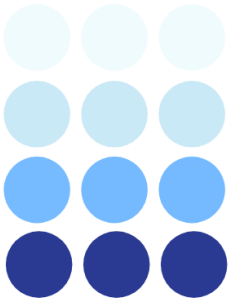
IADI Fintech Briefs provide high-level overviews and key takeaways on Fintech topics of relevance to deposit insurers.



FINTECH BRIEF

INTRODUCTORY BRIEF (PART II)

OPPORTUNITIES FOR DEPOSIT INSURERS (DEPTECH)

NO. 8

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IADI Fintech Briefs are written by Members of the IADI Fintech Technical Committee (Fintech TC), and from time to time by other authors, and are published by IADI. They provide high-level overviews and key takeaways on fintech topics of relevance to deposit insurers. The views expressed are those of the author(s) and do not necessarily represent the views of IADI or the institution to which the authors are affiliated. The authors are grateful to the FinTech TC for helpful comments.

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INTRODUCTORY BRIEF (PART II)
OPPORTUNITIES FOR DEPOSIT INSURERS (DEPTECH)

Foreword

The International Association of Deposit Insurers (IADI) recently launched a research series that explores innovations in financial technology (fintech) and how these innovations affect deposit insurance systems. The Financial Stability Board has defined fintech as

> *technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services.* (Financial Stability Board, 2019b)

While the growth in consumer use of fintech presents challenges to deposit insurers by blurring the lines between financial products and services offered within and outside the traditional financial system, fintech also provides many opportunities for deposit insurers by creating business efficiencies, quality products, and new frameworks for solving problems, among other improvements.

This brief introduces the term "DepTech," or Deposit Insurer Technology, and defines it as the adoption of new technologies to improve deposit insurer operations. This can include enhanced reporting procedures, improvements to the reimbursement process, and faster depositor access to funds when a bank fails.

This brief investigates the opportunities fintech presents to deposit insurers and in doing so, focusses on data standardisation, digital payments, artificial intelligence and machine learning, cloud computing and new media.

1 Background

Deposit accounts are the principal source of funding for deposit-taking institutions (DTIs) and offer depositors a way to save and make payments. In a deposit insurance system (DIS), depositors are protected against the loss of their insured deposits in the event a DTI is unable to meet its obligations. A DIS reduces the incentive for depositors to withdraw their deposits or "run" at the first sign of trouble in their institution and, therefore, helps to maintain financial stability and minimises disruptions to the real economy. To fund this insurance, DTIs pay premiums to the deposit insurer.

1.1 Technology inside and outside the financial sector

Advances in technology present both challenges and opportunities to consumers, financial institutions, and financial safety-net participants. Within the traditional financial sector, technology has enabled DTIs to gather deposits and deliver related services through third-party agents and electronic channels such as computers or smartphone applications. Outside the traditional financial sector, nonbank entities such as tech companies and mobile network operators are developing and providing innovative financial products and services. These innovations are disrupting relationships between consumers and traditional DTIs and have caught the attention of financial regulators as they may pose risks to financial stability or present other types of risk outside of the regulated financial sector. These developments also raise questions about the role of deposit insurance in these new environments.

Financial regulators have the opportunity to harness new technology and better perform their roles within the financial safety net. In addition, innovations such as machine learning, customer relationship management software, and cloud

computing, which are being developed outside the financial sector for broader purposes, provide the opportunity for financial regulators to operate more efficiently.[1]

1.2 What is driving fintech growth?

The growth in fintech is largely driven by tech companies searching for market opportunities so that they can deliver products and services to a wider array of consumers with greater convenience and at a cost lower than traditional financial service providers. In some developed markets, fintech products have aimed largely at capturing "overbanked" financial services customers.[2] Large, established tech companies, such as Apple, Facebook, and Google, have used new technologies to deliver "convenient, attractive, low-cost, and trusted services to a large network of customers. User-centered design is second nature. They understand how people behave on social media and online. They can make payments integrate seamlessly" (Adrian and Mancini-Griffoli, 2019).[3]

Reaching the unbanked or "underbanked" is also a motivator for fintech innovation in developed economies but more so in emerging economies, wherever there is an unmet demand for financial services and the opportunity for greater financial inclusion (Frost, 2020). In many emerging economies, fintech innovation allows for the introduction of simple financial products to those who would otherwise be unbanked due to the cost of maintaining a traditional bank account, geographical distance to a bank, and the documentation process (Ghose et al., 2020). Nine percent of adults globally—or thirteen percent of account owners—opened their first account specifically to receive digital payments (e.g., wages, government payments, or payments for the sale of agricultural products) (Demirgüç-Kunt et al., 2018).[4] Some evidence suggests that as fintech financial services become more widely available, the unbanked join the traditional financial sector at greater rates. In Africa, for example, increased mobile money adoption is correlated with increased bank account adoption in Ghana, Kenya, Rwanda, Tanzania, Uganda, and Zimbabwe (Bill & Melinda Gates Foundation, 2019). In addition, Frost (2020) implies that enhanced financial inclusion, through fintech adoption, supports economic growth especially in emerging economies.

1.3 DepTech: Using Technology to Improve Deposit Insurer Operations

Deposit insurers may consider incorporating fintech products and services wherever they can improve their current functions. This brief introduces the term "DepTech" as a new subset of fintech. DepTech, or Deposit Insurer Technology, is the adoption of new technologies to improve deposit insurer operations. It is parallel to "RegTech" (Regulatory Technology), which is "the adoption of new technologies developed to help overcome regulatory challenges in financial services" (FCA, 2015). Similarly, DepTech is parallel to "SupTech" (Supervisory Technology), which is "the use of innovative technology by supervisory agencies to support supervision" (Broeders and Prenio, 2018).

This brief focuses on new technologies and their potential application to deposit insurer operations (resolution, insurance, and supervision). Each technology is briefly introduced and explained, and its DepTech applications are described.

2 Fintech Landscape

The modern fintech landscape is broad, and each segment has implications for consumers, financial institutions, and regulators. For deposit insurers, opportunities are available in banking infrastructure, digital payments, crypto-assets, and analytics segments of the fintech landscape (see Figure 1). Future Fintech Briefs will expand on these and additional topics in the fintech landscape.

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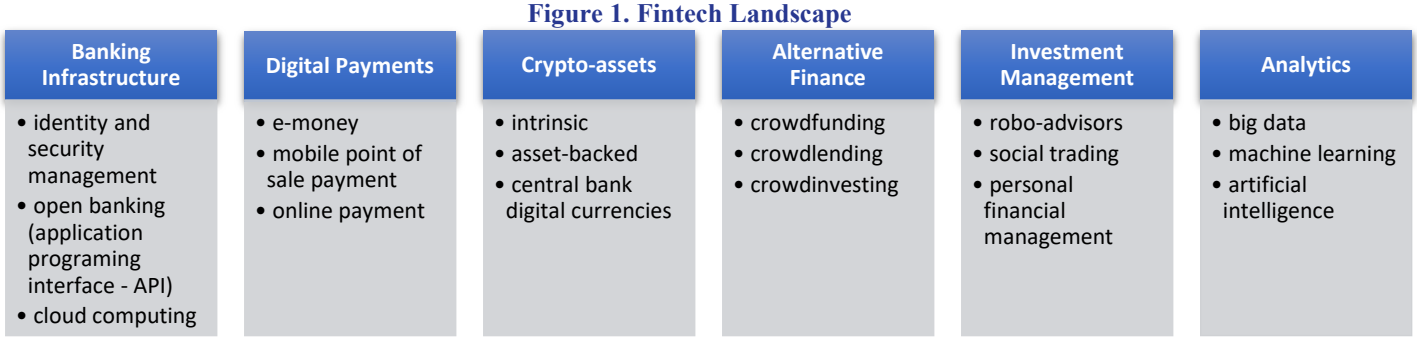
[1] Customer relationship management (CRM) is the technology used to analyse and manage a company's interaction with customers or potential customers. The goal of CRM is to improve companies' relationships with customers, therefore increasing customer retention rates and ultimately driving sales growth. Leaders in the CRM software industry include Salesforce, Zoho and HubSpot.

[2] An overbanked consumer is defined as someone holding open deposit accounts with three or more institutions at any given time (Buckingham, 2016).

[3] User-centered design is an iterative design process in which designers focus on the users and their needs in each phase of the design process. In UCD, design teams involve users throughout the design process via a variety of research and design techniques, to create highly usable and accessible products.

[4] The World Bank Global Findex includes accounts opened at a bank or another type of financial institution, or opened using a mobile money service.

Figure 1. Fintech Landscape



3 Opportunities

Fintech innovations create several opportunities for deposit insurers, from creating more business efficiencies to better protecting depositors and contributing to financial stability. These opportunities will be discussed throughout the series. This brief will focus on five specific categories:

1. Data standards and application programming interfaces (APIs)
2. Digital payments
3. Artificial intelligence / machine learning (AI/ML)
4. Cloud computing
5. New media: social, video, mobile

3.1 Data Standards and APIs

3.1.1 Technology

Data standardisation generally refers to the process of transforming raw (unaltered) data from different contexts and sources using common, agreed-upon definitions, processes, and formats. Examples of data standardisation efforts by deposit insurers include regulations implemented by the Federal Deposit Insurance Corporation (FDIC) in the United States (Recordkeeping for Timely Deposit Insurance Determination), the Canada Deposit Insurance Corporation (CDIC) (Data and System Requirements for Fast Insurance Determination), and the Financial Services Compensation Scheme in the United Kingdom (Single Customer View) that require certain institutions, including DIS members, to use specified formats when providing deposit account data.[5] Data standards can also facilitate the use of APIs. APIs are defined sets of functions and procedures that specify how computers and their software should interact or talk to each other. Financial institutions have relied on APIs to share data across platforms, including to external parties. Financial sector authorities have also implemented data standards and APIs in ongoing required reporting. In the Philippines, for example, the central bank (Bangko Sentral ng Pilipinas) piloted an API-based prudential reporting system in 2018 for banks to transmit near real-time data.[6] Additionally, the Central Deposit Insurance Corporation (Chinese Taipei) uses an API to enhance risk monitoring of factors such as liquidity in internet-only banks.[7]

3.1.2 DepTech Application

Data standards and APIs present unique opportunities to improve the efficiency and security of certain deposit insurer functions. For example, standardised data could greatly reduce the cost and time to convert a failed institution's data to make it compatible with a deposit insurer's systems. This would reduce the staff time required to verify ownership of accounts, resulting in faster deposit insurance determinations and depositor payouts that help deposit insurance systems meet standards set in the Core Principles for Effective Deposit Insurance Systems (CP), specifically CP 14 – Failure Resolution and CP 15 – Reimbursing Depositors. Using private (internal) and open (public) APIs can more efficiently reduce the potential exposure of sensitive information by limiting data access to only the elements necessary to satisfy a request, rather than opening access to all account information or manually segmenting and sharing requested data.

[5] (CDIC, 2019); (Federal Register, 2016); (FSCS, 2021)
[6] Regtech for Regulations Accelerator (2018)
[7] For more information on the Chinese Taipei's system, please see the upcoming IADI Fintech Brief on "Using Fintech to Enhance the Supervision of Internet-Only Banks in Chinese Taipei."

Efforts to adopt data standards and APIs may increase the quality, efficiency, and security of data and data sharing. Data quality can be improved by reducing errors associated with human entry (greater accuracy), allowing for greater linkage of datasets (more complete) and facilitating automation (more timely). For deposit insurers, high-quality data enabled by data standardisation and the use of APIs create opportunities for a more risk-sensitive and responsive pricing system, with fewer resources devoted to cleaning, interpreting, and validating data. Data standards can also lead to greater data sharing and coordination among regulatory and reporting agencies, including those in other jurisdictions and between supervisory authorities and deposit insurers, increasing compliance with CP 4 – Relationship With Other Safety-Net Participants and CP 5 – Cross-Border Issues.

3.2 Digital Payments

3.2.1 Technology

Digital payment can serve as an alternative to cash, cheques, and debit cards, and is the fastest growing segment of the fintech landscape, projected to have 4.5 billion users by 2024 (Zavialova, 2020). Types of digital payments include e-money products, such as mobile money and electronic purses (represented by an open-system prepaid card); mobile point of sale services; and online payments offered through DTIs. More detailed explanations of each product can be found in IADI Fintech Brief No.1 – Introductory Brief: Challenges for Deposit Insurers.[8]

3.2.2 DepTech Application

Digital payments can be harnessed by deposit insurers as they "enable integrated, immediate, and end-to-end payment and settlement transfers" (Shabsigh et al., 2020). Using digital payments for a payout would allow depositors to access their funds much more quickly than non-digital payout methods (and improve compliance with CP 15 – Reimbursing Depositors). Take for example, payout via mailing cheques to depositors of a failed DTI. This method is time consuming as depositors must not only wait to receive their check, they also need to deposit the check into a new account at another DTI, assuming their only account was at the failed institution. In addition, funds could be delayed if sent to the wrong address. Using digital payments for a payout may eliminate these issues by providing depositors immediate access to their funds with less chance of error.

The Deposit Protection Agency (DPA) in Thailand sought to shorten the deposit reimbursement timeframe and offer more convenience to depositors by using PromptPay – the national e-payment system – as a channel for depositor payouts.[9] When a member Financial Institution (FI) fails, the DPA will compensate the depositors within 30 days of the date from which the FI's license is revoked through either PromptPay system or cheque. Depositors with Thai national ID numbers (i.e. those with Thai nationality) and corporate depositors with tax ID numbers will receive transfer of money via the depositor's national ID registered (PromptPay) bank accounts.[10]

The COVID-19 pandemic also enabled government entities to test the use of digital payments. In Colombia, the government sent emergency relief payments via digital financial transfers to nearly three million households severely affected by the pandemic; almost one million were unbanked before receiving the subsidy.[11] In the United States, those households eligible to receive government stimulus payments could opt to receive them as direct deposits into PayPal Cash Plus accounts instead of traditional bank accounts.[12]

[8] IADI defines e-money as an electronic store of monetary value on a technical device that may be widely used for making payments to entities other than the e-money issuer. The device acts as a prepaid bearer instrument that does not necessarily involve bank accounts in transactions. Examples of open-system prepaid cards are Visa and MasterCard gift cards. See also Youssef et al., 2021.

[9] PromptPay is a real-time payment system that increases convenience by using proxy ID numbers for bank accounts and offers access through mobile applications and online channels while reducing costs.

[10] Note: there have been no payout events in Thailand since DPA's inception in 2008, so the PromptPay system has not been used in practice.

[11] Better Than Cash Alliance, "Accelerating Responsible Digital Payments for COVID Relief."

[12] PayPal Newsroom "PayPal and Venmo Check-Cashing Fees Waived for Third Round of Government-Issued Stimulus Checks," March 2021.

3.3 Artificial Intelligence / Machine Learning

3.3.1 Technology

Artificial intelligence (AI), or the ability of machines to perform tasks commonly associated with intelligent beings, has been a target of innovation since the creation of the modern computer. AI is often used interchangeably with machine learning (ML), but in this brief we consider ML techniques as a subset of AI.

Machine learning offers several opportunities for deposit insurers. An in-depth discussion of this topic is presented in IADI Fintech Brief No. 3 – Machine Learning Methods: Potential for Deposit Insurance.[13]

Machine learning refers to the process of programming a computer to improve at a task, over time, without further programming. This process involves the development of algorithms designed to solve learning problems. A learning problem is one in which the goal is to improve performance when executing a task through experience.[14] Over successive iterations, the computer "learns" by using training data provided by a human. The computer develops its own "model" that explains these data, then validates the model on test data. The computer-developed model can then make predictions about new data (out of sample data), and these predictions can be evaluated for performance.

Machine learning can solve problems similar to those in traditional economics, such as linear regression, in which error is minimised; clustering, in which members of a set are grouped in new ways; or forecasting, in which a sample is used to make out-of-sample predictions. Machine learning can also solve new problems, such as recognizing, understanding, and generating language (natural language processing) or identifying objects from a photo (classification). Machine learning uses a training dataset and attempts to learn from that data, then applies the lessons to a separate testing dataset. Key methods include learning the relationship between inputs and a known output (supervised learning), exploring the relationship between data in which there is no set input and output (unsupervised learning), and learning iteratively (reinforcement learning).

3.3.2 DepTech Application

AI/ML techniques have important DepTech applications for pricing deposit insurance and conducting payouts, natural language processing (NLP), and forecasting, which are discussed in IADI's Fintech Brief on machine learning methods. Each application involves a different machine learning methodology. For example, clustering could group deposit insurance members into new risk groups, based on existing data. This technique could improve existing risk-based pricing systems or be compared to evaluate pricing system performance. Likewise, classification could categorize depositors in payouts or assets of a deposit insurance fund. These applications could help deposit insurers meet the standards of CP 9 – Sources and Uses of Funds.

NLP, the technique of teaching a computer human language, presents opportunities for deposit insurers in both communication and claims processing. This technique allows the computer to interpret human language and suggest similar or different responses to inquiries. An example of NLP is the Regions Bank (a U.S. DTI) "rVoice" text analytics tool, which consolidates consumer feedback into trends in a dashboard.[15] Other banks are using AI to communicate directly with consumers. Using this technology, deposit insurers could save time and better direct resources during a resolution by using AI "chatbots," which automatically generate responses, potentially eliminating or at least reducing the volume of calls that require a live-person response. Many deposit insurers, including the FDIC, use contractors to review loan files and provide estimated asset values. NLP could be used to conduct an initial screen in a matter of days, rather than the weeks it currently takes.

Advancements in AI/ML are being used in applications throughout industry and academia, including banking and finance, and have important implications for deposit insurers. While machine learning can improve the performance of models, it can also perpetuate biases or make incorrect predictions if training data are incomplete or non-comprehensive. Focusing attention on the proper implementation and monitoring of these techniques is an opportunity for deposit insurers, and these topics have attracted the attention of regulators around the world. The FDIC, along with other U.S. financial regulators, issued a request for information on AI and machine learning. In addition, the FDIC held a

[13] Defina (2021).
[14] Jordan and Mitchell (2015).
[15] Cross (2020).

conversation on the ethics of AI/ML as part of its 2021 Banking on Data Webinar Series. Likewise, the Bank of England and the UK Financial Conduct Authority launched the Artificial Intelligence Public-Private Forum in 2020, a year-long series of conversations on data, model risk management, and governance.[16] This forum engaged the public and private sector in a dialogue about the potential applications of AI/ML, and deposit insurers should seek to begin their own internal and external conversations.

3.4 Cloud Computing

3.4.1 Technology

Recent advances in cloud computing may present new opportunities for deposit insurer operations, particularly in operational efficiencies when resolving a failed bank. Cloud computing is rapid network access to shared computing resources.[17] The National institute of Standards and Technology describes five key attributes of clouds: on-demand service, broad network access, resource pooling, rapid elasticity, and measured service. This technology can be further broken down into different cloud deployments: a private, community, public, or hybrid cloud. The FDIC Chief Information Officer Strategic Plan notes that "Cloud technology enables continuous availability of services, scalable computing power and storage, and long-term cost reduction because users pay for only the capacity that is actually used" (FDIC, 2019). This model allows for rapid scaling up (and down) for operations such as bank failures and enables cost savings versus a traditional model of estimating use.

3.4.2 DepTech Application

Cloud computing has important existing and potential DepTech applications, including facilitating more informed asset sales. Deposit insurers can use cloud computing portals to speed the resolution process. The FDIC has used a virtual data room (VDR) since 2000 to conduct more timely resolutions. The current VDR—"Venue"—is a secure website that the FDIC populates with information about failing insured institutions. The FDIC gives qualifying financial institutions access to the VDR, which stores granular information about the bank, such as its asset portfolio and depositor base. This enables potential bidders to determine their interest in purchasing the failing bank and provides the information necessary for them to make their best offer. During the pandemic, the FDIC enhanced the VDR with online due diligence. Since this was a cloud service, scaling up to host thousands of scanned files from the bank was a straightforward process. Before the pandemic, the FDIC would allow on-site due diligence by having each potential bidder come on site one at a time, making it difficult for out-of-state bidders to participate. Online due diligence allowed simultaneous viewing of the failed bank's loan files by all interested bidders. The cloud enabled more bidders, including more from out of state, to have access to this information for longer periods of time, encouraging more participation and better bids and improving failure resolution (CP 14).

Cloud computing can also enable more modern bank financial reporting. The FDIC recently conducted a rapid prototyping competition with private sector participants to help develop a new and innovative approach to financial reporting, particularly for community banks. Having real-time information can assist not only in the supervision of banks but also in deposit insurance pricing and resolution.

While cloud computing has potential advantages for deposit insurers, the cloud also presents new security risks. In 2020, the Federal Financial Institutions Examination Council (FFIEC), an interagency group of U.S. federal and state banking regulators, issued a Joint Statement on Risk Management for Cloud Computing Services.[18] The guidance highlights security and risk management principles for the financial services sector's use of cloud computing and provides a helpful background for other deposit insurers interested in cloud computing.

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[16] Bank of England (2022.

[17] NIST Special Publication 800-145, "The NIST Definition of Cloud Computing: Recommendations of the National Institute of Standards and Technology," defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

[18] The FFIEC comprises the principals of the Board of Governors of the Federal Reserve System, Bureau of Consumer Financial Protection, Federal Deposit Insurance Corporation, National Credit Union Administration, Office of the Comptroller of the Currency, and State Liaison Committee.

3.5 New Media: Social, Video, Mobile

3.5.1 Technology

Each generation of technological innovation has presented deposit insurers with new ways to communicate and improve public awareness of deposit insurance, including the protection it provides and how it operates in a bank failure or crisis. Technology has also helped deposit insurers learn what the public's concerns are and how deposit insurers can better fulfill their mandate(s). Today, deposit insurers can use a variety of tools, including social media, podcasts, smartphone applications (apps), and innovation hubs, to improve public awareness.

3.5.2 DepTech Application

Public-facing audio and video have been used by governments and deposit insurers for years. By broadcasting board meetings to the public, deposit insurers reinforce popular opinion and develop trust through transparency. As technologies have evolved, the means of communication used to educate the public about deposit insurance or other financial education topics have grown. Modern communication methods have existing and future DepTech applications and can help deposit insurers comply with CP 10 – Public Awareness.

Social media and messaging apps present an opportunity for deposit insurers to reach large, diverse audiences quickly. Many deposit insurers, such as the Philippines Deposit Insurance Corporation, use Twitter in addition to traditional news releases to inform the public about bank failures. These social media posts create visibility and an opportunity for deposit insurers to respond to questions from the public. Additionally, messaging apps such as Telegram and WhatsApp can be used to directly reach depositors at any given time. For example, the Corporación del Seguro de Depósitos, Fondo de Liquidez y Fondo de Seguros Privados (COSEDE) uses a WhatsApp chatbot and encourages the public to add COSEDE's official number to their smartphones through a QR code. This gives COSEDE a way to quickly send out official communications, and allows depositors to easily reach out to COSEDE with their questions.

Deposit insurers also can use social media advertising, either paid or native, to reach existing online communities, such as those on Facebook, TikTok, and Reddit. Forums such as Reddit's "Ask Me Anything" series present opportunities for experts to answer questions. The sheer scale of these networks—Reddit's Personal Finance community has 14 million members, for example—makes distributing a deposit insurer's message much more efficient. And providing expertise helps create strong customer relationships built on trust.

The CDIC uses both traditional media and social media to achieve its public awareness target range of 60 to 65 percent. Social media allows the CDIC to effectively allocate its resources to optimise public awareness among younger demographics with lower awareness levels.[19] In addition, the CDIC hosts online contests, such as "Earn and Learn," where depositors can apply their knowledge about the CDIC and deposit insurance in Canada to earn entries for a prize. This encourages depositors to actively engage with deposit insurers and reinforces knowledge that depositors may have acquired through the CDIC's public awareness campaign. The CDIC also uses sponsored content, such as podcasts and social media videos, to reach different demographics. Collaborating with a content creator allows the CDIC to spread its message more effectively while ensuring that the information conveyed is accurate.

Similarly, the FDIC has produced several podcasts on topics covered in its Money Smart financial education curriculum and a podcast series that provides background and explanation of policy decisions made during the 2008 to 2013 financial crisis. In addition, the FDIC has launched an online game version of its Money Smart curriculum. Instructional online games present an opportunity for deposit insurers to reach a new audience. The FDIC has also used YouTube videos, radio ads, and online advertising to deliver its financial inclusion campaign, #GetBanked.[20] Finally, the FDIC has partnered with a recent Netflix series to promote public awareness of how it closes banks in an orderly fashion.[21]

[19] CDIC research showed that seniors (65+ years old) have 74 percent awareness of deposit insurance, while millennials (18 to 34 years old) have only 48 percent awareness. CDIC, Public Awareness Strategy, June 2021.

[20] The COVID-19 pandemic amplified the importance of reaching the public using new technologies. In 2020, the FDIC launched a podcast series that seeks to untangle the financial complexities of the world for the public. The podcast has recently focused on how innovation can drive a safe, more inclusive financial system. Similarly, during the pandemic, the FDIC pivoted to using its longstanding YouTube channel to host short videos recorded by its employees who were working from home. These videos, "FDIC Explains" and "FDIC Explains En Espanol," reached thousands of viewers with simple explanations of complex topics.

[21] Obama et al. (2022)

Smartphone apps are yet another innovative way deposit insurers distribute their messages. Hungary has a mobile app that allows users to check whether their deposits are insured, see a list of insured banks, and view a "process map" that shows what happens if a bank fails.

New technology also provides opportunities for deposit insurers to partner with external parties to better engage the public and promote financial inclusion. For example, the Malaysia Deposit Insurance Corporation (PIDM) collaborated with a fintech and the United Nations Capital Development Fund to develop an app that encourages users to save earnings and take up insurance to improve the financial health and resilience of gig workers in Malaysia. PIDM delivers financial literacy programs—using behavioural science principles—to empower this growing demographic with the knowledge and tools to manage potentially volatile income. As a deposit insurer, PIDM uses these actions to promote financial literacy and awareness of its protection systems.

4 IADI Fintech Brief Series

There is very little research on the challenges and opportunities that fintech presents to deposit insurers. This research series seeks to identify issues for deposit insurers on various fintech developments and relevant areas for future research and guidance.

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