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# **IMPACT OF DIGITALISATION OF FINANCIAL SERVICES ON PENSION SUPERVISORY PRACTICES: CASE STUDIES**

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## IMPACT OF THE DIGITALISATION OF FINANCIAL SERVICES ON SUPERVISORY PRACTICES IN THE PRIVATE PENSION SECTOR

Nina Paklina<sup>1</sup>

### ABSTRACT

This paper reviews the most significant applications of digital technologies for the private pension sector and concentrates on the assessment of the current and foreseen impact of digitalisation and new technologies on pension supervision. The project includes also three country case studies from Hong Kong, China; Kenya and Mexico.

We analyse three key areas pertaining to the main theme of the project: major FinTech developments in the private pension sector, some of them being prompted by the supervisors; existing and evolving supervisory approaches and practices to the most significant FinTech developments in the private pension sector; and the ways supervisors themselves use innovative technologies (“Reg Tech” and “SupTech”) to make oversight and communication with stakeholders more cost-effective and efficient. Compared to other segments of the financial sector, digital innovation in the private pension area is still in a nascent stage and relates only to certain areas of pension service providers’ activities as well as their interactions with supervisors.

Supervisors aim in the first place to offer support and foster financial innovation, through organisation of regular meetings, establishment of innovation hubs and/or regulatory sandboxes. In parallel, they also intend to closely monitor developments and address any emerging risks involved with FinTech for the financial sector and consumers. cyber-attacks, stealing of pension assets, private information breaches and fraud are considered the main areas for supervisory attention and priorities for supervisory examinations. A number of jurisdictions have adopted risk-centred and technology-neutral regulatory and supervisory approaches, where the issues are treated according to the risk they pose and not the technology per se.

Still being at an early stage of development and adoption in most jurisdictions, technology-enabled solutions (SupTech) are considered important tools that could enhance the quality and cost-effectiveness of supervisory oversight.

**Keywords:** innovative technology, FinTech, RegTech, SupTech, pension supervision.

**JEL codes:**

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## IMPACT OF THE DIGITALISATION OF FINANCIAL SERVICES ON SUPERVISORY PRACTICES IN THE PRIVATE PENSION SECTOR

### Project Background

1. As a part of the IOPS 2017-2018 Programme of Work, the Members decided to launch a project looking at the impact of the digitalisation of financial services on supervisory practices in the private pension area.

2. Innovative technologies are being widely used in all sectors of the economy. The financial sector is seen as the largest user of innovative technologies (“FinTech”) and a major driver of the digital transformation occurring in economies<sup>2</sup>. Extensive work to understand the role of innovative technologies in the financial sector and related regulatory and supervisory approaches has been undertaken at the regional European level<sup>3</sup> and at the international level. The G20 and the leading standard-setting bodies, such as the OECD (with its horizontal project on the digitalisation of the economy and society), the Basel Committee on Banking Supervision (BCBS)<sup>4</sup>, the Financial Stability Board (FSB)<sup>5</sup>, the International Organisation of Securities Commission (IOSCO)<sup>6</sup> and the International Association of Insurance Supervisors (IAIS)<sup>7</sup> have developed work in their respective domains of competence. It is therefore an opportune time for the IOPS to also investigate the topic and share results with its peers.

3. This working paper briefly reviews the most significant applications of digital technologies for the private pension sector and concentrates on the assessment of the current and foreseen impact of digitalisation/new technologies on pension supervision. Three case studies (Hong Kong, China; Kenya and Mexico) form part of the project.

4. The paper addresses three key areas pertaining to the main theme of the project:-

- major FinTech developments taking place in the private pension sector, some of them being prompted by the supervisors (see Section I);
- existing and evolving supervisory approaches and practices to the most significant FinTech developments in the private pension sector (see Section II);

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<sup>2</sup> European Commission, *FinTech Action plan: For a more comprehensive and innovative European financial sector*, 8 March 2018, [https://ec.europa.eu/info/publications/180308-action-plan-fintech\\_en](https://ec.europa.eu/info/publications/180308-action-plan-fintech_en)

<sup>3</sup> European Commission, *FinTech Action plan: For a more comprehensive and innovative European financial sector*, 8 March 2018, [https://ec.europa.eu/info/publications/180308-action-plan-fintech\\_en; the European Supervisory Authorities \(ESAs\) and the European Parliament.](https://ec.europa.eu/info/publications/180308-action-plan-fintech_en; the_European_Supervisory_Authorities_(ESAs)_and_the_European_Parliament.)

<sup>4</sup> *Sound Practices: Implications of fintech developments for banks and bank supervisors*, <https://www.bis.org/bcbs/publ/d415.pdf>

<sup>5</sup> FSB, *Financial Stability Implications from FinTech: Supervisory and Regulatory Issues that Merit Authorities' Attention*, <http://www.fsb.org/wp-content/uploads/R270617.pdf>

<sup>6</sup> IOSCO, *IOSCO Research Report on Financial Technologies (FinTech)*, February 2017

<sup>7</sup> IAIS, *FinTech Developments in the Insurance Industry*, 2017

- the ways supervisors themselves use innovative technologies (“Reg Tech” and “SupTech”) to make oversight and communication with stakeholders more cost-effective and efficient (see Section III).

5. This project has been developed by the IOPS Members<sup>8</sup>. Bilateral requests for information and replies to the questionnaire as well as desk research (IOPS Members’ websites and publications IOPS members and other IOs) provided the primary sources of information.

6. The key findings of this paper can serve as a basis for the possible development of broad IOPS principles for FinTech supervision.

7. There are currently numerous existing definitions of financial technology (FinTech) elaborated by international organisations<sup>9</sup> or the supervisors themselves. Belgium’s Financial Securities and Markets Authority refers to it as “*start-up or established firms that use technology to offer innovative processes, products or services in the financial sector*”<sup>10</sup>. The European Securities and Market Authority (ESMA) defines FinTech as “*a type of financial innovation that relies on Information Technology to function, e.g. internet, cloud and that can result in new business models, applications, processes, products or services with an associated effect on financial markets and institutions and the provision of financial services*”<sup>11</sup>. Generally, FinTech includes a broad range of companies and actors with different legal status, posing distinct challenges and therefore being subject to different regulatory regimes and supervisory scrutiny.

8. SupTech is a relatively new term emerging in the field of financial supervision. A tentative definition of SupTech could be the use of innovative technologies to support supervisory activities to achieve more cost-effectiveness and efficiency in supervisory approaches and improved capabilities<sup>12</sup>.

9. Different approaches have been developed to analyse FinTech developments. The OECD Committee on Financial Markets (CMF)<sup>13</sup> proposes a comprehensive framework to guide policy makers when addressing the topic of digitalisation of financial services. In our study we will draw on some key elements of this framework<sup>14</sup>.

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<sup>8</sup> The Team Members for this project include supervisory authorities from: Australia, Austria, Hong Kong (China), India, Kenya, Maldives, Mauritius, Mexico and Turkey. The Mexican supervisor, CONSAR, was Team Leader of the project. Twenty four (24) IOPS Members replied to the short survey elaborated by Team Members: Albania (AL), Brazil (BR), Bulgaria (BG), CAPSA Canada, Colombia (CO), Guernsey (GG), Hong Kong, China (HK), Jamaica (JM), Iceland (IS), India (IN), Lithuania (LT), Liechtenstein (LI), Morocco (MA), Mauritius (MU), Mexico (MX), Namibia (NA), Nigeria (NG), Romania (RO), Russian Federation (RF), Serbia (RS), Slovak Republic (SK), Turkey (TR) (Undersecretariat of Treasury and the Pension Monitoring Center), Uganda (UG).

<sup>9</sup> For instance, the Basel Committee on Banking Supervision (BCBS) adopted the FSB’s working definition for FinTech: “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”. [FSB, June 2017].

<sup>10</sup> Source: FSMA website, <http://www.fsma.be/en/Supervision/finbem/FinTech.aspx>

<sup>11</sup> [www.esma.europa.eu](http://www.esma.europa.eu), (speech delivered at the Stock exchange and Securities conference, 18 January 2017)

<sup>12</sup> Financial Stability Institute, FSI Insights on policy implementation N9, *Innovative technology in financial supervision (suptech) – the experience of early users*, Dirk Broeders and Jermy Prenio, July 2018

<sup>13</sup> OECD, *Financial markets, insurance and pensions: Digitalisation and Finance*, 2018.

<sup>14</sup> OECD, *Financial markets, insurance and pensions: Digitalisation and Finance*, 2018.

## Introduction

10. Technological innovation is a major development that affects the whole financial sector, including payment services, banking, funding, insurance, investment, advice and private pensions.

11. A broad range of developments in the finance sector has been prompted by such technologies as the internet, distributed ledger technology (DLT) – blockchain, innovative mobile technologies, Artificial Intelligence, Big Data, Cloud computing, crowdfunding platforms and the use of technology-based customer data.<sup>15</sup>

12. At present, these innovative technologies are more used in banking services (means of payment), lending business and fundraising (crowdfunding, peer-to-peer and peer-to-business funding), insurance, financial analysis, securities trading and portfolio management. There are also some developments being observed in the private pension sector.<sup>16</sup>

13. It is worth underlining that in many IOPS jurisdictions, digitalisation and technological innovations in the private pension area are still in a nascent and experimental stage, touching only certain areas of pension service providers' activities, as well as their interactions with supervisors. This quite cautious take-up of innovative technologies in the private pension sector could be explained by a large variety and complexity of pension arrangements and optionality embedded in pensions. Moreover, pension markets tend to be highly regulated in most jurisdictions with products standardised and fees controlled. However, despite this slow start compared to other sectors (retail trade) or segments of the financial sector, some innovative concepts and services are embracing the private pension sector. Keeping pace with technological developments in the financial sector, supervisory authorities are also in the process of reviewing how to use in a structured way innovative technologies to increase efficiency and cost-effectiveness of their oversight activities (SupTech).

14. Financial innovations driven by technological developments (FinTech) present a range of opportunities for the financial industry, including private pensions, and more generally for the economy, government authorities and consumers. For the financial industry, such innovations are seen as a catalyst of transformation and, potentially, growth with new channels to reach a wider range of individuals. Innovations may favour greater market efficiency through increased competition and diversity through the creation of new business models, “smart” contracts, products and services. Moreover, innovations can also speed up payments and transactions, reduce the number of intermediaries, contribute to the optimisation of administrative and operational processes and therefore reduce costs. For government authorities, including supervisory authorities, innovative technologies can offer opportunities in the areas of data collection, registration (delivery and record of licences; record of digital identity, etc.) and data analysis, more efficient and transparent public services delivery, streamlining and automating reporting and compliance. Benefits for consumers may include: increased trust and confidence in the financial (private pension) system, delivery of more personalised products and services, easier access to information and use of financial services and products, facilitating decision-making and reducing cognitive bias; better services offered at potentially lower cost through automated processes.

15. However, innovations also *bring risks*. They may accentuate already existing risks or create new ones – for firms whose business models may have changed and for consumers with the emergence of new

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<sup>15</sup> See a brief overview of new or emerging technologies used in finance sector: OECD, *Financial markets, insurance and pensions: Digitalisation and Finance*, 2018; <http://www.oecd.org/finance/financial-markets-insurance-and-pensions-2018.htm>

<sup>16</sup> OECD, *Financial markets, insurance and pensions: Digitalisation and Finance*, 2018; <http://www.oecd.org/finance/financial-markets-insurance-and-pensions-2018.htm>

product and services which are not yet well understood or controlled. From the financial or pension supervisory perspective, the following risks require close attention and monitoring: cyber-related risk, technology risks, operational risks related to outsourcing, concentration risks, information asymmetry between consumers and service providers, consumer protection issues (e.g. fraudulent activities, online consent issues, complaints resolution mechanisms, possible occurrence of various forms of financial or digital exclusion).

16. Innovations occurring in the financial sector, including private pensions, have become an area of increased supervisory attention. In this regard, in a growing number of jurisdictions<sup>17</sup>, regulatory and supervisory authorities have adopted a dual approach towards financial innovation. They aim in the first place to offer support to financial innovation, through provision of guidance to entities interested in FinTech issues through innovation hubs, or the creation of regulatory sandboxes that offer a framework for testing innovative ideas and products. Secondly, they aim in parallel to closely monitor and subsequently address any emerging risks involved with FinTech for the financial sector and consumers. It is also observed in a number of jurisdictions that pension supervisory authorities working closely with other stakeholders are at the forefront and initiate take-off of innovative technologies in the private pension sector. Such actions include the creation of mobile applications and interactive platforms, information storage or centralised pension databases, e-pension infrastructure systems and financial ecosystems. Their aim is to further strengthen the private pension systems, enhance protection of users and their retirement savings, eliminate deficiencies in commercial practices and improve quality and access to information and pension services. In a digital world, supervisors have also started testing the use of innovative technologies for supervisory purposes. At this early stage of development, innovative technologies primarily serve to gather more and better information and develop new analytical solutions. Such data enables more efficient supervisory oversight (risk monitoring and management) through analysis of more accurate and real-time information.

17. With respect to the use of innovative technologies in the financial sector, it is also critical to keep in mind the international and cross-sectoral dimensions of financial services. Financial innovations contribute to making financial markets and sectors even more interconnected and global. Therefore, they call for a co-ordinated supervisory approach domestically and internationally.

## **I. Use of digital technologies in the private pension sector**

18. The purpose of this section is to stock-take a number of applications of innovative technologies observed by IOPS members in their private pension sectors and highlight the developments/areas where supervisors had a role to play.

19. The responses to the IOPS survey and the desk research of selected Members' experiences<sup>18</sup> have shown that new digital technologies are exploited for the following purposes:-

### *To increase coverage*

20. Low pension coverage and insufficient pension savings, especially in voluntary private pension systems, are among key policy concerns in many jurisdictions (OECD, 2014, Munnell et al. 2012). Research shows that in some countries the number of young workers contributing to private pension arrangements is declining<sup>19</sup>, with the main reasons being lack of knowledge and myopia, but also lack of sufficient capital or

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<sup>17</sup> AU, BE, FR, NL, UK

<sup>18</sup> Review of selected Members' websites and annual reports

<sup>19</sup> In Ireland, the number of 25-34 years old in employment with private pension plans fell from 49% in 2009 to 36% in 2015 (CSO 2015). Similarly, in the Great Britain the savings rate fell from 43% to 31% for those aged 20-40 between 2001 and 2011 (ONS 2011), source JPEF article under review JPEF-18-1076. In the United

income. Considering that emerging FinTech applications attract in particular the attention of younger generations (millennials) and other digital natives, the use of new technologies may contribute to greater adoption of digital solutions to plan and manage financial resources. Digitalisation potentially may also lead to greater take-up of private pensions, in particular in voluntary pension systems. This can be the case especially for certain categories of the population such as the young, the self-employed, workers in the informal sector, etc. In this regard, a number of jurisdictions offer valuable insights.

21. In Kenya, more than 80% of the working population is in the informal sector and not covered by a registered retirement plan. To address this problem, a retirement saving vehicle – Mbao Pension Plan - was created to help members of the informal sector save for retirement (Box 1, also see Kenyan case study). This is a joint initiative between the Retirement Benefits Authority of Kenya (RBA), the financial industry and a telecom company. The Mbao Pension Plan is based on mobile companies' money transfer platforms<sup>20</sup>, known as M-PESA or Airtel Money, in which Kenya is a world leader.

22. Technological innovation in mobile money transfer services, which is changing the way financial and pension services/products are distributed, plays a pivotal role in the Kenyan economy. Information technology servicing the expansion of mobile money transfer services accounted for about 0.9% of GDP in 2015, with 1.1 billion transactions amounting to KES 2.8 bln made through the system in 2015<sup>21</sup>. Kenyan FinTech companies specialising in e-commerce and money transfer sectors intend to broaden services to a wider number and range of countries. Finserve, for example, will launch a new platform for operations in payment and money transfer in East and Central Africa as well as South Africa<sup>22</sup>.

23. The Mbao Pension Plan allows customers to deposit, withdraw and transfer money easily with the use of a mobile device. The experiment attracted much interest from other supervisory authorities and similar initiatives were launched or are under development in other countries such as Ghana, Nigeria<sup>23</sup>, Tanzania and India to address coverage gaps in the informal sector.

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States, about 66% of people between the ages of 21 and 32 have not saved anything for retirement according to the National Institute on Retirement Security (Census data collected in 2014).

<sup>20</sup> There is a considerable growth of mobile payment systems in Kenya such as M-PESA and BitPesa. M-PESA is not blockchain-based, while BitPesa is.

<sup>21</sup> Kenya, *2017 Budget Policy Statement*

<sup>22</sup> Source: Agence Ecofin

<sup>23</sup> The Supervisory Authority of Nigeria (PenCom) has recently introduced the Micro Pension (MP) Plan for the informal sector leveraging on innovative technology.

### **Mbao Informal Sector Pension Plan, Kenya<sup>24</sup>**

**Objective:** to provide a cost-effective, flexible and efficient savings vehicle for the informal sector

**Regulatory framework:** RBA for the purposes of regulation and the Kenya Revenue Authority for tax

**Target population:** informal-sector workers (although formal-sector workers also joined the plan)

**Members:** in December 2014: 66,228 (about 45% of total membership of individual pension plans)

**Awareness:** through informal-sector associations, Open Days organised by RBA, service providers' stations

**Stakeholders:** RBA, the Supervisory Authority; Kenya Commercial Bank, legal owner, trustee & custodian; Co-Trust Investment Services, investment manager; Eagle Africa Insurance Brokers, fund administrator; Safaricom (M-Pesa) and Airtel (Airtel Money), mobile money transfer platforms

**Minimum contributions:** KES 20 (0.20 USD) per day, KES 500 per month or KES 6000 per year. Contributions paid by members through either M-PESA or Airtel Money transfer services are managed and invested on their behalf by service providers appointed by Mbao Trustees and approved by the RBA.

Source : ppt, by Ms Patricia Odera, RBA, RBA website: <http://www.rba.go.ke/index.php/en/mbao-pension-plan-faqs>.

24. Issues for the attention of the public and possibly supervisory authorities relate to the fact that mobile payment services providers may be levying excessive and undisclosed fees. The Kenyan Government's review process stated that telecommunication companies must disclose all hidden charges in mobile payments and ensure transparency of mobile payment services.

*To engage individuals with private pensions and encourage voluntary retirement savings*

25. The development of digital interfaces (mobile apps, web platforms, self-service kiosks (customer portals), online consolidators and simulators) by pension providers and companies is common in the IOPS jurisdictions. Pension supervisory authorities are also active players in this field, developing their own digital instruments for pension members and beneficiaries. Use of such tools is seen as a possible way to help engage individuals with private pensions, e.g. support decision-making and foster understanding and knowledge about private pensions, and also facilitate saving for retirement. Across the jurisdictions, private pensions are perceived as a highly complex matter that involves difficult decisions and risk-taking. Complexity and comprehension are regarded as central issues in relation to retirement savings<sup>25</sup>. Innovative technologies could offer solutions to address some of the challenges.

*Mobile technology and online platforms*

26. In a growing number of jurisdictions, pension scheme providers and pension funds are adapting their online services into mobile applications (apps) or web platforms to enhance their services and engagement with members through digital means. Often, mobile apps or online platforms include pension calculators<sup>26</sup>. The main purpose of these e-tools is to provide key pension information digitally to savers,

<sup>24</sup> For more details, see the Kenya case study

<sup>25</sup> JPEF article "Supporting decision-making in retirement planning: Do diagrams on pension benefit statements help?", 2018, McGowan, F., under review.

<sup>26</sup> AT, HK, HU, IN, MA, MU, UG

which ultimately may bring significant cost savings to plans and participants. These tools may also offer digital payment solutions (through e-banking or mobile transfer services) to facilitate making pension contributions, investment options, fund switches, receive news or personal messages<sup>27</sup> - developments believed to encourage retirement savings. In Hong Kong, China, some pension scheme trustees have started using artificial intelligence chatbots to answer enquiries and biometric fingerprint login identification for registered members.

27. In the Province of Ontario, Canada, many single-employer pension plans provide access to pension information on intranets or websites, or through the websites of their third-party plan administrators (especially in the case of defined contribution pension plans). Large public-sector pension plans have developed mobile apps for all aspects of member communication and plan administration. Some members can even apply for their retirement benefits through the plan app.

28. In Chile, an online service (PreviRed)<sup>28</sup> was set up to facilitate the payments of pension and health insurance contributions. The service processes around 96% of the pension payments in the country (the remaining 4% use the traditional banking system). It implies no cost for the users (including employers or independent workers) and was designed in a very user-friendly format. PreviRed has formed the most important network of pension institutions operating in mandatory and voluntary private pension systems in the country. Users access PreviRed with their unique national identity number (RUN) and personal password. The online system offers a valuable opportunity for the users to view retirement contributions within a wider context: mandatory and voluntary contributions as well as healthcare, thus facilitating financial decisions.

29. Another important development is the creation of comparison websites and the industrywide pension dashboard to access retirement savings in one place<sup>29</sup>. In the current context of evolving labour markets, people will be likely to collect benefits from multiple plans and companies. Therefore, offering a platform (centralised service) where individuals can see all their accumulated pension savings/assets in a clear and simple format is a desirable development that may foster engagement, especially by the young, with retirement savings and result in better retirement planning.

30. In the context of digital transformation in the private pension sector, it is important to highlight the role and efforts by pension supervisory authorities to create awareness and develop their own digital tools to allow members to keep track of their current retirement contributions and savings, as well as to better plan for retirement. Prominent examples include AforeMóvi (a mobile app) created by CONSAR, the Mexican regulator, and mobile apps developed by the MPFA in Hong Kong, China. Also, most recently the MPFA launched on its website a Fund Performance Platform to offer easy access to key information and comparison of the performance of MPF funds. This measure is intended to facilitate decision-making on MPF investment. [See also case studies on Hong Kong, China and Mexico].

### *Digital Ecosystems*

31. Another emerging trend is the development of financial ecosystems<sup>30</sup> involving a wide range of participants, e.g. traditional players, telecommunication operators, commercial entities, FinTech companies, and supervisory authorities. It is worth noting here a far-reaching innovative strategy developed by CONSAR in the creation of a digital ecosystem. Arguably, such an approach suggests a move away from traditional activities, including supervisory oversight, towards the promotion of a new type of relationship or interconnectiveness in the financial system between supervisor, incumbents and new players, particularly

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<sup>27</sup> In Turkey, SMS and emails are widely used to encourage auto-enrolment process.

<sup>28</sup> [www.previred.com](http://www.previred.com)

<sup>29</sup> In the UK, there is a plan to introduce a pension dashboard next year.

<sup>30</sup> CO, MX

through technological innovation and third-party services providers. CONSAR is currently working on the regulatory changes that should enable full implementation of this digital ecosystem.

32. The innovative digital ecosystem under construction in Mexico provides financial inclusion in four areas:-

- Security: *Customer Knowledge / Consumer Protection / Paperless*
- Accessibility: *Easy / Anywhere / Everyone is included*
- Diversity: *Access to savings / Multiple channels / No cost*
- Comprehensiveness: *Location of Afore / Pension Education / Control of Savings*

**Figure 1: Innovative digital ecosystem under construction in Mexico**



Source: CONSAR

33. Several key elements form part of the Mexican digital system for the private pension sector:-

- **Digital ID file with biometric elements** (fingerprints, voice and digital signature) that collects all documents and personal information of every person with an individual pension account<sup>31</sup>. By December 2017, around 30% of registered Mexican workers had an Electronic ID file including biometrics (around 12 million files).
- **National centralised database**
- Promotion of financial inclusion through payment aggregators (loyalty programmes)
- **Mobile Application for smart phones (AforeMóvil)**. In addition to “AforeMóvil”, other technological platforms in Mexico offer new channels to engage people with their individual account

<sup>31</sup> Presentation by Mr. Carlos Ramírez Fuentes “*Impact of digitalisation of financial services on supervisory practices: Mexican case*”, IOPS Technical Committee meeting, Dublin, Ireland, 22 February 2018.

and facilitate making contributions to their pension account (for example “Millas para el Retiro”, “Transfer” and “uLink” for Mexicans living overseas) in compliance with pension regulation.

- **Web portal**, e-SAR<sup>32</sup>, provides services related to Mexican pension funds.

34. Other IOPS jurisdictions (Australia, Chile, India, the Netherlands<sup>33</sup>, Russian Federation, Turkey and others) have already introduced or are pursuing similar work of creating digital identification numbers to access governmental services and in particular pension accounts. Austria offers access to governmental services and to pension accounts (related presently only to first-pillar pensions) via personal identification or a special identification card (*Bürgerkarte*).

35. Also in the Netherlands in the experimental stage, the two largest pension fund asset managers, APG and PGGM, are working on redesigning the entire pension infrastructure using blockchain technology. The objective is to work on the creation of an ecosystem that will involve pension funds, employers, service providers, supervisory authorities and other governmental agencies<sup>34</sup>. The first phase of this joint experiment involved the development of blockchain-driven pension administration<sup>35</sup>. A prototype of a virtual DB scheme has been developed where administrative data is shared among defined parties and its view, use and change is controlled by so-called “smart contracts”. The next step of the project will be to run the entire administration on blockchain. The project is still in the early stages of development and it is too early to say when the technology could take over the existing administration.

*To improve administration, operational efficiency and pension services*

36. Innovative technologies have the potential to simplify and improve efficiency of administrative procedures, reduce administrative costs and offer higher quality services and experiences for the users.

37. In this way, in Hong Kong, China, over the past years, measures have been taken to standardise, streamline and automate MPF scheme administration. Pension supervisor, MPFA, has already undertaken several initiatives. In 2012, it introduced an electronic system (ePASS) as a secure platform for the automatic transmission of data on transfers of MPF benefits between trustees. In 2014, the MPFA, in a joint initiative with other authorities in Hong Kong, China<sup>36</sup>, launched an E-Payment for MPF Transfer<sup>37</sup>. It aims to automate the payment and settlement of transfers of MPF accrued benefits between trustees to further shorten the time needed for transfers, enhance efficiency and the accuracy of transfer processes. The MPFA is currently exploring ways to develop a centralised electronic platform (eMPF). With the help of technology, it is expected that this new platform will bring significant and fundamental change to the administration of the MPF system. It is considered that the success of eMPF will ultimately depend not only on innovative technological solutions to be offered by the new system but also on the take-up by users (members,

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<sup>32</sup> Online platform, e-SAR ([www.e-sar.com](http://www.e-sar.com)) aims to improve the way pension fund services are provided.

<sup>33</sup> <http://www.digid.nl/en/about-digid/>

<sup>34</sup> [http://www.aiof.org/wp-content/uploads/2018/04/Joep-Beukers\\_Managing-Director-of-Innovation\\_APG-Holanda.pdf](http://www.aiof.org/wp-content/uploads/2018/04/Joep-Beukers_Managing-Director-of-Innovation_APG-Holanda.pdf)

<sup>35</sup> IPE magazine ([www.ipe.com](http://www.ipe.com)), APG and PGGM building prototype of blockchain administration, October 2017;

<sup>36</sup> The Hong Kong Monetary Authority and the Hong Kong Interbank Clearing Limited.

<sup>37</sup> E.g.: registration, switching, re-certification, updating data, accounts unification, pension fund choice, partial or total withdrawals, resources re-integration, purchase of a programmed withdrawal.

employers and trustees) of e-services. The MPFA is currently working on publicity and education strategies to promote greater utilisation of existing e-services to pave the way for full digital adoption of eMPF.

38. In Mexico, on the initiative of CONSAR, the electronic file was introduced in 2015 to improve administration as well as achieve greater security and better processing of individual data. The electronic file captures the following: official ID, address document, biometric information (fingerprints, voice and digital signatures) and all members' interactions with a pension fund. All data are stored in a central database. Previously, paper documentation resulted in high storage cost, capture (inputting) mistakes, lack of control and time to process the information. Introduction of the electronic file achieves a number of gains such as better service provision to members due to accurate contact information; and greater security and control in the management of members' information, which inhibits the risk of any improper practice. In addition, the electronic files bring about better validation (avoidance of duplication, lost or filling mistakes in personal information) and faster processing of personal information, resulting in lower administrative and operational costs. The electronic file needs to be created with respect to the major administrative procedures<sup>38</sup>.

39. In Mauritius, there is a notable interest among pension services providers to invest in data-sharing, investment management and administrative software (a document management system, web-based platforms) to enable information sharing between stakeholders, web-based investment portfolio analysis platforms and online platforms for transacting in mutual funds or collective investment funds.

40. Another emerging trend observed consists of the use of Cloud technology<sup>39</sup> in pension administration<sup>40</sup>. This frees up physical office space, as there will be less need to keep IT hardware. In addition, it lowers IT expenses (including expensive software upgrade costs), moves towards paperless storage with the hard paper files scanned electronically and uploaded into the administration system. Cloud technology gives access to administrators and member to scheme documents any time from anywhere in the world. However, using the Cloud brings its own security issues that need to be addressed properly.

41. Most of the insurance and pension companies in Austria use Cloud services for administrative purposes.

42. Also in the UK, the 2017/2018 Rewards and Employee Benefits Association (REBA) technology survey shows that pension schemes are adopting Cloud-based platforms for auto-enrolment<sup>41</sup>. The survey finds out that three-quarters of employers use Cloud-based pension platforms or off-site hosted software. Workplace pension schemes in the UK are looking to adopt more advanced technologies that will improve income modelling, encourage staff to increase contributions and guide them through retirement.

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<sup>38</sup> E.g.: registration, switching, re-certification, updating data, accounts unification, pension fund choice, partial or total withdrawals, resources re-integration, purchase of a programmed withdrawal.

<sup>39</sup> Cloud hosting ('the Cloud') refers to software applications, platforms and infrastructure that are based remotely (usually outside the company's own infrastructure) and accessible through internet. The storage of data in the Cloud could facilitate the processing, management and recovery of data. The most predominant Cloud providers are Google, Amazon and IBM.

<sup>40</sup> Cloud computing is used by pension funds mainly to improve operational and administrative efficiency and in some cases for pension asset management in Albania, Colombia, Iceland, Hong Kong, China, Jamaica, Mauritius and Nigeria.

<sup>41</sup> By the end of December 2017, over 9.1 million employees were automatically enrolled into a workplace pension and over 983,000 employers had met their auto enrolment duties (Source: DWP, the UK).

43. In Iceland, the use of Cloud solutions by pension funds has been increasing steadily since 2015<sup>42</sup>. Already nine pension funds have been using Cloud solutions to various extents, whereas others are looking into this solution. Some pension funds are using the Cloud to set up management portals for board members and portals for beneficiaries; others are replacing email servers and a few are placing filing systems (data storage) in the Cloud. Those entities who wish to implement Cloud solutions have to fill in a form<sup>43</sup> on the website of the supervisory authority, FME. This check-list, created by the FME, covers the following categories:

- Information regarding the type of Cloud services
- Third-party access
- Risk assessment
- Security and security measures (such as ISO/IEC 27018, encryption of sensitive data etc.)
- Back-ups
- Contingency planning (including exit strategy)
- Outsourcing.

44. The FME looks at the applications on a case-by-case basis to decide whether to grant approval. The supervisor can make objections if it considers the Cloud solution is not compatible with legal requirements. The Icelandic supervisor believes that some supervised entities may have implemented Cloud solutions without being aware of the FME form and intends to investigate this matter in the near future. Among key risks, the FME highlighted the issues of possible data loss if pension funds were allowed to store all back-ups in the Cloud and possible data breaches. In this regard, the FME requires that the contract between a pension fund and a provider of Cloud solution includes a provision regarding access and auditing rights through the service provider. Regarding access and auditing rights, the FME demands that the contract between the regulated entity and the Cloud solution provider have a provision granting the FME access if needed. Auditing rights in this respect are with regard to the external auditors of the regulated entity, and the principle that outsourcing should not limit the scope of the audit. To that point, the audit function is carried out by external auditors but the access rights are reserved for FME staff if the authority deems it necessary to utilise it for the purpose of retrieving data.

45. In Turkey, Cloud computing is not allowed for security reasons. Personal information protection law and other policies prohibit the storage and transfer of confidential data abroad.

*Other potential areas where innovative digital technologies may appear in private pensions*

46. Investment processes and robo-advice are other active areas.

*Investment processes*

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<sup>42</sup> In general terms, the Icelandic government has devoted attention towards the development of Cloud computing data storage projects, including through FDI initiatives. Efforts have been taken to attract data storage companies to locate Cloud computing storage centres in Iceland. Although Iceland has imposed stricter data privacy laws than those generally required by the EU, no specific performance requirements have been introduced on data storage centres. Moreover, there are no other particular impediments to such projects, such as requiring them to be located in specific areas or to allow government access to data for surveillance purposes. For more information, see the Invest in Iceland webpage: <http://www.invest.is/key-sectors/data-centers>, source US Department of State, *2017 Investment Climate Statements, Iceland*, 2017.

<sup>43</sup> <https://www.fme.is/media/leidbeiningar/Gatlisti-vegna-innleidingar-skyjalausna.pdf>

47. New technologies are impacting almost all stages of the investment process – research, analysis, portfolio construction and management, trading, risk monitoring and settlements. Application of Blockchain technology and Artificial Intelligence (‘AI’) are emerging technological trends in investment. The asset management industry both in the US and Europe is testing a variety of Blockchain initiatives to enhance efficiency (e.g. in index data processing and sharing<sup>44</sup>, tracking and analysis of transactions, organisation of data for reporting<sup>45</sup>). The industry is also considering or is at the early stages of implementation of AI technologies. AI algorithms could support the investment decisions of asset managers (e.g. portfolio selection process, automatic portfolio rebalancing and algorithmic securities trading) and are foreseen to be increasingly used by retail investors, especially young people. The results of the IOPS survey show, however, that at present AI technology is not yet used for pension asset management in the responding jurisdictions, with the exception of Turkey.

48. One issue currently debated in international fora like G20, OECD, ESAs, and which is closely monitored by financial supervisors, is the rapid emergence of crypto-currencies<sup>46</sup>. A potential issue of concern for pension supervisory authorities could be investments by pension funds in crypto-currencies either directly, or indirectly, for example through hedge funds. The experiences of IOPS jurisdictions show that at the present time, such investments (direct or indirect) are either not regulated (Turkey) or not allowed, for example in Bulgaria, Colombia and Nigeria. Certain supervisory authorities said that they are not aware of such investments by pension funds. The Financial Market Authority (FMA) of Liechtenstein is not ruling out that pension funds could invest in crypto-currency in the future.

49. In Canada, a major pension plan, OMERS, is the first in the country to take a step into the cryptocurrency business through the creation of an Ethereum-focused public company that is planning to raise CAD 50 mln.

50. In general, supervisors recognise that developments in this area must be closely followed and regulatory restrictions carefully examined. In this direction, the British government has announced a plan to establish a special taskforce<sup>47</sup> for crypto-assets as part of a larger FinTech sector strategy to help to understand and manage any potential risks, as well as harnessing potential benefits of the underlying technology. Similarly, in 2017, the Financial Services Commission of Ontario established a FinTech Working Group to identify and address any emerging market conduct concerns in relation to the adoption and introduction of new technologies by regulated entities.

#### *Investment via robo-adviser*

51. Robotic technology has many real world applications, including in finance. In recent years, ‘robo-advisers’ (understood as a software, rather than physical robots) are gaining in popularity as an investment tool, providing financial advice and management of customers’ investment portfolio<sup>48</sup>. They offer automated, online and relatively low-cost services, accessible to more people. Most of the investment portfolios currently compiled by robo-advisers are made of Exchange-Traded Funds (ETFs) due to their lower fees. The operation of robo-advice is based on digital technologies such as intelligent algorithms, big data and mechanical learning. Robo-advisers’ services are foreseen to grow, but their current value is

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<sup>44</sup> <https://pressroom.vanguard.com/news/Press-Release-Vanguard-Using-Blockchain-Technology-To-Improve-Index-Data-Distribution-121217.html>

<sup>45</sup> <https://www.coindesk.com/irish-fund-managers-blockchain-data-reporting/>

<sup>46</sup> OECD, *Financial markets, insurance and pensions: Digitalisation and Finance*, 2018.

<sup>47</sup> The Taskforce will include the Bank of England, the Financial Conduct Authority and the UK Treasury.

<sup>48</sup> For more information, see OECD, *Robo-advice for pensions*, 2017.

relatively low. In the US robo-advisers managed USD 126 bln in 2016 (compared to USD 69.1 trn in global assets under management)<sup>49</sup>. According to a forecast by KPMG, the AUM by robo-advisers will increase from USD 300 bln in 2016 to USD 2.2 trn in 2020<sup>50</sup>.

52. Throughout IOPS jurisdictions, the pension robo-advice market is still very small and limited data are available. Only a few examples of robo-advice related to retirement savings were collected<sup>51</sup>: in Australia and in Colombia, where one of the pension funds is implementing a project with a robo-adviser that will support the construction and follow-up of clients' savings plans. In Turkey robo-advising applications have been developed in recent years. One provider in the private pension sector, Garanti Emeklilik ve Hayat A.Ş., provides a Robo Fund Advising System. However, the Pension Monitoring Centre has no information about the algorithm that the platform uses. Also, AddVICE (a trademark by a Turkish Fintech company) is another example of a robo-advice platform in Turkey.

#### *RegTech – early stage of development*

53. “RegTech” or “SupTech”, combining the terms *regulation* or *supervision* and *technology*, refer to the use of innovative or new technologies that may facilitate the interaction between the supervised entities and financial regulators or supervisors. Technologies are expected to ultimately automate and improve compliance as well as reduce the cost of compliance for both the authority and the entity.

54. The EU Commission interprets RegTech as “regulatory technology” and a business model where technology enables firms to better comply with regulations. RegTech could also enable government bodies to implement, monitor, or enforce regulation in a more effective, more efficient, or in a more user-friendly manner<sup>52</sup>.

55. Blockchain technology and artificial intelligence (machine learning) are emerging technological trends<sup>53</sup> that could enable industry to develop such techniques. Some financial institutions are already experimenting with an objective to enhance their regulatory compliance. As shown by the FSB report<sup>54</sup> on the example of asset management firms, machine learning tools could help to interpret “regulations into a common language [...] analyse and codify the rules for automation into the integrated risk and reporting systems”, allowing firms to better comply with the regulations. Such techniques should also contribute to reducing cost, time and efforts put into interpretation and implementation of new or updated regulations. “Know your customer” (‘KYC’) is another area highlighted by the FSB report where artificial intelligence could be applied.

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<sup>49</sup> Pension Research Council Conference 2018, 2018 Symposium: The Disruptive Impact of FinTech on Retirement Systems, May 3-4, 2018, presentation by Jill E. Fisch, Marion Labouré, John A. Turner. See also The Economics of Complex Decision Making: The Emergence of the Robo Adviser, J. Fisch and al., August 2017.

<sup>50</sup> MPF Express, *Robo-Advisors: The Future of Wealth Management?*, Q-1, 2017.

<sup>51</sup> Examples of robo-advice in relation to private pensions: AT, CO, TR, UG.

<sup>52</sup> Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions: Consumer Financial Services Action Plan: Better Products, More Choices, 23 March 2017.

<sup>53</sup> IBM Institute for Business Value, *Building trust in government, Exploring the potential of blockchains*, January 2017,

<sup>54</sup> FSB, *Artificial intelligence and machine learning in financial services: Market developments and financial stability implications*, November 2017

56. The survey conducted amongst the IOPS Members revealed only limited experiences in this area. In Hong Kong, China, some MPF trustees use a compliance monitoring system to keep track of the progress of clients' MPF instructions and an anti-money laundering ('AML') system to support Know Your Customer compliance.

57. In Mauritius, in the case of non-occupational pension schemes, the only kind of RegTech solution being used at the moment is "wordcheck" to assist in counterparty/ALM/CFT due diligence and KYC screenings<sup>55</sup>. Also, the FSC of Mauritius and the Bank of Mauritius are working to set up a centralised KYC platform as a repository and main administrator for KYC-related matters.

58. Inputs collected by the Financial Conduct Authority in the UK<sup>56</sup> through discussions and written responses in relation to the development and adoption of RegTech in the financial sector show that technology may offer benefits in the following areas<sup>57</sup>:-

*efficient information-sharing through:-*

- alternative reporting methods that allows the provision of regulatory data in a different or more flexible way, leading to reductions in the cost and burden of regulatory reporting
- shared utilities that allow firms to share services via Cloud or online platforms, slimming the burden and regulatory costs
- online platforms that allow for better communication between firms and regulators/supervisors
- the Cloud/Cloud computing services on the internet that allow greater efficiency and cost reduction

*achieving better understanding of regulatory requirements through:-*

- technology that converts regulatory text into programming learning; machine-readable regulations would allow for more automation and will reduce the cost of change
- robo-handbooks technology that allows firms to interact with regulation and understand its impact on their systems and processes
- Application Programme interface that allows systems to interact with one another

*making better decisions and creating automation:-*

- Big Data, i.e. the advanced analytical solutions that can interpret sizeable volumes of data to support more informed-decision making both for firms and supervisors
- risk and compliance monitoring for surveillance of transactions, behaviour and communications
- modelling/visualisation technology that could help understand impact of regulation before its adoption

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<sup>55</sup> <https://risk.thomsonreuters.com/en/products/world-check-know-your-customer/about-world-check.html>

<sup>56</sup> <https://www.fca.org.uk>

<sup>57</sup> FCA, *Call for input on supporting the development and adopters of RegTech*, July 2016

- cognitive technology that learns from data and pattern recognition to change algorithms (AI)

*new ways (directions) to look at regulation and compliance processes:-*

- Blockchain & Distributed Ledger Technology (DLT) that safely record and share data across a network, contributing to the improvement of system integrity and transparency
- biometrics technology that measures and analysis people's characteristics to verify their identity
- inbuilt compliance system that can automatically apply the regulatory programme code and therefore improve compliance and reduce regulatory and staff costs.

## II. Supervisory approaches to FinTech

59. Advancements in digital technologies in the financial sector in recent years have become an important focus for financial sector supervisors. The 2016 Business Plan of the UK's Financial Conduct Authority identifies innovation and technology as its key priorities. Emergence of a new, previously unknown range of financial products and services, as well as new players competing with incumbent and challenging the usual delivery channels of financial services pose a number of issues for supervisors and makes it essential they understand and respond to these developments in a timely manner.

60. First of all, the rapid pace of technology advancement makes it critical for supervisors to closely monitor developments in the entire financial industry. It is also important that supervisors educate staff on new technologies and build supervisory skills and resources to understand changes in the market at an early stage and to anticipate future developments. Elaboration by supervisory authorities of a dedicated FinTech or SupTech strategy<sup>58</sup> may support building a structured supervisory approach to FinTech innovations taking place in the market and facilitate implementation of SupTech solutions. Another important area of work in which supervisors are involved is the reflection and introduction of right-size regulation that does not unjustifiably impede innovation and gives appropriate powers to supervisors for timely interventions.

### *Regulatory developments in relation to FinTech in private pensions*

61. Disruptive potential of innovative technologies in the financial sector in general and private pensions in particular raises the issue of comprehensive adaption of regulation to address FinTech developments. Fast-moving technological developments pose a number of challenges for regulators. Among them is the already mentioned need to ensure that regulations do not hinder the use of technology for retirement savings and leave enough room for innovation while at the same time safeguarding the system and consumers' rights. There might be a need to review and modernise existing regulatory regimes to eliminate some outdated rules. It is generally recognised that regulating technological evolution that takes place in financial and private pension sectors is a complex task.

62. As highlighted by the FSB report<sup>59</sup>, the regulatory approach taken will depend on whether the current legal frameworks cover developments and any emerging risks resulting from FinTech activities. The

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<sup>58</sup> For more insights on how to develop such strategy see: Financial Stability Institute, FSI Insights on policy implementation N9, *Innovative technology in financial supervision (suptech) – the experience of early users*, Dirk Broeders and Jermy Prenio, July 2018

<sup>59</sup> FSB, *Financial Stability Implications from FinTech: Supervisory and Regulatory Issues that merit Authorities' attention*, June 2017

approach followed by a number regulatory and supervisory authorities<sup>60</sup> consists in adhering to technology-neutral regulatory framework. The main goals of financial regulation such as safeguarding financial security, ensuring access to financial services and consumer protection, imply a risk-centred and technology-neutral regulatory approach. This approach assumes that the existing regulatory frameworks encompass the current FinTech activities. Therefore, regulatory obligations applying to the provision of traditional or digital services are the same. Entities and issues are treated according to the risk they pose and not according to the technology per se. Similarly, the supervisory approach remains neutral with respect to FinTech and should be appropriate and proportional to the nature and risk level. At this early stage of FinTech development (still very small in terms of value and significance in the financial sector), it appears prudent to avoid precipitation and the introduction of new legislation which may lead to a distorted playing field and hinder market forces. In contrast, adopting special regulations or relaxing certain rules during the experimental phase allowing for a gradual adjustment to regulatory requirements seems to be more suited for the risks that FinTech could pose. The future pace of innovation in the financial sector may require a search for solutions that may include adaption or enhancing of financial regulation or creating a new sphere of regulation<sup>61</sup>.

63. It is also worth noting a number of recent important regulatory developments at the European level that take into account technological developments and respond to some of the challenges brought by FinTech. The revised EU Directive on payment services, 2015 (PSD2), as well as the EU regulations on PRIIPS<sup>62</sup> and the MIFID II Directive and regulations enhance regulatory requirements applying to payment services and investment services providers (their operation, conduct and governance). They also strengthen protection of consumers and investors. Another key area of work relates to the regulation on protection of personal data and privacy. The General Data Protection Regulations (GDPR)<sup>63</sup>, which came into force in May 2018 in the EU, place important new obligations on any business that handles the data of individuals living in the EU and the EEA, independent of where the business is located.

64. Drawing on IOPS Members' responses to the survey, recent regulatory changes introduced in some jurisdictions mainly covered issues such as authorisation for pension funds to use digital platforms or mobile applications to enrol members in pension plans (or cancel enrolment). Also, changes were made to allow digital portability of benefits (Brazil); to deliver information to individuals via web-based or electronic platforms (Guernsey and Turkey), signature of pension contracts via e-secure means (Turkey).

65. In Hong Kong, China, to facilitate the launch of the ePASS, the Mandatory Provident Fund Schemes Ordinance was amended, empowering the MPFA to designate an electronic system for the purpose of transfer of accrued benefits. The amendments also authorised the MPFA to charge trustees a fee for the use of the electronic system. The development and introduction of eMPF may entail further legislative amendments.

66. In India, a draft proposed amendment to Point of Presence (POP) Regulations, 2015, for the distribution channel of the new private-sector pension system (NPS), has been released. The draft seeks to include payment banks as one of the distribution channels. Payment banks are independent FinTech

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<sup>60</sup> AU, DE, LT

<sup>61</sup> Banque de France, Financial Stability Review, Financial stability in the digital era, Beyond technology – adequate regulation and oversight in the age of fintechs, Adreas R. Dombert, N°20, 2016

<sup>62</sup> EU Regulations on the key information documents for packaged retail and insurance-based investment products (PRIIPs), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R1286>

<sup>63</sup> [https://ec.europa.eu/commission/priorities/justice-and-fundamental-rights/data-protection/2018-reform-eu-data-protection-rules\\_en](https://ec.europa.eu/commission/priorities/justice-and-fundamental-rights/data-protection/2018-reform-eu-data-protection-rules_en)

companies or subsidiaries of banks or joint ventures of FinTech companies and Banks which utilise IT and ITeS to the extent that they may operate through their websites or mobile apps only.

67. A number of countries are planning to adapt their legislations to allow for creation of regulatory sandboxes (CONSAR, Mexico; Bank of Lithuania are considering introducing a Blockchain sandbox platform).

68. The Financial Services Commission of Mauritius has been mandated to “set rules for regulating FinTech activities” with a view of promoting Mauritius as a regional Fintech centre, in activities such as peer-to-peer lending and funding, as well as mobile wallet. These regulations are under discussion (although do not touch specifically private pension provision).

69. In Mexico, regulatory changes were introduced to allow the use of: biometric authentication methods, unique electronic identification files to substitute paper files, mobile application and a web portal (e-SAR). In 2018, CONSAR is working to develop a consolidated regulatory framework for the Mexican pension funds system to support the implementation of a digital ecosystem and to facilitate regulatory compliance (RegTech), allowing the use of technological innovations and the participation of third parties (like FinTech). On 9 March 2018, the new Law to regulate financial technology companies was published (*Ley para Regular las Instituciones de Tecnología Financiera*). It provides a regulatory framework respecting FinTech in the Mexican financial sector, including pension regulations.

70. The survey carried among IOPS Members concludes that FinTech is not yet defined in private pension regulations.

#### *Supervisory approaches to FinTech in private pensions*

71. IOPS Members’ responses and a review of some supervisory authorities’ experiences<sup>64</sup> towards innovation taking place in the financial sector allow for identification of some general principles and main trends in supervisory approaches:-

##### *Learning more and understanding FinTech better...*

72. ...through **intelligence gathering** and **market monitoring** to better understand and evaluate market trends, new players, the way they operate and the appearance of new business practices. These measures aim also to understand and evaluate the potential impact on other players, on distribution channels and to identify potential risks and issues for consumers. For example, Belgium’s FSMA has launched a systemic “market watch” to keep abreast of developments both domestically and internationally. The market watch is expected to identify the annual priorities for supervision<sup>65</sup>. Also, Austria’s Financial Markets Authority is currently conducting a market survey to gather information on recent market trends.

73. Supervisors are using the results of market monitoring and findings from the reports commissioned or prepared by the authorities<sup>66</sup> as well as analysis of complaints received to build their supervisory strategies and bring new supervisory initiatives.

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<sup>64</sup> AU, BE, European Securities and Markets Authority, HK (HKMA), KE, NA, NL, SA, the UK

<sup>65</sup> FSMA, *Annual report 2014*.

<sup>66</sup> DNB report: *Technological innovation and the Dutch financial sector: Opportunities and risks for financial institutions, new market participants and supervision*, October 2015

74. The survey of IOPS Members' experiences also shows that special attention is also being devoted to the development of appropriate supervisory skill sets and internal resources<sup>67</sup> for new technologies through the organisation of training sessions of supervisory staff<sup>68</sup>. In a number of IOPS Members,<sup>69</sup> dedicated (FinTech) units or joint units between several authorities (France) were created to develop approaches to FinTech and organise supervision, including the adoption of SupTech solutions. As an example, Colombia's financial services regulator, SFC, has created a unit dedicated exclusively to FinTech matters. This unit is responsible for the development and setting forth of the SFC's FinTech strategy and is committed to the adequate and responsible implementation of a FinTech culture within the SFC. In addition, it is in charge of the FinTech training programs and acts as a channel established by the supervisory authority to maintain a dialogue with the industry.

*Maintaining close contact/active dialogue with the industry and other stakeholders*

...to facilitate discussions and encourage the exchange of knowledge and insights with the industry in particular through:-

- organising meetings (e.g. UK FCA "hackathon" or German "BaFin-Tech" gatherings with market players)
- offering start-ups or established companies the opportunity to enter into direct contact with supervisors via Authorities' website (e.g. the FSMA and the NBB in Belgium, FME in Iceland, BaFin in Germany)
- FinTech Innovation Hubs<sup>70</sup>

*Creating an environment to test innovative ideas/products or services and improve the industry's understanding of regulatory requirements and compliance...*

75. ...through creation of a secure environment where FinTech companies can securely test tools, ideas, products and services:-

- FinTech supervisory sandboxes<sup>71</sup> or regulatory laboratories to provide an environment to test innovative concepts with the approval of supervisory authorities and support FinTech initiatives<sup>72</sup>.

The Government of Mauritius launched the Regulatory Sandbox Licence (RSL) on 20 October 2016, offering the possibility for a person or a company to conduct a business activity for which there are no adequate legal provisions. This is as a result of the government's vision to promote creativity and innovations through the application of technology. The RSL falls under the aegis of the Economic

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<sup>67</sup> CO, GG, HK, JM, LI, RF, SK.

<sup>69</sup> CO, HK, HU, LI, LT, MU, MX, RF, UG.

<sup>70</sup> For example, innovation hubs were created by DNB and AFM in the Netherlands, ASIC in Australia, the UK FCA, German BaFin, the Guernsey FSC, and Uganda RBRA, to create room for financial innovation and support market operators to understand legislative and regulatory requirements.

<sup>71</sup> The concept of sandbox has different interpretations in various countries. The AFM and DNB understand a regulatory sandbox as "a "safe space" in which business can test innovative products, services and models without immediately incurring all the normal regulatory consequences of pilot activities."

<sup>72</sup> FinTech Supervisory sandboxes were created by ASIC AU, SEC Brazil, ID, IR, HK, HKMA – banking supervisor; KZ, MU, MY, NL, TH, SG, UAE, the UK FCA; etc. A number of authorities are working on the establishment of an innovation hub and/or sandbox: CO, LT, MX, PL, and RF.

Development Board Mauritius (EDB). It is issued to eligible companies willing to invest in innovative projects. As per the indications of EDB, so far five RSLs (four FinTech and one Biotech projects) have been issued. The FSC Mauritius is not involved with the issue of an RSL.

Based on countries' experiences, the supervisory approach with respect to products tested in sandboxes would usually consist of the following features:-

- Compliance with regulatory requirements may be temporarily required. Supervisors could offer exemption on a case-by-case basis or apply individual waivers (experience of the NBB, Belgium);
- Additional protection measures are taken to protect consumers;
- Offering the entities a restricted activity permit or licence;
- Right of the supervisor to approve no enforcement actions;
- Ability of the supervisor to withdraw a provisional licence.

#### *Setting up supervisory guidelines*

Supervisory authorities are issuing guidance for entities involved or planning to offer FinTech solutions:-

- establishment and operation of new entities planning to offer FinTech solutions. The examples are ASIC, Australia, Regulatory guide 255 on Providing digital financial product advice to retail clients<sup>73</sup>; The US SEC Division of Investment Management Guidance Update (February 2017), robo-advisers are subject to fiduciary obligations and substantive provisions of Advisory Act;
- Cyber-resilience work. The examples are cyber-security principles for pension schemes: guidance for trustees, issued by The Pension Regulator, the UK in April 2018; cyber-resilience good practices<sup>74</sup>, issued by ASIC, Australia, in November 2017, etc.
- guidelines to trustees. The example is the guidance to trustees issued by MPFA, Hong Kong, China with respect to transmission of data regarding transfer of accrued benefits through the designated electronic system.

#### *Organising publicity and educational programmes*

During and immediately after the launch of a digital initiative, publicity and educational programmes are essential to make targeted users aware of benefits but also risks from digital initiatives

- The MPFA, Hong Kong, China, when developing ePASS and E-Payment for MPF Transfer, was engaged closely with trustees, employers and scheme members first to understand their needs and concerns and then to discuss issues like standardisation of data requirements and operational procedures. Relevant trainings were provided to trustees. At the present stage, the government and the MPFA have set up a working group with MPF trustees to steer the development of the eMPF

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<sup>73</sup> <http://download.asic.gov.au/media/3994496/rg255-published-30-august-2016.pdf>

<sup>74</sup> <https://asic.gov.au/regulatory-resources/digital-transformation/cyber-resilience/cyber-resilience-good-practices/>

system. Among the objectives pursued by the MPFA education programmes is to achieve wider digital take-up and adoption of e-services by MPF participants.

- The ASIC, Australia, uses its MoneySmart website<sup>75</sup> to support investors and consumers in understanding the opportunities and risks of digital activities.

*Maintaining close dialogue and co-operation between supervisors*

76. Development and launch of digital projects requires close co-operation between regulatory and supervisory authorities. On some occasions, a digital project may involve more than one regulator. Therefore, *close collaboration between regulators* is pivotal to a smooth launch of the project. Leverage on existing knowledge, expertise and technology tools and solutions in developing digital projects with other regulators is seen as valuable and practical approach. For example, development and implementation of E-Payment for MPF Transfer makes use of the Hong Kong Monetary Authority's (HKMA) Central Moneymarkets Unit to automate payments for transfers of benefits between trustees. The MPFA had to liaise with the HKMA and trustees regarding the mode of co-operation, system requirements, implementation schedule and other preparatory work.

77. Another example could be the establishing or participation of supervisory authorities in FinTech working groups or other committees together with other regulators and supervisors at national level. The examples here are the Brazilian supervisor, PREVIC, working group set up by the government; MPFA and trustees activity to steer the development of e-MPF; the FSC of Mauritius. The latter authority has set up the FinTech and Innovation-driven Financial Services Regulatory Committee to guide all stakeholders in further developing Mauritius as a regional hub for FinTech<sup>76</sup>.

78. The example of international co-operation in the area is the bilateral agreement for co-operation reached by the Bank of Lithuania and Monetary Authority of Singapore to work together to support development of FinTech ecosystems and encourage a greater financial innovation in two countries<sup>77</sup>. As part of the agreement the authorities will exploit joint innovation projects, share information on emerging market trends. Under this agreement, FinTech companies will be able seek support from respective supervisory authorities. In addition, the UK-Australia 'FinTech Bridge' signed by the respective representatives of the UK and Australian government on 22 March 2018 aims to deepen collaboration between governments, regulators and industry bodies and fostering FinTech business expansion internationally<sup>78</sup>.

*Areas of supervisory attention/oversight in relation to FinTech in private pensions*

79. In view of the relatively small scale of current FinTech activities in the private pension sector, it appears difficult at this stage to draw a complete list of key challenges and risks that pension supervisory authorities should be aware of and be prepared to deal with. As the respondents to the IOPS survey stated, this task is further complicated by insufficient official data on FinTech developments in the private pension area. An important work developed by the FSB outlines the list of key areas that merit financial supervisory

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<sup>75</sup> <https://www.moneysmart.gov.au>

<sup>76</sup> <https://www.fscmauritius.org/media/4279/fsc-communique-in-relation-to-regulatory-committee-on-fintech.pdf>

<sup>77</sup> [www.lb.lt](http://www.lb.lt)

<sup>78</sup> <https://treasury.gov.au/fintech/>

authorities' attention with respect to implications from FinTech<sup>79</sup>. Nonetheless, as the report focuses on financial stability implications, its relevance to private pensions is limited.

80. Considering the FSB work and the responses collected through the IOPS survey, a *tentative list of areas/issues that require* (or may require) *supervisory attention or oversight in relation to FinTech* developments in the pension sector are listed below. A number of them require close co-operation and consultations among supervisory authorities:-

- Cyber-security and IT risks: malware; use of digital channels to manipulate or steal pension plan assets and personal data.

In the last years, cyber-threats have increased significantly and their ever evolving nature requires a co-ordinated response on the part of supervisory authorities, other public agencies and the industry. In the financial and the private pension sectors, cyber-security has become an area of special attention for the supervisory authorities. The US SEC Office of Compliance defines cyber-security as one of the authority's examination areas priorities<sup>80</sup>. The Office is working closely with firms to identify and manage cyber-security risks and encourage market participants to actively engage and address this problem. This is done in particular through firms' examination programmes where the focus is laid among other things on governance and risk assessment, access rights and controls, mechanisms to prevent assets and data loss, training programmes and incident responses.

Supervisory authorities are also issuing supervisory guidance to offer market participants a framework for assessing and controlling cyber-risks as a part of internal control systems, but also to recover if such an incident takes place. As an example, in April 2018 the UK Pensions Regulator (TPR) issued guidance for trustees and scheme managers to protect members' personal data and pension assets from cyber-risks<sup>81</sup>. Similarly, the ASIC, Australia, has developed some significant work in the area, including cyber-resilience good practices to improve the processes of entities in Australia's financial markets.<sup>82</sup> The Austrian FMA is currently working and will shortly publish an IT guideline concerning design, requirements and arrangements regarding IT security for pension companies.

It is also worth noting initiatives in developing industry standards and good practices to measure and address adequately cyber-risks in the private pension sector<sup>83</sup> and more broadly in the financial domain that supplement efforts by the supervisory authorities.

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<sup>79</sup> FSB, *Financial Stability Implications from FinTech, Supervisory and Regulatory issues that merit Authorities' attention*, June 2017

<sup>80</sup> Idem footnote 74, *2018 National Exam Program Examination Priorities*. Office of Compliance, Inspections and Examinations

<sup>81</sup> The Pensions Regulator, *Cybersecurity principles for pension schemes, Guidance for trustees*, <http://www.thepensionsregulator.gov.uk/docs/cyber-security-principles-for-trustees.pdf>

<sup>82</sup> The Australian Securities and Investment Commission (ASIC), *Cyber resilience good practices*, <https://asic.gov.au/regulatory-resources/digital-transformation/cyber-resilience/>

<sup>83</sup> See presentations of 2018 Symposium, organised by Pension Research Council, The Wharton School, University of Pennsylvania: *The Disruptive Impact of FinTech on Retirement Systems*, May 3-4, 2018, <https://pensionresearchcouncil.wharton.upenn.edu/2018-symposium-disruptive-impact-fintech-retirement-systems/>

- overview of entry of new players that fall outside the regulatory perimeter;
- monitoring business conduct;

Regardless of the technology used, the focus of supervisors should be on the board of directors/senior managers of a company that intends to offer or is already offering FinTech services or products. As an example, the UK, FCA Senior Management Regime (SMR) captures a number of issues surrounding the adoption of new technologies in financial sector. The aim of the SMR is to increase the accountability of senior management within financial services. The SMR tries to incentivise appropriate risk-taking and good decision making with regard to all aspects of the firm's activity, e.g. the deployment and operation of systems, cyber-security and operational resilience.

- monitoring operational risks related to the outsourcing by authorised firms of activities such as process and information management. For example, complex technologies as AI, Blockchain and Cloud computing are increasingly offered services by third parties;
- controlling whether the use of automated platforms and e-systems by employers/providers complies with regulations, if any, and in the case that there are no rules, setting up procedures for the monitoring of such systems;
- malpractice and fraudulent activities;
- authorisation/supervision of robo-advisers: performance of checks or controls of algorithms used before entering in production phase; requirements for explanation of (investment) outcomes to participants; introduction of any new training requirements for "hybrid" robo-advisers, etc.

For example, the US Securities and Exchange Commission's (SEC) Office of Compliance Inspections and Examinations, among its 2018 examination priorities<sup>84</sup> has identified provision of electronic investment advice through automated or digital platforms. The examinations will focus on compliance programmes, including algorithm governance, advertising and marketing, investor data protection, and disclosure of conflicts of interests.

- monitoring consumer protection issues (settlement of disputes arising due to unclear liability allocation, possible collection and analysis of complaints' data in relation to FinTech; avoidance of any forms of financial exclusion, etc.).
- cross-border issues.

*Issues that may arise in the future:*

- the need for controlling concentration risk: if one or more parties (BigTechs) start dominating specific segments of the value chain or the market.

### **III. Use of innovative technology by supervisors (SupTech)**

81. This section aims to review how supervisors themselves are using innovative technologies to make their communication and oversight (i.e. data collection/reporting requirements, monitoring, on-site/off-site inspections) more cost-effective and efficient. Attention is given to understand actual or potential gains from the implementation of innovative technology (SupTech) to supervise pension services providers. The section

<sup>84</sup> <https://www.sec.gov/about/offices/ocie/national-examination-program-priorities-2018.pdf>

also outlines, based on desk research, some challenges that supervisors are encountering during the implementation process and how they are being tackled.

82. In recent times, experiences are gathered and exchanged to understand how the new technologies can revolutionise the delivery of public or financial (supervisory) services. Some prominent use of innovative technologies by the governmental authorities, especially Blockchain technology, have been observed. A recent IBM report<sup>85</sup> reviews experiences of a group of pioneer public authorities in a selected number of jurisdictions looking into the applicability of Blockchain technology in a number of domains such as regulatory compliance, contract management, identity management and delivery of better services for citizens. The report finds that 90% of government authorities surveyed believe that Blockchain will have the largest impact on regulatory compliance because the current systems and infrastructure established to enforce regulatory compliance may appear inefficient in terms of time, cost and human labour involved.

83. Several examples of government experiences in testing or using innovative technologies include: recent work to move land registers or property transfers into a Blockchain-based framework; testing the use of Blockchain for the payment of welfare benefits in Australia and the UK<sup>86</sup>; work undertaken by the Russian State Pension Fund (PFR) to introduce smart contracts between employers and employees with the use of Blockchain technology<sup>87</sup>; developments in Australia (Govpass in Australia<sup>88</sup>) and the Russian Federation to create digital identification systems with biometric elements for the use of governmental services online, as well as the experience of Estonia with a creation of digital identity-based Blockchain services (e-Residency). Other experiences relate to work undertaken to test the use of Cloud services to serve workload and host data from the Australian Government (Microsoft announced the creation of a new facility to serve the workload of the Australian Government<sup>89</sup>).

84. Responses to the IOPS survey highlighted quite different stages of adopting technology by pension supervisors. Generally, it could be stated that the majority of pension supervisory authorities are still at a quite early stage of adoption/integration of innovative technologies. However, they are expressing interest to learn more about such experiences from jurisdictions that have advanced in this direction. More generally, the recent report by the Financial Stability Institute (FSI) outlines that data collection and data analysis are the two main domains where SupTech is currently most used by supervisory authorities. Within data collection, SupTech applications are used in reporting, data management and virtual assistance. For data analytics, four main areas are named by the report: market surveillance, misconduct analysis, micro-prudential and macro-prudential supervision<sup>90</sup>.

85. Below there are some examples collected through IOPS survey and desk research on the use of innovative technologies by supervisors:

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<sup>85</sup> IBM Institute, *Building trust in government: Exploring the potential of blockchains*, January 2017

<https://www-935.ibm.com/services/us/gbs/thoughtleadership/blockchain-for-government/>

<sup>86</sup> <https://www.zdnet.com/article/welfare-payments-in-australia-could-be-delivered-over-blockchain/>; The UK Government, Office of Science, *Distributed Ledger Technology: beyond block chain*, 2016.

<sup>87</sup> <https://cryptodaily.co.uk/2018/08/russia-continue-to-explore-blockchain-this-time-its-pensions/>

<sup>88</sup> The Govpass platform in Australia is currently in testing phase. See <http://www.zdnet.com/article/australian-government-details-govpass-digital-id/>

<sup>89</sup> <https://www.forbes.com/sites/justinwarren/2018/04/10/microsoft-makes-clear-play-for-mission-critical-cloud/>

<sup>90</sup> Financial Stability Institute, *Innovative technology in financial supervision (suptech) – the experience of early users*, Dirk Broeders and Jermy Prenio, July 2018

- putting certain regulatory or supervisory services online, e.g. online licensing<sup>91</sup> or online plan registration and amendments<sup>92</sup>, online messaging. The DNB in the Netherlands is currently developing a digital portal for submitting documents and forms for market entry (the process for authorisation of applications). The MPFA, Hong Kong, China has launched a pilot scheme of e-Application, which allows MPF intermediaries to submit their registration applications via MPFA’s online eService to expedite the registration process and enhance service quality. An online business licensing service (OBLS) was created in Singapore to improve licence-processing and interoperability between several governmental agencies<sup>93</sup>. Several authorities<sup>94</sup> provide online facilities for lodging complaints on their own websites. The MPFA, the first among public organisations in Hong Kong, China, launched a messenger bot, offering an innovative channel to chat with the users of the MPF system<sup>95</sup>.
- innovative technological solutions can support supervisory information management: collection; storage; processing and use of large volumes of data and information to proactively respond to supervisory mandates.

A “Business process management tool” is used in Chile to help to organise, process and control the information within the Superintendence of Pensions and also information/requirements provided by external parties (government, ministries, AFPs, etc.). It is an intranet tool, where every request is saved and followed until the parties involved have finished it.

The Superintendence of Pensions uses Business Intelligence (BI) software in its surveillance work with the AFPs. The Superintendence of Pensions receives massive structured data from the AFPs on a large variety of topics, and BI technologies help to handle these data and to put out an alert in case of risk/mistakes. The use of BI started just ten years ago, therefore the potential for improving the supervision is still significant.

- *use of IT solutions to streamline regulatory reporting*<sup>96</sup>. In a number of jurisdictions, returns from supervised entities are filed mostly by electronic means through electronic files or electronic platforms<sup>97</sup>.

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<sup>91</sup> BR, JM, LI, LT, MU, NI, TR, UG (considering introduction)

<sup>92</sup> Provinces of Ontario and Alberta, Canada

<sup>93</sup> *Digitalising Governmental payments, Kenya Study, 2013*

<sup>94</sup> Examples: AL, AT, [Province of Alberta \(Canada\) – emails are routed to the central in-box for analysis and reply](#), GG, HK, JM (as a part of integrated regulatory system), IN (the Central Record Agency (CRA) platform supports centralised grievance management system to ensure smooth and speedy resolution of complaints), LI, MU (OSP interactive platform), NA, MX (current e-SAR system allow for lodging pension complains; work is undertaken to extend the platform to include new services); NI, RF, SK, TR, UG.

<sup>95</sup> MPFA Annual Report 2017-2018

<sup>96</sup> In February 2016, the IOPS jointly with COVIP, Italy hold a Technical Workshop ‘Reporting by pension funds to supervisory authorities: IT opportunism and challenges’; *further information could be gathered from the presentations made at the Workshop.*

<sup>97</sup> AT, BG, Province of Alberta, Province of Québec (in place in 2019), Canada, CO, GG, JM ( still in project phase), IN (under development), LI, MU, MX, NA, NI, RF , RO, SK, TR, UG.

The FMA in Austria uses a web-based application (Incoming Platform) with a high security level for the electronic submission of data, reports and documents. The submission has to be done via predefined form sheets and processes, enabling efficient automatic data processing.

The MPFA, Hong Kong, China, has already put in place systems to collect annual returns from registered MPF intermediaries and automatically verify the compliance of registered MPF intermediaries. Trustees can also submit business data to the MPFA. There is a plan to put in place electronic collection of data for statutory returns from MPF trustees. Development and implementation of the *eMPF initiative* will likely make more significant advancement in this respect.

In Liechtenstein, the web-based platform “e-Service”<sup>98</sup> was introduced in mid-2015, through which financial intermediaries submit their supervisory reports (Solvency II and statutory reports). The platform provides diverse communication lines with financial intermediaries as well as interfaces with other essential systems (e.g. customer relationship management). The platform is used to check the compliance with regulatory requirements, to validate the returns data, as well as for statistical evaluation purposes (such as making queries on the reporting data). The e-Service platform constitutes a very meaningful and secure tool for a centralised entry point for all reporting requirements. The platform helps the supervisor to gain a complete overview of all reports and makes the handling process efficient due to automation of processes. The system meets the requirements of the European Supervisory Authorities (ESA) concerning the exchange of reporting data.

In Mauritius, an interactive platform was recently created, allowing for the collection, compilation and analysis of data (statutory submissions and surveys) through online submissions. This system provides a secured and user-friendly online platform, with SSL certificate, for licensees to submit their respective data.

- the creation of fully automated data collection (an electronic system which enables supervised entities to submit data/reports electronically) and standardisation of the process (formats used by providers) – can allow for collection and use granular data essential for effective supervision. This will require supervisors and providers to co-ordinate more closely and invest in the right technology. An example is Austria’s Central Bank automating the collection of granular prudential bank data and eliminating the report templates: in a new system, the granular data is collected automatically by banks systems and, subsequently, sent to AuRep, a company owned by banks. AuRep automatically prepares granular datasets using standard formats, which can be accessed and used by the Central Bank and financial supervisors any time<sup>99</sup>.

The FSI report details the experience of the National Bank of Rwanda (NBR) and its innovative experience in collecting the data directly from the IT systems of supervised financial institutions (a data-pull approach). The data is extracted from these institutions in most cases every 24 hours and combined with the data from the internal system of the NBR offers a valuable source for supervisory and policy making purposes<sup>100</sup>.

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<sup>98</sup> The e-Service platform is also used for processing requests (questionnaires, surveys) by international organisations on ad-hoc basis.

<sup>99</sup> The Consultative Group to Assist the Poor (CGAP), *Why Digital Finance Supervisors should automate data collection*, January 2018;

<sup>100</sup> See Financial Stability Institute, FSI Insights on policy implementation N9, *Innovative technology in financial supervision (suptech) – the experience of early users*, Dirk Broeders and Jermy Prenio, July 2018, pp 6-7.

CONSAR, Mexico's supervisor, reported that the authority is currently interconnected with supervised entities through *ConnectDirect* system, and has a defined *EDI* protocol to collect data from the supervised entities. In addition, the supervisor has an online connection with the central pension database that allows monitor critical processes online and in real time.

- *online platforms or other technological solutions to facilitate remote on-site supervision* (Examples of Mexico, Provinces of Alberta, Ontario and Quebec (in place in 2019), Canada, Colombia, Guernsey (currently under development), Jamaica (as part of the IRS systems); India; Mauritius, Mexico, Nigeria, Slovak Republic, Turkey (PMC), Uganda).

In recent years, CONSAR has been working to develop technological platforms to improve efficiency in monitoring AFOREs. The creation of electronic files that AFOREs need to generate during their interaction with members is the initial stage in this process. The electronic files are stored in the central database through an Electronic Data Interchange (EDI) tool. Information cubes and report analysis tools have been implemented to facilitate interaction between the supervised entities and CONSAR. The system allows CONSAR to have an online view of the operations performed by AFOREs.

Also, the MPFA, Hong Kong, China, plans to put in place by phases starting from 2019 systems that maintain and automatically analyse information and data collected from MPF trustees to identify new issues and risks.

- *creation of a single centralised pension database.*

Another interesting development is the creation by supervisory authorities of the centralised national pensions database (Austria, Belgium, Province of Alberta in Canada, Finland, Guernsey, Mexico). Interconnectivity of the pension database with supervisory authorities and other public agencies allows use of the data for supervisory purposes as well as for other governmental activities, such as tax payment controls.

The primary purpose of the centralised single pension database<sup>101</sup>, called 'DB2P', recently launched<sup>102</sup> in Belgium is to allow access to individual key pension information. Since 2016, individuals can have a full overview of their pension rights via web-application<sup>103</sup> (both public and private sources), which could be accessed by ID card or via smart phone. Registered data also offer a major source for monitoring compliance with the social occupational private pension legislation by the FSMA and have prompted the shift towards a more proactive and structural mode of supervision. Interconnectivity of DB2P data with other governmental databases in Belgium makes possible updates of the data and its use for other public purposes (checks on pension premium deductively by tax authorities and others). Work is currently under way to expand the registered data to meet the different purposes of various stakeholders and adequately reflect ongoing and forthcoming pension trends.

- *Educating the public:* Supervisory authorities are using different channels and platforms to disseminate their messages and encourage use of digital tools.

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<sup>101</sup> <http://www.db2p.be/fr/home>

<sup>102</sup> Source: FSMA presentation at the IOPS Technical Committee meeting in Dublin, Ireland on 22 February 2018

<sup>103</sup> [www.mypension.be](http://www.mypension.be)

86. Some preliminary reflections on the *efficiency gains achieved through the use of technological tools could be summarised as following:*

- More efficient data processing enables timely generation of key risk figures.
- Direct and online access to pension data and information has resulted in more focused supervision.
- Eliminating the time needed to ask, search and wait for specific supervisory information, that on some occasions would take several weeks to receive, SupTech solutions allow supervisors to improve (shorten) response times and achieve better results for customers.
- Automation of data collection and standardisation of reporting processes could lead to cost reduction both for the supervisory authority and pension providers. The same applies for the process of validation (data quality checks).
- Real-time information on service availability and number of transactions has helped to better detect and prevent possible malpractices or fraud.

In the case of Mexico, complete visibility on the sales agents' activity has resulted in a decrease of commercial expenses and malpractices. Using these technologies (biometrics, cubes, Electronic Data Interchange), illegal transfers have been reduced to a historical minimum. Since the implementation of biometric elements, CONSAR has detected only one case, which is being prosecuted.

- More controls that allow early detection of issues (such as inconsistencies in the collected/generated information).
- Analysis tools that provide early alerts have prevented misbehaviours or possible collusion problems.
- Onsite supervision has been improved by focusing efforts with the use of the information provided by the SupTech tools described above.
- These tools also offer the capability to reflect on and stimulate policy reforms.

87. Along with benefits, some challenges encountered by supervisors during the development and use of SupTech solutions were identified. The FSI report outlines a number of issues<sup>104</sup>:-

*Technical issues*, related to computational capacity constraints. In some cases, only limited amounts of data could be used for developing analytical solutions. Besides, supervisory staff controls and interventions remain indispensable when analysing and deciding on further actions in relation to the outputs provided by innovative solutions;

*The issue of data quality*, mainly relating to reliability, when collected from various sources (social media, etc.), and handling a big amount of data that needs to be processed and analysed (e.g. equity and derivatives markets transactions);

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<sup>104</sup> See Financial Stability Institute, FSI Insights on policy implementation N9, *Innovative technology in financial supervision (suptech) – the experience of early users*, Dirk Broeders and Jermy Prenio, July 2018, pp 6-7.

*Legal issues* that might potentially arise from either intended or unintended breaches of privacy data laws;

*Reputational risks* that may arise from early-stage alerts or actions taken by supervisors (“poor quality algorithms or data may affect the reputation of supervisors”)

*Operational and cyber-risks* that may arise when using innovative technological solutions (Cloud solutions, algorithms, etc.) as well as cyber-attacks resulting in data losses and the interruption of supervisory activities, considered a key threats.

*Capability and human resource issues*, as the use of SupTech solutions requires specific qualifications and experiences (in data management, computer science) that are rare and may be difficult to retain.

*Senior managerial support* being essential to approve and introduce in practice SupTech solutions.

Responses to the IOPS survey also highlighted the importance of assessing the cost of possible developing and implementing RegTech and SupTech solutions.

#### **IV. Conclusions**

88. Technological innovation is a major development affecting the whole financial sector, including private pensions. Compared to other segments of the financial sector, such innovation in the private pension area is still at a nascent and experimental stage, touching only certain areas of pension service providers’ activities as well as their interactions with supervisors. The report outlines that in a number of jurisdictions pension supervisory authorities, working closely with other stakeholders, prompt and initiate innovative technologies in the private pension sector, with the aim to improve quality and access to pension information and pension services, eliminate deficiencies in commercial practices and generally enhance protection of users and their retirement savings.

89. In view of the great complexity of private pensions and difficulty for individuals to take appropriate decisions and overcome cognitive bias, innovative technologies could address, from the supply side, some of these challenges. Greater adoption of digital solutions (mobile applications and interactive platforms) and digital disclosure may help to engage individuals with private pensions. These tools may facilitate real-time access to key pension information, allow individuals to better plan and manage retirement savings and ultimately increase their retirement contributions and savings. In some jurisdictions, supervisors are developing their own digital tools to raise awareness and facilitate understanding and use of pension products and services. In order to stimulate greater take-up of digital tools from the demand side, the supervisory authorities are currently working on publicity and education strategies to promote utilisation of existing e-services to pave the way for a greater digital adoption of e-pension systems in future.

90. Innovative technologies (Blockchain, biometrical technology, Cloud computing, etc.) have the potential to simplify and improve efficiency of pension administrative procedures. These tools may provide more efficient data collection, storage and faster processing of the users’ information and may facilitate higher quality services and experiences for users at lower costs. The report outlines the experiences of several jurisdictions, where supervisory authorities in close co-operation with the industry are redesigning administrative and operational procedures with these new technologies.

91. The new technologies are also being tested to facilitate interaction between the supervised entities and financial regulators or supervisors and to automate and improve compliance (RegTech). These may result in a reduction of the cost of compliance for both authorities and financial entities. Technologies are expected to contribute to more efficient information-sharing (through shared utilities), achieve better

understanding of regulatory requirements (machine-readable regulations, robo-hand books), better decision-making and may open up new ways for compliance processes (inbuilt compliance). Although at present it seems that the adoption of RegTech in the pension area is still at very nascent stage, there may be significant developments in future.

92. Innovation occurring in the financial sector, including private pensions, has become an area of increased supervisory attention. Supervisors aim in the first place to offer support and foster financial innovation, through the organisation of regular meetings, establishment of innovation hubs and/or regulatory sandboxes. In parallel, they also intend to closely monitor developments and address any emerging risks involved with FinTech for the financial sector and consumers. Cyber-attacks, stealing of pension assets and private information breaches; and fraud are considered the main areas for supervisory attention and priorities for supervisory examinations. The approach taken by a number of jurisdictions consists in adopting risk-centred and technology-neutral regulatory and supervisory approaches, where the issues are treated according to the risk they pose and not the technology per se.

93. In view of rapid technological developments, supervisory authorities are committed to enhancing their knowledge on new technologies. They are investing in developing appropriate knowledge and skills through training programmes for their staff and maintaining a close dialogue with the industry to enhance overall understanding of current and possible future use of new technologies. In a number of authorities, a dedicated unit/department or a joint unit between several supervisory authorities were established to better follow and address issues arising from FinTech activities. The development by supervisory authorities of their own FinTech or SupTech strategy, or adhering and contributing to a larger FinTech sector strategy, can help supervisors harness potential benefits of the underlying technology and consider integrating/using SupTech solutions in their supervisory processes.

94. Still being at an early stage of development and adoption in most jurisdictions, technology-enabled solutions (SupTech) are considered important tools that could enhance the quality and cost effectiveness of supervisory oversight. Several work areas were identified: putting online certain supervisory services such as licensing/registration, complaints management or handling, responding to enquiries from users through messenger bots; streamlining reporting process and moving to automated data collection process that allows for collection and use of granular data for supervisory purposes, data management and analysis of collected data; development of single centralised pension database that allows use of this data by individuals as well as for supervisory purposes as well as by other governmental activities; development of technological platforms to facilitate remote on-site supervision, etc. In the jurisdictions where SupTech solutions are being adopted, they bring about efficiency gains. For example, SupTech allows a move to a more focused, proactive mode of supervision; earlier and better risk detection, improved access and online view of entities operations and market data, better communication between supervisors and supervised entities. Such solutions also generally contributed to reductions in cost and time spent on operations and interventions for both supervisory authorities and financial entities. As supervisors work on the adoption of SupTech solutions, they need to continue to enhance their data security programmes to ensure they meet or exceed industry standards.

95. The development and launch of digital projects and SupTech solutions require close co-operation between regulatory and supervisory authorities. In particular, leverage on existing knowledge, expertise and technology tools and solutions in developing digital projects with other regulators is regarded as a valuable and practical approach.

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