

# GLOBAL OVERVIEW OF EXPERIENCES IN FINTECH DEVELOPMENT AND ADMINISTRATION

Interim report on trends in  
fintech sector development  
in OECD countries and SIDS

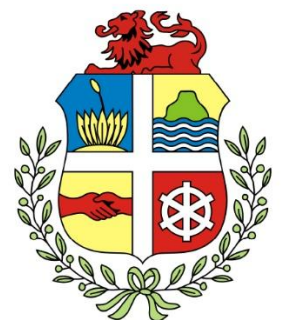
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# Global overview of experiences in fintech development and administration

Interim report on trends in fintech sector development in  
OECD countries and SIDS

Dale Alexander  
Kwesi Prescod



This document was prepared by Dale Alexander, Chief, and Kwesi Prescod, consultant, of the Caribbean Knowledge Management Centre of the Economic Commission for Latin America and the Caribbean (ECLAC) subregional headquarters for the Caribbean, within the activities of the joint project of ECLAC and the Ministry of Economic Affairs, Communications and Sustainable Development of Aruba.

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## Glossary

ACA	Association for Insurance (Luxembourg)
AI	Artificial Intelligence
ALFI	Association of the Fund Industry (Luxembourg)
AML/ CFT	Anti-Money Laundering/ Countering Financing of Terrorism
API	Application Programming Interface
B2B	Business-to-Business transactions
B2C	Business-to-Customer transactions
B2G	Business-to-Government transactions
BNM	Bank Negara Malaysia
BOT	Bank of Thailand
CBB	Central Bank of Bahamas
CBDC	Central Bank Digital Currency
CBTT	Central Bank of Trinidad and Tobago
CCTV	Closed Circuit Television
CNBV	Comisión Nacional Bancaria y de Valores (Mexico)
CSSF	Commission de Surveillance du Secteur Financier (Luxembourg)
DARE	Digital Assets and Registered Exchanges (Bahamas)
DLT	Distributed Ledger Technology
ECCB	Eastern Caribbean Central Bank
ECCU	Eastern Caribbean Currency Union
ECF	Equity Crowdfunding

ESMA	European Securities and Market Authority
EFSA	Estonian Financial Supervision Authority
EU	European Union
EU AI	AI Act of the European Parliament
FCA	Financial Conduct Authority (United Kingdom)
FSA	Financial Services Authority (Saint Vincent and the Grenadines)
FSC	Financial Services Commission (Montserrat)
FSRA	Financial Services Regulatory Authority (Saint Lucia)
FTI	Financial Technology Institutions (Mexico)
GARFIN	Grenada Authority for the Regulation of Financial Institutions
GDP	Gross Domestic Product
GDPR	General Data Privacy Rules
GFIN	Global Financial Innovation Network
GPAI	General Purpose AI
ICO	Initial Coin Offering
ICT	Information and Communication Technology
JCB	Jamaica Central Bank
KYC	Know Your Customer
LHoFT	Luxembourg House of Financial Technology
LLM	Large Language Model
MDEC	Malaysia Digital Economy Corporation
ML	Machine Learning
NFIS	National Financial Inclusion Strategy
OECD	Organization for Economic Co-operation and Development
OECS	Organization of Eastern Caribbean States
P2M	Person-to-merchant
P2P	Peer-to-Peer
RegTech	Regulatory Technology
SCM	Securities Commission Malaysia
SME	Small and Medium Enterprises
SIDS	Small Island Developing States
UN	United Nations
UNCDF	United Nations Capital Development Fund
VABA	Virtual Asset Business Act (OECD)
WEF	World Economic Forum

## Introduction

There has been much discourse in the past decade about the impact and importance of fintech – as a driver of either economic development, social change, financial inclusion or a combination of all three. But what, specifically, is fintech? What is this innovation that holds such promise, at least in the context of these discourses?

Fintech facilitates not only the technological transformation of finance through digital financial services, but also the digitization and datafication of global financial markets. The emergence of new fintech start-ups around the world and, most recently, the emergence of giant technology platforms (“BigTechs”) engaging in finance, such as Facebook, Apple, Amazon and Alibaba have provided a platform for rapid transformation of how commerce is facilitated across the globe.

Fintech itself comes in many forms or fashions. There are a variety of fintech applications with the potential to improve commerce and advance financial inclusion, including those platforms focused on:

- Making payments more transparent and efficient and transactions more secure through various technologies;
- Innovative credit scoring and greater product segmentation and development through the use of big data;
- Making customer on-boarding processes and transaction verification faster and more efficient through digital identity solutions;
- Strengthening compliance with global standards for financial stability and integrity and increasing the efficiency of domestic supervision through RegTech; and
- Making operations more efficient through the adoption of cloud computing technology in the financial sector.

Fintech evolution can be categorised into three stages.

The first stage, fintech 1.0 lasted from 1866 to 1987. During this period, the first industrial revolution gave birth to many valuable technologies such as the telegraph, transatlantic cable, steamships, and railroads to improve the speed of financial transactions and extend their reach globally. In the mid-20th century, the introduction of electronic systems increased the automation of financial transactions.

Subsequently, cash could be withdrawn using an automated teller machine (ATM) without going to banks; stocks were traded using desktop terminals, and payments could be made easily using credit cards.

Fintech 2.0 started from 1987 and continued up to 2008 at the dawning age of digitalization with the Internet. The increased size and scope of information connectivity helped speed up information sharing among intermediaries. These innovations also caught the attention of regulators who recognised a need to regulate the market and ensure no laws were broken. Nevertheless, internet technology raised many fintech innovations, including digital banking and online payment services such as PayPal and others. Such innovations threatened to disrupt the existing industry structure and reduce long considered intrinsic industry boundaries. They forced changes in terms of how services and products were delivered, and provided new channels for entrepreneurship and financial services.

Fintech 3.0 emerged after the 2008 global financial crisis to the present day. The distrust towards the traditional banking system and loss of jobs by financial professionals gave rise to new fintech innovations. During this stage, cryptocurrency or digital money became more common as it became more affordable for regular use by the public (Mohamed & Ali, 2019).

The emergence of the cryptocurrency application on the blockchain technology was a critical component to the emergence of fintech 3.0. However, cryptocurrency is not the only application on Digital Ledger Technologies (DLTs), of which blockchain is one example. The impact of DLTs have been a foundational building block to the expeditious growth of digital services across a wide breadth of the service industry. Other major developments globally based on the adoption of DLTs include:

- Central Bank Digital Currencies (CBDCs);
- Smart Contracts and digital assets; and
- Blockchain applications in supply chain management, healthcare, identity verification, and voting systems.

Accordingly, it is accepted that a singular approach to treating with the technology may overly constrain its potential to provide significant commercial and economic value. Risk-based approaches are being adopted by regulators to treat with these emerging suites of services. This approach allows for the iterative tailoring of regulatory requirements and oversight based on the specific risks posed by different activities and technologies. Examples of these approaches include:

- Regulatory Sandboxes: controlled environments to enable innovative firms, including those operating in the fintech and digital asset sectors, to test new products, services, and business models under regulatory supervision. The European Securities and Market Authority's (ESMA's) DLT Pilot Regime established under Regulation (EU) 2022/858 is an example of such an approach;<sup>1</sup>
- "RegTech" Solutions adopted by regulators to enhance regulatory compliance and supervision through automation, data analytics, and artificial intelligence; and
- Harmonization efforts, led by OECD and other international organizations, which promote cooperation and dialogue among regulators to develop common standards and principles for fintech and DLT regulation, aiming to foster innovation while ensuring consumer protection and financial stability.

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<sup>1</sup> Simmons & Simmons (2023).

In the cryptocurrency sphere specifically, more traditional approaches to cryptocurrency regulation have seen the creation of exchanges. This modality has had particular advantages in engaging with common regulatory requirements, including:

- Licensing and/ or registration regimes by some cryptocurrency exchanges;
- Compliance with “Know Your Customer” (KYC) and thus Anti-Money Laundering and Countering Financing of Terrorism (AML/CFT) regulations;
- Compliance with relevant financial regulations;
- Compliance with security measures and requirements; and
- Identified focal points for educational initiatives and dialogue with Regulators.

However, despite these efforts, challenges persist in achieving comprehensive regulatory oversight of the cryptocurrency sector. In particular, the decentralized nature of cryptocurrencies, cross-border operations of exchanges, and regulatory fragmentation across jurisdictions continue to pose challenges for regulators in effectively overseeing the application and thus limit their ability to contain risks to the financial sector.

Another development which is super-charging the fintech space as an area for innovation is the emergence of Large Language Models (LLM) in Artificial Intelligence (AI). The introduction of more robust AI tools and algorithmic engines over the last decade have resulted in a quantum leap in the modes through which automation and digitalization of services can be affected. The ability of these engines to consume, analyse and revert responses has only been exceeded by the open-source modality of model launches. These open-source approaches have led to the rapid democratization of these platforms, which in turn, has allowed developers to innovate and introduce this computing power to a wider breadth of public and private sector users. Notwithstanding the overarching social concern of job displacement by virtue of role automation in certain sectors and the associated economic inequality, this widespread use of AI tools and engines introduces other concerns. A key point of deliberation and discussion about the integration of AI systems into service delivery – in both public and private spheres - involves the necessity of “adequate human oversight and intervention” to minimise over-reliance on “black-box algorithms”. It is suggested that the benefits of this approach are twofold:

- (i) such oversight minimizes the risks associated with malfunctions or deficiencies in AI algorithms leading to service disruptions, incorrect or prejudicial outcomes, negatively affecting the public's trust and confidence in those services.
- (ii) such oversight mitigates these AI systems adjudicating on ethical dilemmas where life-and-death decisions are required, thus ensuring ultimate accountability and transparency in service delivery.

The use of AI and DLTs were initially seen as subordinate to their ability to strengthen the capacity of fintech service providers. However, the broad scope of functionality that these platforms can individually provide exceed the specific use-cases within the fintech space. Instead, taken together these two platforms of technological advancement can be the springboard for innovation wider afield.



## I. What is fintech?

While Schueffel (2017) states that fintech is a new industry in of itself, which applies technology to improve financial activities. The WEF and World Bank,<sup>2</sup> have a more conservative position, defining fintech as advances in technology that can transform the provision of financial services, promoting the emergence of new business models, applications, processes, and products. Within this broader definition, it has been identified that fintech has been a feature of the financial sector for decades. Fuelling innovations from ATM use, through online banking, to credit card-based e-payments, fintech has supported improvements in the convenience to accessing banking services for over one hundred years. These innovations have been driven largely from within banking institutions with IT-driven solutions that are internally administered and controlled.

The most recent iterations of fintech differ with respect to the use of technology. The emergence of Application Programming Interfaces (APIs)<sup>3</sup> and secured system inter-operability modalities enable third parties to provide services that are not administered and controlled by the serving bank. These fintech providers leverage technologies to create new channels to existing banking services or alternatively create new service niches through the amalgamation of distinct banking services. These have allowed fintechs to establish new interaction modalities with broader external benefits – targeting financial inclusion, by creating new means for the banking sector to engage those who traditionally would be defined as unbanked or underbanked.

More recently, fintech evolution has been based on the convergence of fintech and Artificial Intelligence (AI) and machine learning. Indeed PwC (2019) believed that the most popular fintech technology being discussed is artificial intelligence (AI). AI uses applications and techniques such as natural language processing, deep learning, reinforcement learning to enhance services provided to consumers and business partners and drive new product design. With continuous developments, the

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<sup>2</sup> CCAF, World Bank and World Economic Forum (2020).

<sup>3</sup> APIs or Application Programming Interfaces are sets of rules and protocols that allow different software applications to communicate. Exchanging data, functionality and features.

fintech industry is expected to experience another disruptive transformation that could lead to both positive and negative consequences.

The IMF 's Working paper by Wank Tok and Heng (2022) draws three conclusions:

- (i) Fintech has a positive correlation with financial inclusion, and the correlation is greater when digital financial inclusion measures are used as compared to traditional measures.
- (ii) Fintech has played a positive role in bridging the digital access gap between rural and rich-poor populations.
- (iii) Fintech has no correlation with the gender digital gap.

## **A. Requirements for establishing a fintech sector**

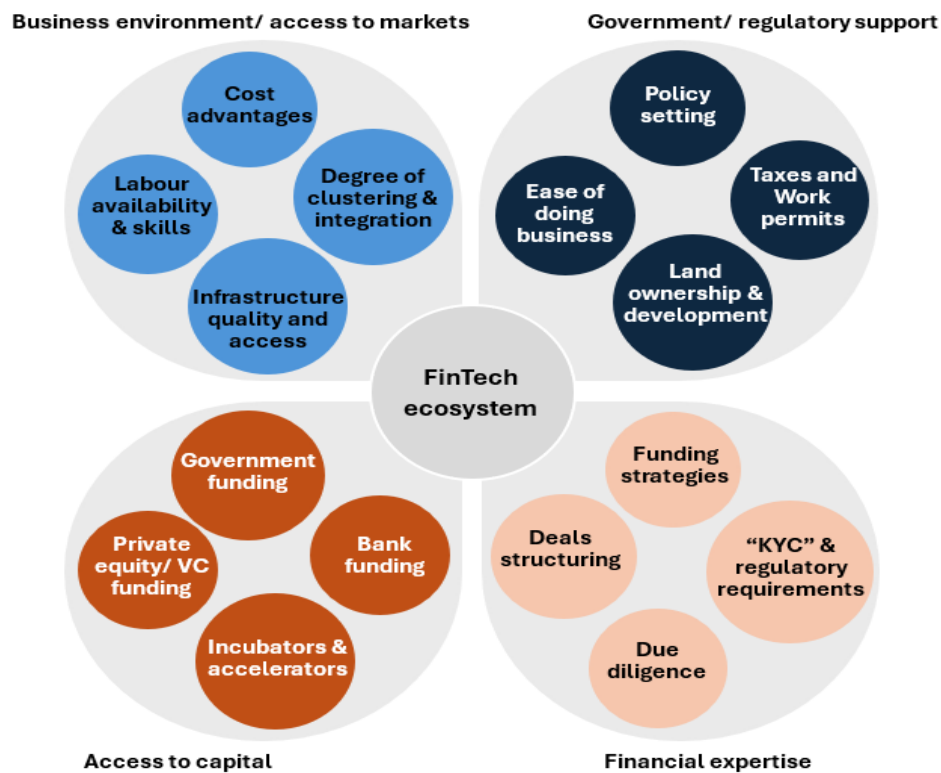
For the fintech sector to thrive, requires more than the actions and interventions of a singular party in the economy. Modern fintech services rely on the interaction of multiple, co-dependent service providers using common tools and interfaces. These parties thus interact in a broader transactional system. That system mitigates single points of failure or implementation bottlenecks and thrives on the innovative capacity of the parties. All the while, the system's structure must ensure economic survivability of the various actors. Indeed, the development of a fintech sector, requires the emergence of an enabling ecosystem of players undertaking specific roles.

PwC Networking (2020) in "Strategyand" (Strategy&) defined a model identifying four critical design elements that support the development of a fintech ecosystem:

- Business environment/ access to markets
- Government/ regulatory support
- Access to capital
- Financial expertise

Each of these must be addressed to establish a fintech Sector. Notably, the Government can only be a direct actor in three of these elements of design. This reaffirms the need for strategic partnerships between public and private sector actors, who share a common vision, to facilitate the development of this broader eco-system.

Figure 1  
Fintech ecosystem development framework



Source: Figure adapted from PwC Networking (2020), "Developing a fintech ecosystem in the GCC".

## 1. Business environment/access to markets

This aspect of the fintech eco-system considers factor inputs associated with the general competitiveness of the business environment of the community and wider country. With sub-elements such as "cost advantages" and "labour availability and know how", this design element asks the policymaker to confront questions such as "cost of living" and "education quality and employment relations". These are long term macroeconomic factors which speak to the opportunity for the ecosystem to create an overall cost advantage from working in a country or region if they are to flourish. This also means equipment, technologies, and utilities must all be available and affordable, which cannot be gainsaid in determining the attractiveness of a jurisdiction as a locus of fintech activity.

The sub-element "infrastructure quality and access" asks the policymaker to consider whether the enabling infrastructure, from roads and ports to quality utilities are available, and supported by underlying supportive regulatory frameworks. Further, the sub-element "Degree of clustering & integration" speaks to level of integration and synergies among the actors. Technology clusters (or hubs), where entrepreneurs with similar business objectives can network and integrate, make it easier for the ecosystem to flourish. These clusters promote the availability of skilled labour and know-how, from technocrats to management personnel.

## 2. Government/regulatory support

This aspect of the fintech ecosystem focuses on the overarching enabling role of Government. It should be noted that the Government may not ideally be the main actor executing fintech solutions but instead

would be the party that creates the enabling environment for others to act. In this regard, the Government plays a pivotal role in establishing the policies that incentivise or disincentivise actors' investment and interventions in the other aspects of the ecosystem. Thus, the role of the Government should, in the first instance, be that of Policy Designer and Regulator – establishing economic objectives for the various aspects of the ecosystem and establishing institutions that will set rules and ensure compliance, and where necessary modify tactical approaches based on market responsiveness. These policies need not be limited to those which are specifically Financial Services related, but can include Zoning and Development permitting, establishing one-stop shop portals for licensing and permitting, and the definition of incentives for social development.

In less diverse economies, the Government may also play various roles within the ecosystem and supply chain - from Landowner and Developer responsible for establishing the physical space that will enable clustering and innovation, to supply chain service provider and facilitator of seed capital.

### **3. Access to capital**

The development of the fintech ecosystem requires funding along the value chain of direct and indirect suppliers of enabling services. These capital sources are typically funded through three main sources:

- (i) Governments, though subsidized utilities, offices, and co-workspaces. In partnership with banks in consortia, support seed funding as initial financial support prior to the entrance of the next main source of capital.
- (ii) Venture capital funds and private equity shops, which are the traditional investors in fintech start-ups, supporting the refining of business models as the firms reach critical mass; and
- (iii) Incubators and accelerators, which prepare businesses for venture capital and fundraising.

Participation of all three capital sources are necessary to facilitate the emergent fintech ecosystem.

### **4. Financial expertise**

Finally, the development of the fintech ecosystem requires participants' access to broad financial expertise and know-how. This is a necessary structure in a fintech ecosystem, supporting entrepreneurs with advisory services from the early stages of idea generation through commercialization, and lastly provide legal and regulatory counselling to ensure adherence to local law and tax regulations.

These experts can also assist in lobbying for the modification of financial or regulatory measures to ease the conception and acquisition of startups. Indeed, this easing of regulatory measures to support start-ups finding their proverbial feet is the policy basis behind the Regulatory Sandbox approach that is rapidly becoming best practice in fintech development.

In summary, creating the enabling environment for the fintech sector, requires broad based action by both the Government and private sector towards this objective. However, both the public and private sector stands to benefit from this collaboration – as there is evidence of a positive correlation between fintech Sector development and Financial Sector development.

## B. Financial sector development

It should be noted that aspects (3) Access to Capital and (4) Financial Expertise discussed above mirror the considerations of the World Bank (2012) that a market's financial development and structure are also a key precursor to fintech sector development. Financial development and structure are described in more detail as the relationship between the saturation of economic resources, the complexity, and fragmentation of the financial and monetary system, on the one hand, and economic growth rates, on the other.

Financial Sector development can be described and assessed using the following quantitative characteristics:

- **Depth** of the financial sector, and its continued expansion, is the role of a financial market in an economy. The indicators of financial depth demonstrate the proportion of the value of a particular segment of this market in relation to GDP.
- **Access** to financial services means that businesses and households have access to financial services and are able to effectively use services that meet their needs. Financial services must be provided responsibly, economically, and continuously under the conditions of appropriate regulations. According to the World Bank (2005), access to financial services includes four areas: savings, loans, banking, and insurance.
- **The efficiency** of the financial sector can be assessed using both the performance indicators of the financial mediation sector itself and of its efficiency as an intermediary for investment capital. If the use of mediation services is expensive, these costs are borne by households and businesses.
- **Stability** of the financial sector is of paramount importance for macroeconomic stability. Due to this truism, financial stability is sometimes considered in isolation, out of the concept of financial development. Financial stability is an important feature of financial systems, which is closely linked to the broader process of financial development.

The relationship between the state of development of the financial sector and the impact of fintech sector activity has been subject to academic study.

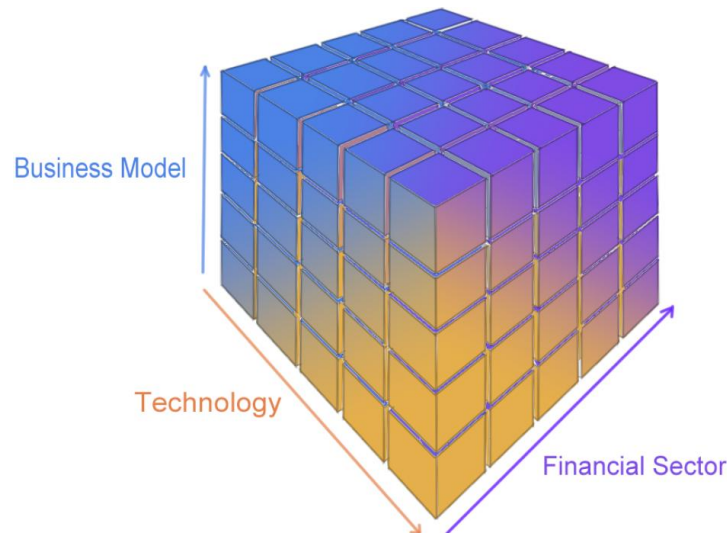
Lavrinko, Krukowski, Cizo and Danilevica (2023) found that there is a positive linear relationship between the **Global fintech Index** and **Financial Institutions Depth Index**, which is characterized by such indicators as private-sector credit (% of GDP), pension fund assets (% of GDP), mutual fund assets (% of GDP), insurance premiums, and life and non-life (% of GDP). From this analysis they concluded that fintech sector development may improve the institutional depth of firms within the financial sector, increasing the quantum of deposits and savings from customers. This in turn suggests a positive impact on financial sector contribution to GDP. The same study also found a negative linear correlation between fintech and Financial Institutions Access, demonstrating its greater impact in countries with lower access to financial institutions, via branches or ATM points of presence. A major caveat, however, was that overregulation should be avoided to optimise the benefits of policies towards fintech development.

## C. Model of fintech dimensions and the regulatory environment

Focussing the discussion on identifying the appropriate mix of regulatory support that may be required to create the enabling business environment, it is assumed that the fintech sector will impact a wide cross-section of services. Accordingly, a model was considered through which the breadth of technology, business and financial services available can be considered in turn, with a view to identifying the appropriate regulatory mix.

Urus & Mohammed (2021), reflected on the recommendations of O’Hanlon, Christi, Bradley, Jockle and Patrick (2020) due to its broad classification mechanisms of fintech. There it was recommended that there are three dimensions of fintech, which consists of (1) financial sector, (2) business model, and (3) technology.

**Figure 2**  
**The O’Hanlan fintech cube**



Source: Adapted from Urus & Mohammed, citing O’Hanlan, Christi, Bradley, Jockle and Patrick.

- (i) The financial sector dimension outlines the critical areas in the financial services that will benefit from using fintech. It includes banking, stock trading, asset management, transaction payments, insurance, foreign exchange, and others.
- (ii) The business model dimension identifies different important types of models used by firms to conduct their business which include business-to-consumer (B2C), business-to-business (B2B), business-to-business-to-consumer (B2B2C), to business-to-government/regulator (B2G), to platform-based business models, crowdfunding, and peer-to-peer (P2P) lending.
- (iii) The technology dimension indicates different types of technology use within the business. It includes cloud computing, big data, artificial intelligence (AI) and machine learning (ML), Blockchain (distributed ledger technologies), the Internet of Things (IoT), and quantum computing, to augmented and virtual reality, among others.

It is recommended that the components of the fintech cube may be used to assess the readiness of the enabling environment as it supports the development of each specific component. It is proposed that appropriate regulatory environments for specific components will support the development of fintech actors accordingly. In the case of Aruba, it is thus proposed that there can be some level of determination in the aspects of the fintech sector in which development is encouraged.

## **D. A brief overview of AI in the context of fintech sector development**

As discussed previously, the automation of the processing of digitalised datasets can be a boon to the development of the fintech Sector. However, without adequate controls to guide the use of AI platforms, unwanted negative externalities can accrue. These negative externalities can make the

fintech services thus developed, uncompetitive. In this regard, the risk associated with the use of AI, by virtue of how these AI agents are trained have been identified, namely:

- AI algorithms may perpetuate or exacerbate existing biases and discrimination present in society. Where “black box” AI system algorithms are trained on biased interpretations of data, such as where designed without sufficient considerations of diversity or societal contexts, these systems can produce biased outcomes, leading to discrimination against demographic groups.
- The use of AI systems often involves the collection, processing, and analysis of large volumes of data, which may be personal or copyrighted. This raises concerns about privacy infringement without consent, and copyright use without authorization or attribution.
- The adoption of AI platforms may exacerbate the digital divides on both the supply and demand sides of the service delivery. On the demand side, marginalized communities having limited access to and understanding of digital technologies will experience these initial barriers to leverage AI systems. Further, with limited access to the digitalization of applicable data sets associated with those communities, the AI systems’ opportunity to be trained will also be limited – exacerbating the issue of existing biases and discrimination discussed above.

To provide a structured approach to mitigate these risks, in December 2023, the European Parliament adopted the Artificial Intelligence Act (EU AI).<sup>4</sup> The Framework provides for four (4) levels of risk for AI systems, minimal, limited, high and unacceptable. With the intention to “protect fundamental rights, democracy, the rule of law and environmental sustainability from high-risk AI, while boosting innovation”. Key components of risk-based approach to the EU AI framework include:

1. The banning of applications that may threaten citizen’s rights, such as:
  - Biometric categorization systems based on sensitive characteristics and untargeted scraping of facial images from the internet or CCTV footage in the creation of facial recognition databases.
  - Emotion recognition in the workplace and schools and social scoring.
  - Notwithstanding specified law enforcement exemptions, predictive policing when based solely on profiling a person based on their characteristics), and
  - Exploitation of people’s vulnerabilities to manipulate human behaviour.
2. The classification of high-risk AI systems, based on potential impact on health, safety, the environment, democracy, and the rule of law, with clearly defined obligations to assess and reduce risk, maintain logs of use, and ensure human oversight.
3. Transparency requirements for “General Purpose AI (GPAI) systems” including compliance to copyright law and the publication of detailed summaries of training content.
4. The development of regulatory sandboxes to be established at national levels and made available to SMEs and start-ups in the sector.

In this regard, the EU AI seeks to provide specific guidance on the application of existing areas of regulatory oversight, where both institutions and instruments can be leveraged to facilitate effective and timely monitoring and compliance. Indeed, it is because of the wide scope of sectors where AI

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<sup>4</sup> European Parliament (2024).

systems are deployed, best practices suggests that common regulatory framework are leveraged. Common areas of regulatory focus which underpin the oversight of adoption of AI systems, include:

- Privacy and Data Protection frameworks based on the General Data Protection Rules (GDPR).
- Intellectual Property Rights management.
- Algorithm transparency (with varying levels of authorization requirements for devices and software).
- Cybersecurity standards and reporting frameworks.
- Fair trading and competition controls, including anti-trust monitoring and regulation.

## II. International experiences in establishing a fintech sector

### A. Overview

The international arena provides precedent of the key considerations that should be adopted by an administration in establishing the appropriate governance frameworks to support the development of the fintech sector, across the four design elements of fintech eco-system. A review of international best practice highlights four (4) areas in which the administration should focus in transforming its governance modality:

#### 1. Institutional and organizational structure

On review of the AFI (2020) assessment of developments in the regulation of the fintech sector, the general precedent can be identified that the Financial Sector regulatory bodies maintain oversight over this emerging sector. There is not much precedent for an ICT regulator to operate in this space. However, even in this regard, in adapting to the specific requirements of financial and technological innovation, it is advisable to evaluate existing organizational structures to assess whether current structures can sufficiently support regulating fintech developments. In the AFI review, common trends which have emerged include:

- Establishment of fintech or Innovation Units
- Emergence of specialized units

Key suggestions:

Regulatory leaders must ensure cross-functional coordination across relevant departments (Information Technology, Statistics, Supervision) to monitor developments in this emerging sector.

### (a) Capacity building

The rapid growth of technology-driven financial services has heightened the need to develop new skills and build capacity and an organizational culture that embraces and nurtures innovation among regulators. However, the need for training to appreciate the benefits and risks of this new environment does not reside only with staff at the regulator. Customer awareness and knowledge is an important channel through which the regulatory bodies can get feedback from the marketplace. Accordingly common practice recommended by AFI suggests that there be concerted efforts in both:

- Capacity building for staff, and
- Capacity building for consumers

Key suggestions:

In this regard, it is imperative that the policy leaders recognise the importance of partnerships with the civil society in this regard. Common initiatives include:

- Advocacy for the academic community to provide courses on fintech and related technical skills
- Conduct digital financial literacy campaigns targeting the general population

### (b) Engagement and outreach

Another common trend identified by AFI is the need for regulators to be proactive in responding to innovation and engaging with stakeholders to gauge the likely impact of emerging products on consumers and the regulatory framework. Regulators often engage actively in outreach efforts with the fintech industry and with their regulatory counterparts and peers. These outreach efforts should include:

- Industry outreach initiatives,
  - curate and support the development of National fintech Associations
  - establishing incubator programs, accelerators, innovation labs and co-working spaces
  - hosting of national and regional fintech events
- Collaborate with regulatory counterparts to share learnings and innovative best practices.

Key suggestions:

- Create a stakeholder map to identify focal points for coordination across the industry.
- Connect with incubator programs, accelerators, innovation labs and co-working spaces to bring in fintech start-ups.
- Harmonize and align regulatory regimes across local regulatory counterparts by creating working groups or taskforces to regulate new innovations.
- Collaborate with regulatory peers from other regions to promote regional integration through regional working groups.

### (c) Regulatory framework and incentives

Regulators are often faced with the task of balancing conflicting priorities such as market growth and competition with the integrity, safety and stability of the financial system. Striking that balance will involve defining how non-traditional financial service providers fit within existing regulatory structures, gauging whether there is a need to alter them, and creating agencies, licenses, or rules to oversee innovation. With the establishment of appropriate regulatory frameworks, fintech can contribute positively to the development of financial markets, including to the economic well-being of the consumers.

Examples of common regulatory frameworks and incentives which have been shown to have positive impact on fintech sector development include:

- Fintech targeted regulations
  - Link to national financial inclusion strategy (NFIS)<sup>5</sup>
  - Regulatory sandboxes and innovation hubs/labs<sup>6</sup>
  - The “test and learn” approach<sup>7</sup>
  - Regtech, Suptech and other innovative approaches, leveraging
    - Digital identify verification (e-KYC)<sup>8</sup>
    - Payment infrastructure interoperability,<sup>9</sup> or
    - Open banking APIs.<sup>10</sup>
- Enacting supporting general legislative frameworks and establishing necessary institutions:
  - Consumer protection
  - Data protection and privacy
  - Market competition
- Government incentives
  - Immigration programs to attract entrepreneurs and investors
  - Funding assistance
  - Tax incentives for investors and businesses

Key suggestions:

- Examine how fintech can be linked to an NFIS, if such a goal is in place.
- Review national legislation on consumer protection, data privacy/protection and market competition and how they can be applied to the supervision of fintechs.
- Where possible, review and advocate for incentives for investors/start-ups and funding of fintechs.
- Seek feedback and peer reviews from both service providers and outside consultation on regulation drafts.

## **B. International case study snapshots**

### **1. Organisation for Economic Co-operation and Development (OECD)**

#### **Estonia**

To enhance financial innovation in Estonia, the Estonian Financial Supervision Authority (EFSA) established an in-house fintech working group of various specialists from the EFSA and Estonian Central Bank in 2016. This working group serves as an Innovation Hub. The Innovation Hub functions as a

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<sup>5</sup> Examples of precedent seen in Nigeria and India.

<sup>6</sup> Examples of precedent seen in UK and Estonia.

<sup>7</sup> Examples of precedent seen in Tanzania.

<sup>8</sup> Examples of precedent seen in Jordan.

<sup>9</sup> Examples of precedent seen in Thailand.

<sup>10</sup> Examples of precedent seen in Mexico.

partner for fintechs, helping them overcome preliminary obstacles posed by a complex legal framework, while also serving as an in-house fintech knowledge aggregator for the EFSA.

The Hub is open to any entity whose business model involves financial innovation. The broad aim of the Innovation Hub is to:

- Establish permanent and effective contact and information exchange with fintechs and other relevant institutions in Estonia and abroad;
- Gather and analyse information on the development of innovative financial technology and respective legal barriers; and
- Develop carefully considered proposals to enhance innovation or remove the barrier hindering it, which involves establishing, changing or repealing legal rules, publishing statements or guidelines, or introducing, changing or halting specific supervisory practices.

Fintechs are provided with direct contact with relevant specialists, as well as initial guidance on the regulatory framework and assistance in qualifying the product/service to proceed to licensing. The Innovation Hub also provides general guidance through publications on the legal aspects of fintech “hot topics”, which have so far covered crowdfunding, initial coin offerings (ICOs) and virtual currencies.

## **Luxembourg**

The Luxembourg House of Financial Technology (LHoFT) is a foundation established in 2017 by the Ministry of Finance and thirteen (13) private partners, with the aim to drive innovation in Luxembourg’s financial industry. The LHoFT also works closely with Luxembourg’s financial sector regulator, the Commission de Surveillance du Secteur Financier (CSSF), the Association for Insurance (ACA) and the Association of the Fund Industry (ALFI).

The LHoFT works closely with regulators, banks, lawyers, insurance companies, asset managers, public institutions and research centers. It has become a unique and innovative platform where all industry participants, even competitors, can come together to converse and build innovative projects. The LHoFT also provides training programs on innovation for international regulators and actively supports education programs to prepare the younger generation on the future of finance.

The 10-person LHoFT team hosts 60 fintech companies in its incubator program, bringing together more than 150 fintech members from around the world. The team provides fintechs with vast networking opportunities in Europe, access to mentorships and partnerships and even co-working spaces.

Luxembourg has become a hub for fintechs seeking to launch in Europe, due to a thriving financial ecosystem and a trusted regulator. fintechs are encouraged to have their first meeting with the CSSF to explain their business model and business plans — a meeting that may seem daunting for fintechs in other countries. The CSSF has a dedicated Innovation Team that provides the start-ups with valuable feedback and connects them to the relevant licensing parties within the institution. The regulator is therefore open to dialogue and embracing innovation, a position that makes it possible to work closely with the fintech industry.

## **Mexico**

Mexico was the first country in Latin America to introduce a framework covering a wide scope of fintech activities in one piece of legislation. Authorities enacted the fintech Law in March 2018 with the aim to bring new financial business models, such as crowdfunding and e-money activities, within the regulatory perimeter. The Law was prompted by the rapid growth of these activities in prior years, for example, the alternative finance industry in Mexico (including balance-sheet lending and crowdfunding

models) increased 730 percent from 2015 to 2016, and P2P consumer lending market volumes expanded by 90 percent in 2017.

The Law provides more opportunities for non-banks to enter the sector with more legal clarity, encouraging new products and links between banks, telcos and fintech providers. The Law supports innovative fintech activities by:

- Giving legal recognition to and setting supervisory frameworks for financial technology institutions (FTIs), which can perform the following activities: crowdfunding (debt, equity, co-ownership or royalties) and e-money (including e-wallets).
- Allowing FTIs and banks to make transactions using cryptocurrencies, subject to special authorization and rules issued by the Central Bank.
- Creating an obligation for financial services providers to share financial data with other providers and third parties specializing in technology through standard APIs (Open Banking).
- Introducing a regulatory sandbox for both nonregulated and regulated entities. For the former, the Law allows financial authorities to grant legal and regulatory exemptions to test products or services before becoming a regulated entity. For the latter, exemptions to the secondary regulation are granted to test innovative models. In both cases, eligibility criteria for testing apply.

The fintech Law gives the Comisión Nacional Bancaria y de Valores (CNBV), an agency of the Ministry of Finance and Public Credit, and other financial authorities the power to supervise FTIs and innovative model institutions. New organizational structures within the CNBV have also been established to support the supervision of the new sector. The CNBV now houses a fintech Supervision Department to oversee crowdfunding and e-money, and a Sandbox Team that works with both regulated and non-regulated entities seeking to test new innovations.

The enactment of the fintech Law set in motion efforts to create a vision of the healthy development of a fintech ecosystem in Mexico. These efforts included the recruitment of international research experience, ongoing close contact with model fintech companies globally and active participation in fintech events and forums in Mexico and abroad.

## United Kingdom

In 2014, the Financial Conduct Authority (FCA) of the United Kingdom launched Project Innovate, creating an area within the FCA responsible for monitoring and identifying emerging trends in fintech. It has since evolved into the Innovation Division with three departments working on different aspects of fintech, including crypto-assets, Reg-Tech and advanced analytics, data strategy and a regulatory sandbox. The FCA launched the world's first regulatory sandbox in 2015. The sandbox has attracted a large number of applications every year. Once a fintech is accepted into the sandbox, the FCA assigns a case officer as its point person. The case officer works with the company to understand the business model and provide support on existing regulations, where appropriate. The case officer also consults with colleagues at the FCA when additional expertise is required.

To join the FCA Sandbox, companies are asked five questions:

- (i) In scope: Are you looking to deliver innovation that is either regulated business or supports regulated business in the UK financial services market?
- (ii) Genuine innovation: Is your innovation a new or significantly different offering in the marketplace?

- (iii) Consumer benefit: Does the innovation offer a good prospect of identifiable benefit to consumers (either directly or via heightened competition)?
- (iv) Need for a sandbox: Do you have a genuine need to test the innovation in our sandbox? (This depends on the nature of the innovation and can be waived.)
- (v) Ready for testing: Are you ready to test the innovation in the real market with real consumers?

As of April 2019, around 80 percent of the fintechs that have completed sandbox testing were authorized and operating in the market.

The FCA, together with an international group of financial regulators, recently established the Global Financial Innovation Network (GFIN) to provide a global regulatory sandbox in which fintech companies can apply to test out cross-border solutions. GFIN has over 90 members and serves as a network for regulators to collaborate and share experiences with regulating innovation in their respective markets. They cover emerging technologies and business models and provide a contact point for firms seeking to bring their innovations to new markets.

## 2. Developing countries

### Malaysia

The Malaysia Digital Economy Corporation (MDEC) was established in 1996 by the Malaysian Government as part of a national initiative to drive the country's digital economy. Implementing efforts centred around attracting investments, building local tech champions and catalysing digital innovation ecosystems. The MDEC works to align the interests of three key stakeholders: regulators, the industry (financial institutions) and the community (start-ups, corporate enterprises).

The MDEC works closely with Bank Negara Malaysia (BNM) and the Securities Commission Malaysia (SCM), aligning itself with regulators' financial inclusion goals of leveraging technology to target the underbanked and bringing Malaysia's shadow economy into the light. The MDEC also plays a strong policy advocacy role, helping to advise regulators on policy changes, voice industry feedback and advocate for non-bank actors to play a role in bringing financial services to the underbanked.

The MDEC also operates The Orbit, a co-working space for fintech start-ups and a hub for partners, such as Visa, MerchantTrade, United Nations Capital Development Fund (UNCDF) and Chaintope, among others. The Orbit is a nexus for many fintech-related trainings and workshops, including its quarterly "regulator boot camp" in which BNM and SCM meet with fintech start-ups to discuss various trends. The Financial Innovation Lab hosted at The Orbit aims to accelerate innovation in digital financial services with new or improved solutions that help improve the daily lives of low and moderate-income people.

The MDEC also runs a fintech Academy that collaborates with secondary schools to develop students' technical skills and with universities to deliver modules on fintech topic. The Academy also holds design thinking workshops for banking professionals. The MDEC recently has launched the "Fintech Booster" program, which helps companies to understand the overall scope of fintech and its legal, compliance and regulation requirements. MDEC also has created a vibrant fintech ecosystem leveraging the expertise and knowledge in Islamic Finance.

The following are some of the key trends taken place across Malaysia relating to fintech:

- Peer-to-peer (P2P) financing and equity crowdfunding (ECF)
- Mobile wallet
- Initial Coins Offerings (ICOs)/ Crypto Assets

## Thailand

The Bank of Thailand (BOT) has established a separate Financial Technology Department adjacent to the Payment Systems Policy Department to oversee the BOT's regulatory sandbox - set up to help shorten time-to-market for banks and non-banks wanting to provide innovative digital financial services. The fintech Department includes a mix of both IT and policy experts, works closely with both industry players and other relevant departments in the BOT – as existing regulations will apply, aggregates information from relevant BOT departments and identifies key success indicators to gauge whether the sandbox project will fail or pass the sandbox and be scaled up for the public.

In 2016, PromptPay was launched as an e-payment initiative to move the country towards a cashless society. PromptPay enables real-time fund transfers using only the recipient's mobile number or national identity number. The impact of PromptPay since launch has been significant. Over half of Thailand's population has now registered for PromptPay: 43 million registered IDs with over 450 million transactions worth THB 2.2 trillion THB (USD 71.6 billion). PromptPay's success and rapid uptake have been primarily due to two key factors: interoperability across banks and the digitization of government payments. Fifteen commercial banks and four non-bank service providers have joined the PromptPay system, supporting an open payment infrastructure and interoperable ecosystem. Furthermore, the Thai government launched extensive campaigns to encourage citizens to register for the service in early 2017, with the goal of using PromptPay to push out social benefits and tax returns more efficiently. In addition, the BOT, in partnership with banks in Thailand, has developed a standardized QR code that has provided SMEs and micro-merchants with a safe and secure way to get paid for their services or goods. It has eliminated transaction fees on what are often low value purchases, especially valuable for low-income users. Roughly five million merchant acceptance points across the country now use QR codes.

### 3. The Caribbean experience with fintech and DLTs<sup>11</sup>

There has been some experience in the Caribbean with regard to the roll out of fintech services. Occurring over the last decade, these experiences are based on the use of DLTs, more than AI platforms, although the latter is expected to be emergent soon. Accordingly, the approaches to treating with fintechs have revolved around the challenges outlined in the Policy Report on fintech data gaps (2021).<sup>12</sup> That study focused on the data gaps which emerge around the operation of DLTs, and specifically cryptocurrencies. The study focused on how various modalities of implementing cryptocurrencies broadly undermines Central Banks roles in monetary policy administration, financial stability and effective regulation. This then has an associated impact on Central Banks' economic reporting and administration of payment systems.

With such widespread externalities, the implementation of cryptocurrencies in particular is approached with first, caution with regard to the local contexts, but also with due consideration of operations and logistics associated with regulatory partnership between Central Banks. In this latter perspective, ideally, a consistent regulatory response to the deployment of DLTs in the emerging Caribbean fintech sector should be pursued to establish a predictable regime for both entrepreneurs and customers region-wide, to provide economies of scale for the potential investor. However, this is not what has emerged. Below is a review of the significant developments which have recently occurred throughout the Caribbean.

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<sup>11</sup> Extracts from this section will be published in a Chapter entitled "Envisioning the Future Landscape of Caribbean Digital Regulation" by Kwesi Prescod in *Digital Regulatory Agencies*, Forthcoming by Edward Elgar, 2025.

<sup>12</sup> Marqués, J.M. , Ávila, F., Rodríguez-Martínez, A., Morales-Reséndiz, R., Marcos, A., Godoy, T., Villalobos, P., Ocontrillo, A., Lankester, V.A, Blanco, C., Reyes, K., Lopes, S.I., Fernández, A., Santos, R., Maza, L.A., Sánchez, M., Domínguez, C., Haynes, N., Panton, N., Griffith, M., Murray, K., Doyle-Lowe, M., Des Vignes, L.A., Francis-Pantor, M. (2021).

- There have been advances in the establishment of regulatory sandboxes. Notably Jamaica, Barbados, Trinidad and Tobago, and the Organization of Eastern Caribbean States (OECS) have all implemented regulatory sandboxes since 2020. However, the scale and function of these sandboxes vary significantly, with none yet presenting the breadth and scope of approach and partnership outlined in the international review above. Instead, the regulatory sandboxes in the Caribbean initially imposed the same regulatory obligations on fintechs that apply to traditional financial institutions. These obligations are thus generally broader, and some argue more restrictive, than the focus on information sharing requirements suggested by the 2021 Policy Report.
- There has been moderate adoption of regulatory frameworks to recognise digital assets and to provide oversight of businesses that trade in these assets. These include:
  - Bahamas' Digital Assets and Registered Exchanges (DARE) Act was passed in 2020 to regulate the issuance, sale, and trade of digital assets. In 2024 the Act was repealed and replaced by the DARE Act, 2024. The new legislative framework broadens the categories of activities covered by the law and tightens the regulatory obligations of operators. The revised DARE Act establishes a framework that captures most aspects of businesses that would trade in digital assets. Administered by the Securities Commission of Bahamas, the Act also strengthens the reporting requirements of the digital asset businesses in Bahamas.
  - The Virtual Asset Business Act (VABA) was enacted between 2020 and 2021 in most Eastern Caribbean Currency Union (ECCU) member countries. The competent authorities for the enforcement of the Acts are identified and vary by jurisdiction from the St. Vincent and the Grenadines Financial Services Authority (FSA), Grenada Authority for the Regulations of Financial Institutions (GARFIN), Montserrat's Financial Services Commission (FSC) and the St. Lucia Financial Services Regulatory Authority (FSRA). The VABA implementation in ECCU Member countries is critical to AML/ CFT Compliance within these jurisdictions. In that regard, the provisions of VABA are not comparable to the Bahamas DARE Act as amended in treating with a wide range of digital assets,
  - The Central Bank of Trinidad and Tobago (CBTT) is undertaking two initiatives:
    - In 2020, CBTT issued its Electronic Money Issuer (EMI) Order. The framework was amended in 2023. The Trinidad and Tobago EMI framework is designed to treat with the specific question of digital wallets, where the monetary value in the wallet is matched with moneys in the providers reserves. This does not address cryptocurrencies in the broadest sense and does not treat with other forms of digital assets, such as provided for in the revised Bahamas DARE Act. EMIs are under the rubric of CBTT's regulatory sandbox, established in partnership with the Securities Exchange Commission (TT-SEC) and the Financial Intelligence Unit (TT-FIU).
    - In 2024, it was announced that the CBTT was entering into an MOU with NPCI International Payment Limited, a firm out of India, to implement the latter Unified Payment Interface (UPI) to support person-to-person (P2P), person-to-merchant (P2M) and Government-to-person (G2P) transactions.

Concurrently, there are several Central Bank Digital Currency (CBDC) initiatives to mainstream crypto-currency adoption and support e-payments, including:

- In 2020, the Central Bank of Bahamas (CBB) launched the "Sand Dollar", a digital version of the Bahamian dollar. In this regard, although the CBB does not directly manage any wallets and interact with customers, it does maintain the ledger of all individuals holding sand dollars and also administers the centralised KYC/ identity infrastructure.

- In 2021, the ECCB launched a digital version of the Eastern Caribbean Dollar, DCash, as a pilot within the four countries within the OECS: Antigua & Barbuda, Grenada, Saint Lucia, and St. Kitts & Nevis. The pilot phase was completed and the ECCB has yet to announce whether and how it would move forward with its CBDC.
- In 2022, the Jamaica Central Bank (JCB) launched Jam-Dex, a digital version of the Jamaican dollar. There are currently two main wallet providers, the National Commercial Bank ("LYNK" digital wallet) and Jamaica National Bank ("JN Pay" wallet). Notwithstanding the Jamaican government pursuing various incentives to increase adoption, it was reported in August 2014, that the majority of banking wallet LYNK's trading volumes were not associated with the CBDC. This has been attributed to poor merchant adoption.

It is evident, however, that there is no consistency in the coverage and the policy approaches in framing a response to DLTs and cryptocurrency oversight. Accordingly, there is divergence in approach to sector administration other than encouraging registration of service providers. Notably, the only commonality regionally is that these regulatory developments are squarely in the financial services sector, overseen by Central Banks of the various territories.



### III. Conclusion

The development of fintech with AI or DLT as a segment of the ICT and financial sectors provides an opportunity for overall sector development, particularly in the areas of financial service provision. There are matters of systemic risk mitigation that must be addressed to establish an appropriate environment that is attractive to investors, however overregulation should be avoided to maximise the benefits of policies geared to fintech sector development.

The review of international best practices provides a baseline of the regulatory framework, including laws, institutions and practices, which should be considered.

In this regard, System's proposed design elements that support the development of a Fintech ecosystem:

- Business environment/ access to markets
- Government/ regulatory support
- Access to capital
- Financial expertise

was used to identify key activities, reflected in international best practice, which should be reflected in an implementation strategy.

In establishing a framework through which a regulatory strategy specifically can be outlined, O'Hanlan et al fintech Cube was adapted to identify the appropriate regulatory mix associated with the segment of the fintech sector which is being pursued. Therein it was determined that Aruba would need to establish standard and/ or revised regulatory frameworks treating with:

- Foreign Exchange control and management, particular in the context of AML/CFT requirements;
- Consumer Protection;
- Competition Management;

- Privacy Protection; and
- Cybersecurity Coordination and Management,

to create the appropriate enabling environment for a fintech sector.

Finally, from the perspective of institutional readiness, international best practice suggests that there is a concerted focus on:

- Creating new structures to support reactive regulation, in controlled environments.
- Capacity building, both internally and externally; and
- Engagement and Outreach, both with sector participants and regulatory partners.

There is significant precedent upon which the Government of Aruba may take guidance, both in the Caribbean and further afield in Europe and the Far East. The challenge will be in identifying the areas of focus where competitive advantage may best be engendered. Thereafter pursuing this policy in those particular areas of focus will require leadership to inspire the wider society, including the private sector and civil society, to partner in the pursuit of these opportunities together.

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This interim report explores the transformative impact of fintech on global financial markets. It delves into the evolution of fintech from its early stages to the present day, highlighting key innovations such as digital banking, cryptocurrencies and artificial intelligence-driven financial services. The report provides an in-depth analysis of international best practices, regulatory frameworks and the role of government and private sector partnerships in fostering a thriving fintech ecosystem. In particular, the report underscores the importance of regulatory frameworks addressing foreign exchange control, consumer protection, data privacy, cybersecurity and competition management.

With case studies from countries including Estonia, Luxembourg, Mexico and the United Kingdom, the report offers valuable insights into the challenges and opportunities in fintech development. It also discusses the Caribbean experience with fintech and distributed ledger technologies, emphasizing the importance of regulatory sandboxes and digital asset frameworks. Ultimately, the report concludes that a balanced regulatory approach fosters financial innovation while mitigating risks, and that effective collaboration between the public and private sectors is crucial for sustainable fintech development.



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