well as the financial institutions involved. This allows for a more targeted supervisory analysis and scrutiny. The tool is therefore able to recognise common anti-money laundering typologies and thus can prioritise and target risks in anti-money laundering supervision. It is now incorporated in the supervisory authority's enterprise applications platform.

- **An enhanced internal risk rating system for different types of supervised institutions (ie banking and insurance).** While the technical implementation of the tool was carried out by an external IT company, line supervisors were involved in defining and calibrating the parameters. The tools are used to allocate supervision resources, so they have become an important part of the whole supervisory process.

- **A natural language processing (NLP) tool that supports supervisors' fit and proper assessments of banks' prospective board members and key executives.** The tool pre-screens responses in fit and proper questionnaires and highlights issues, if any. It is also able to translate non-English documents. The tool is now fully integrated into the supervisory authority's information management system.

17.   **Some of the effectively embedded or critical tools automate a whole supervisory process or several steps in a process.** Examples include:

- **An early warning system that consolidates several supervisory applications.** It includes a document analyser that analyses submissions from financial institutions and flags those that need further supervisory review; a predictive model that predicts risks based on data from regulatory reports; a web analyser that searches the web for relevant information on financial institutions that might signal potential supervisory issues; and a relationship analyser that maps related entities and assesses contagion risk. While different types of supervisors within the authority have varying levels of usage of the different applications, supervisors of investment funds have incorporated the early warning system in their day-to-day work process, particularly the document analyser application.

- **A supervision platform that supports a supervisory authority's cyber risk supervision activities.** The platform collects all types of cyber-related reports (eg event-driven reporting, responses to self-assessment questionnaires). Based on the information collected, the platform can come up with dashboards on the cyber posture and maturity of each financial institution, as well as of the whole sector. This allows for more efficient off-site monitoring. The platform also produces cyber profile scoring and classifications of individual financial institutions, which help achieve more focused on-site supervision and more agile thematic examinations. The information collected in the platform also informs policy improvements and coordination with other authorities.

18.   **Tools that have not been effectively embedded in supervision show different characteristics.** Some are also meant to automate a specific step in the supervisory process, while others are mainly used to provide information that supplements supervision work.

- **A tool that automates the creation of working papers (ie internal reports containing all supervisory analyses) and the drafting of communications to financial institutions.** The tool was meant to automate steps in the supervisory process that do not require judgment. However, uptake by supervisors is slow, which the supervisory authority in question attributes to a lack of confidence in the tool.

- **A tool that analyses board minutes of financial institutions.** The tool was conceptualised to assist supervisors in their reviews of the culture and behaviour of financial institutions' boards. However, there were several challenges to implementing the tool, including differences in the formats of board minutes and the complexity of the language. Additionally, the tool does not

have a direct user interface. Supervision staff wishing to analyse board minutes must go to the centralised data analytics unit within the authority, which is outside of supervision. The data analytics unit runs the minutes on the tool and provides the results to the supervision staff.

- **A tool that automates risk annotation of documents submitted by financial institutions.** The tool allows for text analysis, document summarisation and analytics. The tool, however, is topic specific. This means that its design must be tweaked depending on the topic of interest. Examples of topics that were analysed from document submissions using the tool include climate-related financial risks, cloud adoption, board effectiveness, compliance with consumer protection requirements, cyber risk and COVID-related financial risks. As with the previous tool, there is no direct user interface and supervision staff have to go to the data analytics unit to process relevant documents.

- **A data lake that integrates all supervision data and aims to provide easier and more efficient access to data by supervisors.** Interest from supervisors exceeded expectations. However, accessing the data lake requires technical knowledge (ie knowledge of structured query language). This imposes a high barrier to entry, resulting in only a few staff with the requisite technical knowledge able to access the data lake.

- **A social media monitoring tool that aims to examine public sentiment on financial institutions expressed in social media.** A few supervisory authorities mentioned having such a tool. The idea is that social media sentiment could provide clues on issues facing a financial institution, whether they are conduct- or prudential-related. While such tools are easy to build, they have not really been embedded into supervisory processes. One authority points to data and technical issues surrounding the tool's use as the main causes (see succeeding discussion).

19.   **Limited user accessibility seems to be a common problem of the tools that have not become effectively embedded in supervision.** Some tools do not have direct user interfaces and therefore users need to take the extra step of going to the specialised units to run the tools. Other tools may have direct user interfaces, but these require technical knowledge to use. In either case, these tools do not promote seamless, efficient and interactive data processes.

20.   **Other problems that have plagued tools that have not been effectively embedded relates to availability of data and computing power.** In the case of social media monitoring tools, data access has become a problem, given that some social media platforms no longer allow screen scraping. The board minutes analyser was trained using only two and a half years of board minutes from a limited number of institutions, and these minutes have different formats. The local language is also complex with the same words having different meanings. Developers therefore found it challenging to accurately write key words, resulting in a tool that is not able to capture the main ideas of the minutes. The on-premises computing power needed to run these tools is also an issue. While this is true for all suptech data analytics tools, some supervisory authorities are more open to using the cloud to address this issue. Other supervisory authorities are cautious about doing so because of security concerns.

21.   **AI-enabled tools also present some practical challenges.** Some supervisory authorities highlighted the fact that the AI-enabled solutions they are using are specialised solutions. They are therefore use-case specific. The implication is that the return on investment needs to be carefully analysed before developing such tools. In addition, this also highlights the need to manage user expectations. While "use-case specific" means that a tool can only be used for identifying a specific risk, it also means that it can only identify that specific risk based on the data the tool was trained on. This needs to be made clear to users to avoid instances where they might expect the tool to spot risks caused by factors not captured in past data. Clarifying this is especially important if a tool is meant to replace a specific step in the supervisory process. Without setting clear expectations, supervisors will lack confidence in using the tool. The ideal scenario for supervisory authorities is for AI and machine learning to evolve in such a way that they can provide generalised solutions for risk identification. There should also be an option for machine-

human collaboration, so that users' feedback can inform improvements of the tool. This requires an interactive user interface.

Section 4 – Profiling suptech tools that have become critical to supervision

22.   **Previous FSI papers have highlighted the importance of a suptech strategy in effectively implementing suptech tools.** A well-defined strategy can help authorities optimise the benefits of suptech for their organisation.[16] A suptech strategy can also help facilitate supervisory buy-in and guide authorities' deployment of various suptech tools.[17] There are three key elements of a well-defined suptech strategy: (1) ambitious but achievable targets in terms of technology to be used, the supervision area to be covered and funding; (2) an assessment of data availability and quality, as well as the availability of analytical resources; and (3) a step-by-step action plan on how the supervisory authority will get from the current situation to full implementation.[18]

23.   **The most recent survey confirms that supervisory authorities with a suptech strategy are more likely to deploy suptech tools successfully and make them critical to supervision.** Almost all authorities with a suptech strategy reported having successfully deployed suptech tools. Conversely, a smaller number of authorities without a strategy reported having successfully deployed tools (Graph 6, left panel). The same observation can be made when it comes to suptech tools that have become critical to supervision – more authorities with a suptech strategy reported having such critical tools, while the opposite is true for authorities without a strategy (Graph 6, right panel).

Experience in deploying suptech tools – with vs without a suptech strategy   Graph 6
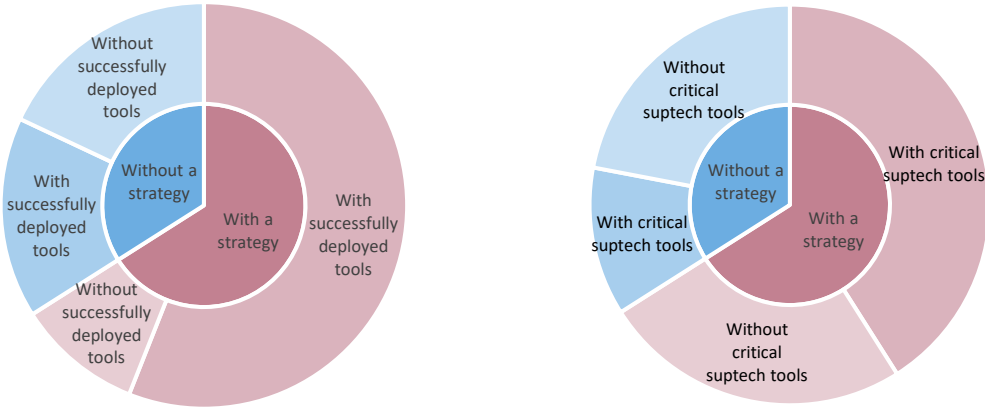
Source: FSI.

[16]   di Castri et al (2019).

[17]   Beerman et al (2021).

[18]   Broeders and Prenio (2018).

24.   **The number of authorities without a suptech strategy seems to be decreasing.** While a significant proportion – albeit a minority – of respondents still do not have a suptech strategy/roadmap, the situation has actually improved over the years. In 2019, about half of supervisory authorities that responded to an FSI survey did not have a suptech strategy.[19] This is also significantly better than the findings of other studies, which show that almost all respondents lack a formal, comprehensive and explicit suptech strategy.[20] This may be explained by the fact that FSI surveys are addressed to members of the ISN, which consists of representatives of authorities that are the most active in the suptech space.

Suptech strategy/roadmap   Graph 7

| Do you have a suptech strategy/roadmap? | What elements does your suptech strategy cover? |
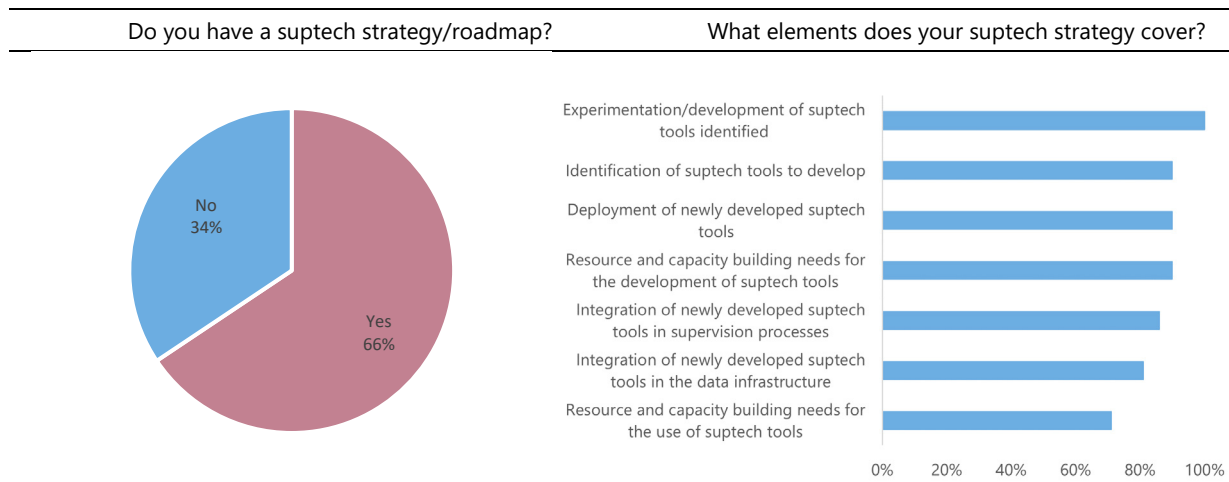
Source: FSI.

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25.   **Suptech strategies/roadmaps tend to give less attention to deployment-related issues.** All respondents reported covering experimentation and the development of suptech tools in their strategies/roadmaps, while almost all explicitly cover the identification of such tools (Graph 7, right panel). By contrast, most but not all authorities' strategies cover deployment-related issues. These include how tools will be rolled out to users and integrated in the data infrastructure/supervision systems, as well as how and when these tools should be reviewed and upgraded. The latter implies having a continuous support and funding model that would enable suptech work to respond to changing supervisory needs. Deployment-related issues also include fostering users' ability to deploy suptech tools effectively. A few samples of supervisory authorities' suptech strategies[21] that were examined for this paper show that the proportion of those that do not cover deployment-related issues is even higher. This means that, so far, not many suptech strategies cover the third key element of a well-defined strategy mentioned above.

26.   **Previous studies stressed that addressing deployment-related issues is imperative to enhance suptech adoption.** These include integrating various tools in supervisory processes and implementing governance structures for the use of such tools.[22] There is also a need for appropriate skills, not only in the development but also in the deployment of these tools.[23] Suptech tools also need to be made more approachable and accessible to supervisors.[24] These were also highlighted as important

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[19]   di Castri et al (2019).

[20]   Cambridge Suptech Lab (2023).

[21]   These suptech strategies are either publicly available or shared by supervisory authorities with the FSI.

[22]   Beerman et al (2021).

[23]   Garcia Ocampo et al (2022).

[24]   Broeders and Prenio (2018).

elements for deployment success in the external evaluation of a supervisory authority's suptech work.[25] Moreover, the experience of authorities described in Section 3 points to these same elements, which are discussed in detail in the succeeding paragraphs.

27.   **A critical suptech tool tends to fit naturally in a supervisory process by addressing specific pain points in the process.** It should be able to support a key step in the process which would require more time if done manually. It should also be clear to supervisors what the tool aims to achieve. Many of the tools that were effectively embedded in supervision, as described in Section 3, exhibit these characteristics. They are used to identify misclassified credit exposures, visualise the key metrics of mortgages, filter various reports or questionnaires that may have issues and establish the risk ratings of financial institutions. Such steps are important in supervision since they produce the outputs needed for further supervisory actions. This sample of effectively embedded tools also supports the survey findings in Section 2 on the criticality of financial risk assessment tools.

28.   **Supervisors will likely be less open to a suptech tool that creates another process or additional steps in the existing process.** This is the case for example with social media monitoring tools. Social media posts have not traditionally been used as a source of information by supervisors. Monitoring these posts therefore creates another process and may be seen as "nice to have" but not necessarily important. As introducing these types of tools requires buy-in from supervisors, the potential benefits need to be made clear to them. Ideally, demand for such changes should come from supervisors based on their experience. They have an important role to play in helping to identify suptech solutions to develop.[26] This does not mean, however, that supervisors should be suggesting specific tools to develop because this is not within their area of expertise. What this means is that supervisors' challenges and pain points should be the basis for identifying tools to develop.

29.   **Critical suptech tools are well integrated into the core supervision systems.** This enables straight-through processing of information, with the data collection system able to interface with different analytics applications and tools. This helps in seamlessly integrating suptech tools in supervisory processes, as is the case with the early warning system and the cyber supervision platform described in Section 3. In both examples, the focus is not on a single suptech tool but on creating a single platform or system that integrates different related processes, preferably in a modular way, as well as the applications and tools needed for these processes. Anecdotal evidence based on interactions with ISN members shows increasing interest among authorities in having such a holistic approach to suptech development. Given authorities' legacy systems, however,this kind of platform-based approach could be costly and take a long time to build.

30.   **In developing suptech tools, supervisory authorities need to have a long-term vision of their desired "supervision IT ecosystem".** A supervision IT ecosystem consists of the IT infrastructure, systems, applications and tools needed for supervision. Authorities need to have a forward-looking plan of how to develop this ecosystem in order to make their supervisory processes more efficient and effective. This means that the development and deployment of a suptech tool should not be seen in isolation. Authorities need to determine how it would fit into the overall supervision IT ecosystem. This also helps avoid the proliferation of tools and systems that may just be duplicative.

31.   **Availability of granular data is key.** Section 3 describes a few examples of financial risk assessment tools that have become critical to supervision. One of their common characteristics is that they rely on granular data. In these cases, supervisory authorities have collected these data historically. The emergence of suptech tools has allowed these authorities to fully benefit from these granular data by making it more efficient to organise, interrogate and analyse them. This in turn makes it easier to extract

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[25]   Packard and Prenio (2024).

[26]   See for example Broeders and Prenio (2018) and Beerman et al (2021).

useful insights from them. Some supervisory authorities may not have such granular data in place. This may have contributed to the challenges encountered in successfully developing and deploying these tools.

32.   **A suptech tool needs to be user accessible.** Supervisors need to be able to use a suptech tool for it to be effectively embedded in supervision. However, as discussed in Section 3, some of the tools do not even have a direct user interface. Intervention from technical staff is thus needed, which introduces inefficiencies. On the other hand, it could be that a tool has a direct user interface but using it would require technical skills. Both cases highlight the importance for suptech tools to be user-friendly so that they are accessible to supervisors. They also underscore the need to develop appropriate staff skills when deploying suptech tools.

33.   **Supervisory authorities are looking at new technologies to help build more user-friendly tools.** A number of authorities are experimenting with generative AI (GenAI). Two areas seem to be in focus so far: (i) creating a chatbot to help supervisors – and eventually the public – to find, summarise or interpret relevant regulations;[27] and (ii) setting up a database co-pilot that can help supervisors find data using natural language (ie without the need to learn programming language). In general, there has always been interest among supervisory authorities to explore tools that can help them go through huge amounts of narrative reports and other relevant text documents. Thus, over the years, there have been many examples of tools using natural language processing. GenAI has the potential to significantly improve the capabilities of these tools.

34.   **Supervisors need to have confidence in a deployed suptech tool.** The above elements, while important, will remain ineffective in embedding suptech tools in supervision if supervisors do not have confidence in the tools and thus refuse to use them. This is especially true for tools that try to identify supervisory issues (eg risk identification tools), as their outputs may be seen as questioning supervisors' judgment or competence.[28] Consequently, change management is important when deploying suptech tools. This involves clarifying to supervisors the objectives of the tool (eg to help supervisors identify potential issues and not to dictate their decisions or actions), its capabilities (eg what it is good at doing based on its design) and its limitations (eg what issues the tool will not be able to spot and why).

Section 5 – Conclusion

35.   **The survey responses and interviews show that the impact of suptech on supervision to date has been on improving efficiency.** Supervisory authorities are using efficiency gains as an explicit indicator of success. Moreover, many of the suptech tools that have become critical to supervision are used to support existing processes. This indicates that suptech has not really resulted in new approaches to supervision but has made existing approaches more efficient (ie it has not really become transformative yet). Having said that, efficiency gains also indirectly benefit supervisory effectiveness since they allow supervisors to focus more on judgment-based activities.

36.   **Some suptech tools are now critical to supervisory processes, and supervisory authorities' experience in deploying them points to a few factors that have contributed to this outcome.** These include:

* **Suptech work should be guided by a suptech strategy.** Suptech strategies should cover not just the experimentation and development aspects of suptech work, but also deployment-related issues. These include how to roll out suptech tools to users, how to foster users' ability to deploy them effectively and how to integrate these tools in the supervisory processes and systems.

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[27]   See for example ChatDNB (Central Banking, 2024).

[28]   Beerman et al (2021).

Support for continuous investments in upgrading suptech tools is also needed to meet evolving supervisory needs.

- **Suptech tools should have a natural place in supervisory processes and address specific pain points.** Tools that add an additional step or create another process should have buy-in from supervisors. Ultimately, suptech tools should address the needs of supervisors in order to effectively meet supervisory objectives and not introduce things that may only be considered as "nice to have".

- **Suptech tools should be integrated in supervision systems.** This allows for seamless use of all data, applications and tools needed for supervision. The deployment of a suptech tool should not be pursued in isolation, but rather supervisory authorities need to see how it fits into the overall supervision IT ecosystem as it stands at present and after any planned changes.

- **Suptech tools need good-quality granular data.** Supervisory authorities that have been collecting granular data benefit more from suptech tools. Without access to such data, it will be challenging to develop and deploy these tools. This underscores the importance of starting with enhancing data collection practices before pursuing the benefits of suptech for data analytics.

- **Users should be able to easily access suptech tools and have confidence in using them.** Suptech tools should have direct, user-friendly interfaces to make them as easily accessible as possible to users. Fostering confidence in using the tools involves clarifying the tools' objectives, capabilities and limitations.

37. **The survey responses and interviews also provide insight into how international work supporting suptech development might be approached.** International work may need to take on a more process-focused rather than an issues-focused approach. Currently, international experimentation work on suptech is focused on issues like climate-related financial risk and cryptoasset monitoring.[29] While this work is helpful in illustrating how tools might be developed for specific issues, the degree of replicability or usability at the national level could be limited if there is limited consideration of how national supervisors actually supervise these issues. Hence, a clear understanding of the common steps in supervisory processes and the common challenges national supervisors face in working through these steps might be a better starting point to identify the best kind of experimentation project to undertake at the international level.

38. **These insights should hopefully contribute to ensuring that suptech work results in supervisors having the right tools to identify weaknesses in supervised institutions and support their ability to act in a timely manner.** The factors identified above could provide useful guidance to supervisory authorities in identifying suptech tools to develop, as well as in deploying them, so that they could maximise the tools' benefits for their supervision work. Similarly, the proposed shift in approach to international work on suptech could result in experiments that would be more attuned to actual supervisory practices and thus could provide immediate benefits to supervisory authorities. Ultimately, to be able to enhance supervisory ability and contribute to supervisory objectives, suptech needs to transcend the hype and start becoming a true workhorse for supervision.

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[29] For example, recent suptech projects by the BIS Innovation Hub include Project Pyxtrial (stablecoin monitoring) and Project Gaia (climate-related financial risk analysis).

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Annex – List of authorities that responded to the survey[30]

Jurisdiction	Authority
Australia	Australian Securities and Investment Commission (ASIC)
Brazil	Central Bank of Brazil (BCB)*
Canada	Office of Superintendent of Financial Institutions (OSFI)
European Union	European Banking Authority (EBA)
	European Central Bank (ECB)*
France	French Prudential Supervision and Resolution Authority (ACPR)
Germany	Deutsche Bundesbank (DB)
Greece	Bank of Greece (BoG)
Guernsey	Guernsey Financial Services Commission (GFSC)*
Hong Kong SAR	Hong Kong Monetary Authority (HKMA)
India	Reserve Bank of India (RBI)
Israel	Bank of Israel (BoI)
Malaysia	Central Bank of Malaysia (BNM)
Netherlands	De Nederlandsche Bank (DNB)
Peru	Superintendency of Banking, Insurance and Private Pension Funds (SBS)
Philippines	Bangko Sentral ng Pilipinas (BSP)*
Poland	Polish Financial Supervision Authority (KNF)
Qatar	Qatar Financial Centre Regulatory Authority
Republic of Korea	Financial Supervisory Service (FSS)
Singapore	Monetary Authority of Singapore (MAS)*
South Africa	Prudential Authority, South African Reserve Bank (PA – SARB)
Spain	Bank of Spain (BdE)**
Switzerland	Swiss Financial Market Supervisory Authority (FINMA)*
Thailand	Bank of Thailand (BoT)*
United Arab Emirates	Dubai Financial Services Authority
United Kingdom	Financial Conduct Authority (FCA)
United States	Federal Reserve Bank of New York (FRBNY)*
	Office of the Comptroller of the Currency (OCC)

*Interviewed authorities.

**Some information mentioned in Packard and Prenio (2024) is included in this paper.

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[30] Four respondent authorities did not indicate their institution names in their survey responses.