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# DIGITAL TRANSFORMATION OF BANKING AND FINANCIAL INSTITUTIONS IN THE UAE: UNDERSTANDING THE COMMON CHALLENGES FOR COLLECTIVE ACTION

FULL PAPER

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# 1. FOREWORD

The ADGM Academy Research Centre, in collaboration with the College of Business and Economics at the United Arab Emirates University (UAEU), undertook a research project aimed at understanding the current landscape of the digital transformation of banking and financial institutions in the UAE and the common challenges faced.

The research was supported by senior representatives from across the UAE's financial sector, who shared their insights via interviews conducted by the research team.

Digital transformation has become increasingly important in all spheres of life, including the financial sector of the UAE. The government of the UAE has embraced digital technology as an essential enabler, adopting various strategies to empower both the government and business sectors. However, it is also apparent that multiple challenges mitigate against the adoption of digital technology. The outcomes of this research will enhance future collaboration between government entities, banking and financial institutions, and the academic world to find solutions through research projects and the sharing of best practices and experiences.

The findings in the paper do not reflect the views of the research team but are the consolidated views of the industry representatives who participated in the study

## Acknowledgements:

The research team, consisting of **Dr. Thouraya Gherissi Labben, Mr. Johan Burger, Dr. Gurdal Ertek, and Dr. Tariq Elrazaz**, would like to thank the following UAEU members for their contribution in designing the interview questions:

### COLLEGE OF INFORMATION TECHNOLOGY:

- Prof. Abderrahmane Lakas
- Dr. Ali Ismail Awad

### COLLEGE OF BUSINESS AND ECONOMICS

- Dr. Ahmed Elsayed
- Dr. Muhammad Naeem
- Dr. Nader Atawnah
- Dr. Zakaria Boulanouar

While the interviews with financial industry representatives were conducted on the principle of anonymity, some interviewees provided permission to acknowledge their contribution:

- Mr. Jamal Saleh, Director General, UAE Banks Federation (UBF)
- Mr. Sean Langton, Chief Information Officer, Abu Dhabi Commercial Bank
- Mr. Devid Jegerson, Chief Operating Officer, Invest Bank
- Dr. Ashraf Elwan, Chief Operating Officer, Gulf Regional Office, Banque Misr-UAE
- Mr. Alaa El-Shafei, Chief Risk Officer, Gulf Regional Office, Banque Misr-UAE
- Mr. Sido Bestani, Managing Director, Swift, Middle East, Africa, South & Central Asia
- Mr. Dmitry Fedotov, Head of DLT Foundations Oversight, ADGM

## 2. INTRODUCTION

### a. Purpose of the Paper

The banking industry is vital to the UAE's economic growth - around 8.2% of the GDP in 2022 and 13% of the non-oil sector domestic product (Haque, 2023; Kothari & Seetharaman, 2020). Furthermore, the UAE is the most important financial hub for the Middle East and one of the world's leading financial centers. Recently, the UAE announced its plans to become a global innovation center by establishing initiatives related to Artificial Intelligence (AI), blockchain, and fintech. In this direction, the UAE's Central Bank announced in 2023 the launch of a program to hasten digital transformation in the financial sector, encouraging initiatives ranging from open finance to a new digital currency. Furthermore, the UAE Banks Federation (UBF) declared that, over a period of time, the rate of digital banking services used through several banking channels had increased by 100% by May 2023. The latter indicates the level of technology adoption by financial services businesses and the customer's trust in the safety and security of digital services.

Enhancing the position of the UAE as a hub and benchmark of digital banking and financing necessitates adopting comprehensive and sustainable digital transformation strategies. Digital transformation is about more than digitalizing brick-and-mortar processes. Digital transformation embeds a high level of complexity and uncertainty, engaging the entire organization in a complete change management journey to create a distinct competitive advantage appealing to a growing number of digitally savvy consumers. In this context, the College of Business and Economics (United Arab Emirates University) led this project to explore the common challenges banks and financial institutions face while undertaking digital transformation. More specifically, the study investigates the benefits and challenges caused by AI, blockchain, fintech, cyber security, and technology integration.

### b. Method and Structure of the Paper

To collect data, the ADGM Academy Research Centre facilitated the connection with UBF, leading banks and financial institutions in the UAE. The team from the College of Business and Economics at the UAEU prepared semi-structured interview questions composed of six sections, exploring the selected organizations' views related to the impact of 1) digital transformation in general, 2) AI, 3) blockchain, 4) fintech, 5) cyber security, and 6) technology integration. The research team interviewed leaders from thirteen selected banks and financial institutions across the UAE. Each interview lasted, on average, one hour. The interviews were recorded after obtaining formal approval from the interviewees. The recorded interviews were then transcribed and analyzed.

As an introductory section, the paper addresses the general landscape of the digital transformation of financial institutions. Then, based on the qualitative research outcomes, the article focuses on the case of the UAE and explores the six areas mentioned above. The report concludes by identifying areas where government, financial institutions, and academics could collaborate to advance knowledge about digital transformation.

## 3. BACKGROUND: LANDSCAPE OF DIGITAL TRANSFORMATION IN FINANCIAL INSTITUTIONS

### a. Digital Transformation is Irreversible

The major transformation brought by the Fourth Industrial Revolution is incomparable in scale, speed, and complexity (World Economic Forum, 2016). The main change drivers are the modern and advanced technologies impacting individuals and businesses. The 2019 pandemic has brusquely accelerated this process as the globe was pressured to find suitable ways to educate people to become digital consumers. Technologies such as big data, AI, cloud computing, the Internet of Things (IoT), simulations, and augmented reality (AR) are transforming service

provision, allowing businesses to understand better and accurately meet corporate and individual customers' needs and expectations.

According to Gül and Gül (2018), Industry 4.0 applications create new opportunities, challenges, and uncertainties for the service sectors, pushing the different economic actors to focus on changes in communication technologies and innovative integration trends and embed new paradigms to compose the current phenomena. Digital transformation is irreversible in these circumstances, and lagging businesses may quickly become obsolete.

Defined as “the combination of information, computing, communication, and connectivity technologies” (Bharadwaj & Sawy, 2013, p. 471), digital technologies notably impact IT-intensive business sectors such as the financial services industry. However, compared to other sectors, the pace of digital transformation of banking and financial organizations is slower. A study (Yurcan, 2023) surveying 750 C-suite executives at financial institutions from different countries involved in digital transformation concluded that 50% of the companies declared that they were either “beginners” or “implementers” and that the digital transformation of customer interaction is their priority project for the upcoming two years. This result shows that “Digital Transformation,” even if it is a nebulous concept, tends to be assimilated to “Digitalization,” which is considered the conversion of existing processes to digital systems (e.g., going paperless through a digital solution). Bloching et al. (2015) consider digital transformation the next step after digitalization. Although no single agreed definition of digital transformation exists, it could be viewed as a “disruptive or incremental change process. It starts with adopting and using digital technologies, then evolves into an implicit holistic conversion of an organization or deliberate in pursuing value creation.” (Henriette et al., 2016). In other terms, this refers to the customer-oriented strategic business transformation entailing rethinking the business model and cross-organizational change while adopting digital technologies.

In this direction, Chamorro-Premuzic (2021) also affirms that digital transformation is not only about acquiring and adopting the best technology. Streamlined processes, change culture, and adequate talents are all critical to successful digital transformation. As a result, Babbar et al. (2023) concluded that 70% of the companies carrying digital transformation initiatives, including those in banking and financial services, fail to achieve their objectives while exceeding their original budget. Further to this challenge, digital technologies brought additional threats to traditional banking and financial services institutions. In addition to the emergence of digital banks as new competitors, brick-and-mortar banks are no longer the unique providers of financial services. Insurance companies, pension funds, and, most importantly, fintech organizations are gaining market share and overcoming barriers to market entry by delivering exclusively digital products adapted to more digitally savvy customers. Even more threatening, Big Tech companies (e.g., Alphabet (Google), Amazon, Apple, Meta (Facebook) and Microsoft) have already in 2019 announced their intention to diversify their portfolio by offering financial and banking services (Dietz & Yasenovets, 2019). Big Tech firms have since then increasingly ventured into finance and are offering a range of financial services, from payments to money management, insurance, and lending (BIS Working Papers No WP1129, Big techs in finance, 2023). Given the current situation, brick-and-mortar banks and financial services companies must embrace digital transformation to survive by making their institution competitive and achieving higher performance.

## **b. Digital Transformation for Competitive Advantage**

As discussed above, advanced technologies such as AI, data analytics, blockchain, cloud computing, robotics, etc., have disrupted supply and demand for financial services through accelerated innovation processes and the development of digital services and products. In this regard, traditional banks and financial institutions are urged to engage in digital transformation to position themselves within this new ecosystem, covering a wide range of financial services from wealth management and investments to banking and insurance. In this crowded market, financial institutions should adopt clear strategies to differentiate their digital products and services from competitors. Figure 1 represents the range of digital transformation approaches to be undertaken by organizations to create value and achieve a distinctive competitive advantage.

**Figure 1:** Combination of Business Strategies to Yield Competitive Advantage  
(from Kraus et al., 2021, p. 7)

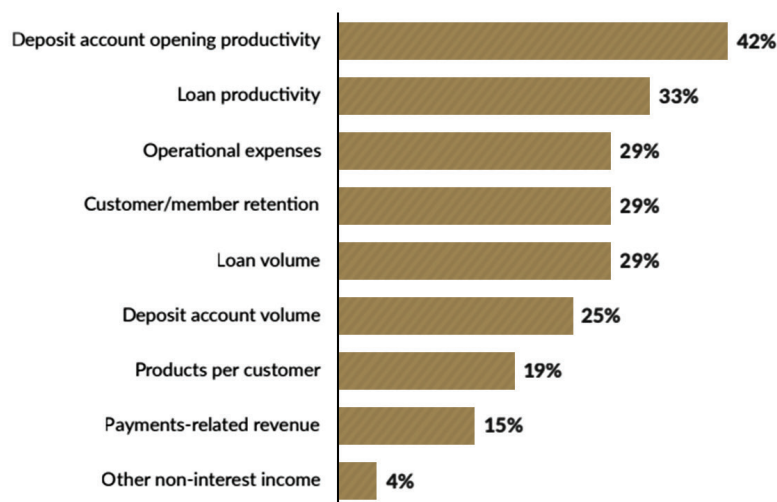


A report by Ernst & Young (2021) stated that the retail banks' clientele considered an exceptional customer experience the critical criterion for staying loyal. In this sense, AI and machine learning can help customers make smarter trade decisions relying on timely and accurate analyses of market trends. These technologies also play a crucial role in reducing fraud and money laundry hazards. For example, financial services automation with chatbots can enhance operational efficiencies (Georgiou, 2023). IoT-connected devices such as sensors, cameras, and smart gadgets are crucial to improving efficient data collection and processing by collecting real-time information and allowing financial institutions to react to customer needs in real-time. IoT contributes to improving human resources efficiencies and reducing financial institutions' management and cost, for instance, by monitoring energy consumption.

Even though the regulation of transactions involving blockchain-based products and services lags the pace of advancement of the technology, the technology can drastically shorten the time for payments abroad and money transfers. Blockchain applications go far beyond cryptocurrency and Bitcoin; they guarantee higher transparency and data audit and permit a certain tolerance for the needed trust between interested parties in a financial transaction (MindSmith, 2020). Big data and data analytics act and will continue to be a significant change driver in the back-office of banks and financial services organizations to sustain their existence (Ogochukwu, 2022). Big data analytics allow value creation by making sense of massive volumes of various types of daily data. Financial services businesses will gain accuracy and effectiveness in segmentation, fostering the development of tailor-made services and products. Analytics enhances organizations' knowledge, which helps to shorten processes, reduce risks, and improve the quality of decision-making. The disruptive technology of cloud computing releases financial institutions from the responsibility of investing and managing software and hardware by outsourcing them to a third party offering limitless data storage space (Nguyen & Sondano, 2023). Embracing cloud computing permits cost savings, encouraging financial institutions to focus on their core business. These digital transformation approaches directly impact the performance of banks and financial services companies. A report by Cornerstone Advisors (2023) shows that several financial institutions claimed that digital transformation has improved their performance metrics by more than 5%, as shown in Figure 2 below.

**Figure 2: Impact of Digital Transformation Strategy on Selected Performance Metrics**  
 (Source: Cornerstone Advisors Report (2023, p. 24))

**Percentage of respondents reporting 5% or greater improvement in the following performance metrics**  
 (Base=Financial institutions three quarters or more complete with digital transformation strategy)



Banks and financial institutions should develop a long-term strategy to succeed in digital transformation instead of reacting to the market’s uncertain conditions. In this regard, Jim Marous said, “It is the time to look beyond short-term quarterly results, reimagining what is possible with a universal focus on speed of digital transformation as opposed to being a fast follower.” (The Financial Brand, 2020). Jardak and Ben Hamad (2022) demonstrated that, in the short run, companies face financial problems impacting the growth of ROA and ROE. Still, companies can maximize their financial outcomes and market value in the long run. Digital transformation does not happen overnight; it is a long, complex process entailing restructuring, reorganization, and cultural change. Accordingly, financial institution leaders should balance the pressure of showing short-term ROI and achieving long-term ROI by linking short-term performance to strategic goals.

However, the achievement of the long-term perspective of digital transformation is hindered by two significant changes. One is related to investors, and the second is to management ambition. A report by Deloitte (2020) concluded that compared to start-ups (e.g., fintech organizations), the investors of mature financial institutions are risk-averse and tend to prefer predictable returns, expectations that could not be met when decisions are made about digital transformation projects. According to the same report, managers leading digital transformation are simultaneously responsible for the current business, causing a conflict between their set short-term performance and the digital transformation strategy scorecard. For successful digital transformation, all actors should understand what the latter entails to achieve the highest outcomes from this irreversible transformational journey.

### c. Impact of Digital Transformation

Digital transformation is not merely a decision to adopt new technologies and digitalize a process. It is a complex decision involving a completely different approach to financial institutions’ business. Digital transformation means a shift from a silo-and-outcomes-based approach to cross-functional teams working collaboratively to generate value while staying resilient and agile to align with continuous technological advancements. The latter entails transformations in processes, business models, domains, and culture. Process transformation involves reflecting on integrating technology while being more efficient and effective (e.g., shorter time for transactions, reduced costs or errors, simplified processes, etc.).

Business model transformation entails reimagining part of the business by digitizing services or a product. This transformation is undertaken to respond to the change from a demand perspective



or proactively react to competition. Domain transformation engages financial organizations in identifying new opportunities, even in different sectors or new markets, to diversify and reinforce their competitive position. Finally, beyond product and service transformation, cultural and organizational transformation ensures that digital change is accepted across functions, departments, and units. It sets a culture of digital embracement, encouraging the shift from the inside rather than just reimagining their services and products.

However, several impediments may hinder a successful digital transformation. This is due to the latter's multidisciplinary nature, encompassing strategy, organization, information technology, and supply chain (Papathomas & Konteos, 2023). Not only this, Verhoef (2021) added that digital transformation also encompasses "a host of newly defined roles for existing agents" when talking about customers, partners, and competitors. For a successful digital transformation strategy in banking and financial institutions, it is vital to ensure that the organizations have enabled a digitally friendly environment ready to engage in strategic transformation.

One of the significant factors that would facilitate digital transformation is the organization's human capital. Getting the proper strategy execution capabilities and digital leadership skills is required. These talents must have broad skills relevant to the digital economy, innovation, and entrepreneurship and be knowledgeable about the latest technological trends and their potential impact on businesses (Chanas et al., 2019). High competition to attract technology-savvy candidates may lead financial institutions to search for these profiles. Few banks have recruited candidates from big tech or hospitality sectors (Deloitte, 2020). Even though the financial services sector offers attractive packages, the fierce competition with other domains and technology companies to attract digital talents requires financial institutions to adjust their talent acquisition and retention policies to include incentivized and innovative compensation and reward plans (Deloitte, 2020).

Another critical condition to avoid the pitfalls of digital transformation is the IT infrastructure. To continuously adapt to and adopt the incessant technological developments and innovations, financial institutions must rely on resilient and flexible IT infrastructure and big data management (Chanas et al., 2019). For this reason, financial institutions have overcome challenges caused by the existing legacy infrastructure, preventing them from adopting open systems architecture with data (Diener & Špaček, 2021). Agile and adaptable IT systems allow businesses to ease integrating new technologies (e.g., AI, IoT, and blockchain) into the existing system and leverage the integration of all these different technologies to improve the ability to promptly and timely adjust to customers' evolving needs.

Most importantly, culture change must precede any technology investment or deployment. A study led by EY in collaboration with ACCA (2021) concluded that 94% of finance leaders agreed that a robust digital culture is a prerequisite for a successful digital transformation. More than 50% of the surveyed leaders stated that there is still a big gap between the desirable culture for a digital transformation and their current culture. In the case of the financial sector, as in any other domain, accepting a digital shift requires a change management intervention consisting of getting the employees' buy-in and preventing any harmful employee reaction that may inhibit the transition (Kitsios et al., 2021). According to Goran et al. (2017), there are three main cultural barriers to digital transformation: silo thinking and organization, fear of taking risks, and a lack of sharing and acting in the same direction towards customer interest. These barriers are not aligned with what a digital culture should promote. Banks and organizations must deploy plans to instill drivers and seed the values of a digital corporate culture. The report by Capgemini, in partnership with Brian Solis (2018), identified seven attributes of digital culture, namely customer-centricity, innovation, data-driven decision-making, collaboration, open culture, digital-first mindset, agility, and flexibility. Westerman et al. (2019) added that digital cultural values are based on the following pillars:

- **Impact:** change through innovation and value creation.
- **Speed:** take risks and learn instead of acting after getting all the answers.
- **Openness:** share knowledge to augment learning instead of learning in isolation.
- **Autonomy:** Take initiative and allow less formalized processes and policies.

The above shows the complexity and multidisciplinary perspective of digital transformation. Understanding their challenges is vital to helping banks and financial institutions in this digital transition. Mapping the common challenges will help these institutions prioritize these obstacles and enhance their collaboration to jointly find solutions, learn from each other's experiences, and share knowledge about best practices to improve the pace and effectiveness of digital transformation.

## 4. DIGITAL TRANSFORMATION OF FINANCIAL INSTITUTIONS IN THE UAE: BENEFITS, PRIORITIES, AND CHALLENGES

### a. Identifying the Benefits of Digital Transformation

The various interviewees agreed that digital transformation would bring about, and is bringing, many benefits to clients in the financial services sector and the banks themselves.

As explained by one of the interviewees, broadly speaking, digital transformation plays a significant role in achieving the vision set out by the Central Bank of the UAE, which is about “enhancing monetary management, financial stability, and protecting consumers by adopting digital technologies” and helping the UAE reach its goal of becoming one of the leading financial markets in the world. As such, the UAE Central Bank is seen to be driving the digital transformation process.

The interviewees identified various benefits of digital transformation for customers. First, onboarding new customers has become much faster and more efficient. Furthermore, banks can customize value propositions to understand and meet the unique needs of the various customer segments in the sector and personalize offers for everyone. This can be done while managing the cost curve by reducing and optimizing costs. The ease of customer interaction is enhanced by digital technology, creating an improved and direct customer experience, and bringing the customer closer to the bank. This will enable the banks to meet customer expectations better, significantly enhancing customer retention.

In addition, banks can now also offer new and improved products based on customers' purchasing history. Digital technology allows banks to introduce diverse digital products and services into the market, including web connectivity for clients, mobile banking, online payments, digital wallets, and many more, which helps increase customer convenience and satisfaction.

As banks can better understand their customers, they can respond to global consumer and corporate behavior trends. They also can gain better access to the next generation of digitally literate customers while increasing financial inclusivity. While banks can provide fast, cheap, efficient, and secure services, they can also enable corporate customers to drive development from their side.

Banks can also use digital technology to gather data on external and internal events and customers and undertake various analyses. This should help banks to improve their data analytics processes and develop better products with more user-friendly features.

From a structural perspective, digital transformation can improve and simplify processing, significantly reducing the need for physical branches and large numbers of personnel. Despite reducing their infrastructure, banks can increase their productivity and efficiency, creating more efficient and effective processes and making them seamless. Digital transformation has also enhanced the ease of accessing services from home or anywhere else. Automating processes also reduces the need for manual intervention and streamlines operations. Accountability is more transparent, and turnaround times of transactions are easier to manage. It is also now easier to identify the location of bottlenecks in processes, time expired, and whether the stipulations of internal service-level agreements have been adhered to. Digital technology has transformed the financial services sector into a 24/7 business, with greatly improved ease of doing business with customers and service providers. It has also allowed banks to scale their operations without

increasing their physical infrastructure.

From a risk management perspective, digital technology enhances dealing with fraud, corruption, and privacy challenges. Therefore, risk management has become more efficient, as has transaction monitoring. Digitalizing data and processes helps banks safeguard against natural disasters such as floods, fires, etc. It is also much easier to store data and information. Digital transformation also enables financial institutions to monitor and analyze data in real-time, identify potential risks, and respond quickly to mitigate them. Financial institutions can improve security by implementing robust cybersecurity measures and protecting customer data. At the same time, transparency is enhanced by maintaining a complete record of transactions, audit trail, etc., which allows regulators to monitor and regulate them effectively. Therefore, the scope of fraud and malpractice is reduced by establishing a record of all activities with a time and activity stamp.

Another benefit of digital transformation is that innovation has become easier. With digital technology, a lot of digital innovation is happening in the areas of payments, remittances, onboarding of customers, know-your-customer (KYC), and the whole client servicing area. In addition to reducing operational costs, promoting more significant innovation, and enhancing customer experience, digital transformation will improve regulatory compliance. For example, digital records can now be easily accessed and audited. At the same time, automated compliance checks can ensure regulatory requirements are met in real-time while governance issues are identified more efficiently.

At a competitive level, digital transformation allows banks in the UAE to increase their competitiveness by developing better competitive strategies against global players and becoming more efficient. They can create new business models, capitalize on new business opportunities, and meet continuously rising customer needs through innovations such as fintech. In addition, financial institutions can offer innovative products and services that can differentiate them from their competitors, helping them to attract and retain customers.

It has become clear that embracing digital transformation is no longer a nice to have – it has become a must-have.

Note 1: fintech refers to the technological innovation in which digital technology is used in the financial services industry. As such, it is an abbreviation of financial technology. The concept of a fintech organization refers to organizations that have embraced financial technology (fintech) as the core of their business model. Bear in mind that banks themselves use financial technology to develop and offer products and services. For clarification purposes, when using “fintech organization” in this paper, they refer to the typical startups and other non-bank entities that use financial technology (fintech) to develop and deliver products and services, typically in competition with banks themselves.

## **b. Immediate Steps to Drive Digital Transformation in the UAE**

The interviewees agreed that digital transformation is an ongoing process in the UAE, and most banks, if not all, are already on a digital transformation journey. They offered several suggestions on the nature of the process. Banks must clearly understand what they want to achieve through digital transformation. This includes setting goals and identifying the areas that need to be transformed. It is, therefore, essential to develop and adopt an appropriate digital transformation strategy, with milestones driven by the bank’s leadership (board and executives), with an internal agreement on the road ahead being essential. The strategy must be clear about the reasons and pace of the process. Getting the right people (decision-makers and subject matter experts) together in an appropriate platform is also essential. Therefore, it is crucial to plan and develop a future orientation in which knowledge sharing, including the vision and milestones, is deemed necessary. Banks must understand their end goal and develop a clear execution plan with clear objectives.

Developing new operating models with clear decisions on the channels to be used is vital as part of the strategic paradigm. It is also essential to address the correct issues. Having a digital

mindset is of utmost importance to address business challenges. It is also necessary to have digital technology as a key agenda item, with the transformation process discussed constantly.

It is also necessary to have the requisite physical and people infrastructure. Banks must allocate investments with complete budgets and available resources because the process is resource heavy. The organization must be prepared for improved digital literacy, and it is vital to gain organizational support and stakeholder contribution to have successful digital transformation projects. At the same time, it must be understood that it is difficult to change the bank when the current systems are working well. Care must be taken not to alienate those customers who prefer the old model by clearly articulating the value that the digital transformation process will unlock for all the stakeholders.

Regarding data management, it is essential to start with the data on the various stakeholders, processes, and products, taking a long-term view. At the national level, regulators must prioritize data management and security, as is having the best-in-class data privacy laws. Data collection and analysis are central to the success of digital transformation. To achieve this, financial institutions must ensure that their data is secure, compliant with regulations, and accessible for analysis. Regarding systems, banks must decide whether they will build their unique systems or buy ready-made systems in the market. It is essential to use the right technology, with frequent backups with the back-office systems.

On the people side, retaining a personal touch with customers is essential. The relationship between banks and customers must be managed carefully. The role of humans in the bank of the future must be reinvented with a blend of people and technology. It is essential to rethink the skills, tools, available data, and the nature of human roles and equip people with the different skill sets required in the new world of digital technology. For this to work, it is necessary to identify the current digital literacy in the organization and find the business needs and challenges that can be addressed through digital transformation. Educating the community is one of the most critical steps that should be done in parallel with the process.

To optimize their products and processes, banks must identify customers' real needs and demands and understand the market trends. This requires banks to identify the various customer segments and their needs and develop appropriate solutions to meet near-future requirements. In addition, banks must be able to identify the best matching technology to serve the purpose and understand their internal capabilities.

Standardizing processes and managing the convergence of various technologies is also essential. As there are always legacy systems, banks must identify and address the potential challenges of such legacy systems. In addition, banks must attract the right talent to implement the new technologies. It is also possible to leverage fintech solutions. Banks must invest in new technology and implement the infrastructure to support their digital transformation efforts. This includes implementing new systems and upgrading existing ones. During the process, banks must remain customer-centric and focus more on innovative solutions to customer needs while also adopting required measures toward data/information. Furthermore, public and private entities must collaborate on digital transformation to ensure an alignment between the internal and external systems.

Some interviewees believe that actively engaging fintech organizations (organizations with a business model focused on utilizing fintech) as technology partners will enable banks to leverage innovative, cutting-edge solutions/products for customers. Banks and other participants must adopt an agile framework to foster digital transformation and create a safe environment for adoption.

At a national level, an interviewee identified establishing a unified digital strategy across the UAE as an important factor. At some point, there will be a need to merge policy at a country level and clarify applicability to the two financial free zones of DIFC and ADGM. As it is, the UAE Central Bank (CBUAE) and other parties have identified that the "increasing adoption of technology-enabled business models presents both opportunities and challenges to those carrying out Innovative Activities."

They have subsequently issued a set of guidelines “to provide a set of principles when using Enabling Technologies in financial services and accompanying guidance. The key principles are broad enough to cater to the different business models, operating models and financial services offered by existing organisations operating in, and new entrants to, the financial services sector.”<sup>1</sup>

The interviewees mentioned, as an example, the Financial Infrastructure Transformation (FIT) Program set by the CBUAE. According to the CBUAE, the FIT Program “aims to support the financial services sector, promote digital transactions, and enable the UAE’s competitiveness to become the financial and digital payment hub and a centre of excellence for innovation and digital transformation through encouraging innovation and collaboration as well as competition in the financial sector.”<sup>2</sup>

Leveraging the best-in-class digitization legislation from the EU and other mature markets is also important. The regulatory environment must support digital transformation. There must also be clear guidelines and a regulatory framework for the fintech / non-bank players in the industry. Investing in digital infrastructure that supports the vision of FIT is also necessary. This includes robust and secure networks, cloud-based technologies, and software applications that can integrate with the existing systems. As a point of departure, banks must also accept that security challenges must be identified and addressed. The adopted security programs must meet business needs. While digital technology provides for the development of unique solutions at a greater speed and scale, it unfortunately also creates greater risks that must be dealt with.

It is essential to optimize the existing systems and processes that are already in place before they can be digitized/automated. This will promote achieving transformation goals by using scarce resources wisely.

### **c. Identifying and Managing Challenges Facing Digital Transformation**

The interviewees identified several challenges facing those involved in digital transformation. Legacy systems can impede the process as they take a long time to change. Together with the systems, it is also difficult to let go of the old and adopt the new. Banks must also deal with uncertainties about the abilities of new systems that will be developed. It is essential to understand and manage legacy systems and how they could integrate with new systems.

Changing the mindsets of people remains a considerable challenge. Banks typically find it difficult to convince people to change when the status quo works. Employees can be uncertain whether digital transformation initiatives will work and whether they need it. Some interviewees identified the presence of the innovator’s dilemma, referring to problems regarding the willingness to disrupt revenue streams or profits and take a hit during the transformation process. This is a challenge for most successful organizations. Questions arise, such as “Why are other banks not doing it?” This requires changes in organizational culture or even the workforce itself. It also requires redoing the base or fundamental systems. Unfortunately, banks are not able to successfully manage organizational culture toward digitization. This is aggravated by fears among employees that the transformation will lead to job losses. Digital transformation requires significant changes to traditional thinking, processes, and workflows, which can be unsettling for stakeholders. These stakeholders can be everywhere in the financial ecosystem, for example, clients (retail and corporate), market participants, vendors, industry bodies, etc.

In addition to resistance to change, banks must also deal with a need for more skills among their employees to deal with the new and fast-changing technology. For example, there needs to be more experts in cyber security for all the existing and emerging threats.

More need to be trained and recruited from abroad, where possible. The right people must be sourced and kept on board. Therefore, customers and banking personnel face a steep learning curve with a clear and serious educational need.

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1. <https://rulebook.centralbank.ae/en/rulebook/guidelines-financial-institutions-adopting-enabling-technologies>

2. <https://www.centralbank.ae/media/mdupathy/cbuae-launches-a-financial-infrastructure-transformation-programme-to-accelerate-the-digital-transformation-of-the-financial-services-sector-en.pdf>

Digital transformation is also costly, with some companies needing more funding. This requires a cost-benefit analysis to ensure the available funds meet the objectives. The transition can also impact negatively on the overall costs as it has the potential to impact sales cycles and revenue targets negatively.

In addition, with new technology constantly evolving, banks are forever in a situation of playing catch-up, which plays havoc on the cost equation.

With the increasing amount of available data, risk management and security must be increased to safeguard the data itself. The fraudulent use of customer generated data and the vulnerability of servers can be problematic, requiring, amongst others, firewalls to deal with these security challenges. In addition to protecting data, banks must obtain sufficient levels of customer data to develop appropriate products and services to meet customer expectations. Other issues that must be addressed include data privacy, data governance, and AI governance.

As far as competition is concerned, banks do not only compete against other banks or fintech companies but also against Big Tech. The Big Techs have deep pockets and continuously seek new business opportunities. Banks are also competing against fintech organizations with good quality technology and data, which tend to be quite innovative.

Internally, as far as digital technology is concerned, banks tend to forget the support functions (e.g. HR, Finance, etc.) and focus primarily on operations. This creates a disconnect and impedes the support for operations, leading to organizational silos. To make matters worse, infrastructure needs to be more aligned, e.g., cloud strategy versus digital technology strategy. There also appears to be a lack of standardized protocols to handle the latest technology, fragmented systems, and a lack of coherence. Banks must have the knowledge available to proceed to the next system, with the required resources to do so. Digital initiatives sometimes fail to meet business needs as banks lack the skill set to evaluate what technology can and cannot do to meet these needs.

Banks must also deal with contrasting challenges amongst internal stakeholders. They also tend to primarily focus on revenue-generating projects instead of also on effectiveness and efficiency.

As alluded to in the above section, it is imperative to gain and keep customers' trust in the digital processes of organizations. Customers must be educated about the bank's operations and product changes to avoid losing faith. It is also necessary to get advice from representatives from various age segments, both internally and externally.

To deal with these challenges, institutions in the financial services sector require agile systems and mindsets. They must determine what needs to be done to get ahead of other institutions in the market. It is generally seen as very important that senior management of banks understand digital leadership. Senior management must develop and embrace a transformation vision by understanding how the world is changing and how it will affect customers. This must be conveyed to all stakeholders. It is necessary to transform senior management roles to know how to operate a digital institution and transform it into one. It is imperative to solve the right problem; banks must listen to their customers and solve it correctly.

The vendors of the traditional IT department need to be more supportive of success in digital transformation. They create confusion by selling older software and hardware through outdated delivery models from the pre-cloud era. This confusion is exacerbated by a need for more skills and experience in the IT department in modern ways of running technology departments. This amounts to a constraint in the ecosystem where technology providers and companies that should support the country and the banking sector are not at the cutting edge compared to what the UAE needs and what is available in some other countries.

It is also not only the acquisition of new technology that is expensive and time-consuming but also the technical integration of systems and processes and continuous upgrades. This can be challenging given the complex nature of financial systems and different regulatory environments across countries. To overcome these challenges, banks and financial institutions must adopt a comprehensive digital transformation strategy that is integrated and aligned with their overall

business goals, as stated above. This strategy should be supported by clear communication and training programs to address the resistance to change and ensure a smooth transition.

## 5. ARTIFICIAL INTELLIGENCE (AI): THE COST-BENEFIT DILEMMA

According to McKinsey, “AI is a machine’s ability to perform the cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with an environment, problem solving, and even exercising creativity.”<sup>3</sup>

### a. The Benefits of Artificial Intelligence

The interviewees agreed that AI offered many benefits to financial services institutions and banking clients in general. There is considerable overlap between the benefits of digital transformation, as indicated above, and the benefits of AI specifically. Looking at customer benefits, AI dramatically facilitates the ease of onboarding customers. AI also enables improved analytics and analysis of customer interactions. The study of customer spending and revenue patterns is improved, leading to better customer understanding. This supports decision-making and provides tailored advice to investors based on their unique profiles.

Regarding efficiency and productivity, AI reduces the scale of repetitive work, which can be outsourced to bots. Banks can now also work 24/7 as there are frequently no people involved. It is also possible to automate product advisory and other recurring services. At the same time, productivity is increased through real-time monitoring and decision-making and a shorter deployment time (time-to-market), including reduced turnaround times.

AI has also reduced the dependency on physical resources. Banks can now drastically change how they work and completely transform the sector. AI also enables algorithmic trading, providing better services at greater speed, scale, and scope. With enhanced analytics, banks can provide early notice of future market trends, asset classes, profit potential, and timing strategies. AI, therefore, can offer better views and understanding of the future. Banks now use AI to use data, filter data, and digest that data at levels of speed, efficiency, and cost that a human cannot. AI can also detect anomalies through data management and deal with them. It facilitates detailed data insights. Moreover, the time taken to provide reliable and customized advice on investment strategies is also significantly reduced.

In finance and costing, AI enhances cost-effectiveness by reducing costs and increasing the speed and volume of output. At the same time, the price of technology is decreasing, although still very expensive – as such, it is an opportunity to democratize technology.

AI can support risk management by addressing fraud by lowering false positives and human error, providing better protection and support. Identity management authentication is automated, with improved accuracy. AI enables banks to run analytics over all their digital interactions, reduce error rates, identify trends and threats, and deal with them.

From a competitive perspective, AI allows banks to leapfrog others in harnessing technology to improve operations and advance to the next level.

In summary, some key benefits of using AI technology in financial and banking systems are detecting suspicious transactions, improving data analytics towards informed decisions, creating intelligent workflows that automate business decisions and business process automation without compromising security, and improving operational efficiency. Back-office operations are improved, customer and employee satisfaction are enhanced, and regulatory compliance and fraud detection are improved. AI also lends itself to enhanced investment evaluation, reduced operational costs, and improved loan and facility evaluation.

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3. <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-ai>

## b. Immediate Steps to Drive AI

As is the case with digital transformation, banks in the UAE have already started to adopt AI. The interviewees identified several steps that must be taken to drive AI within the institutions and the financial services sector in general. From a strategic perspective, it is vital to develop a clear strategy to deploy AI, looking at it from both a short-term tactical point of view and a longer-term sustainability point of view. It is also essential to move from analog business models to digital business models.

In the internal environment, it is imperative to identify the core business areas requiring automation, with automated workflows and improved operational efficiency as the first step toward using AI to benefit the financial and banking system. Furthermore, it is also essential to onboard skilled resources, define the business needs, and collaborate with relevant Fintech partners to further strengthen the AI-driven business solutions. Banks must identify all processes that can be automated and considered time-consuming for employees, leaving room for more complex work and projects. They must ensure best practices are adopted.

As far as people issues are concerned, employees and customers must be introduced to the new technology and the benefits thereof. In addition, it is essential to ensure the level of education is appropriate and increases competence within organizations. Governance is also recognized as important, with the requisite governance policies and ethics policies in place to ensure transparency and compliance.

Infrastructure and technology are also critical, and banks must ensure they have the required technology to deal with AI and data. The potential sharing of infrastructure must also be investigated, while legacy systems must be dealt with appropriately.

Data management is viewed as of the utmost importance. Internal processes must ensure quality data. Data must be created, with transactions transformed into data. Banks must also promote the idea of everything becoming data. This data must be structured and personalized for the development of products and services for customers. Banks should consider involving external experts where appropriate.

Risk management is another area of importance. Banks must ensure robust risk controls are in place. New frameworks and safety-critical systems with human circuit breakers must be adopted. It is critical to ensure security measures and compliance measures are implemented.

## c. Identifying and Managing Challenges to Adopting AI

The speed of growth in adopting AI technology, developing models, and accumulating data, as well as the pace of modernization, are forcing the stakeholders in the sector to play catch-up and allocate resources to keep pace with developments. Finding the correct models and algorithms to implement within the banks is also imperative.

The cost-benefit implications show that AI adoption can be expensive, especially when it is considered that technology can become redundant quickly. This increases the need for speedy implementation and places pressure on planning and operating cycles/models.

Another challenge is that it takes a long time to implement an AI project and get dependable results that could justify the expenses. A lack of understanding of state-of-the-art systems and the integration thereof within the organization can also be problematic. Many financial and banking institutions still rely on legacy systems incompatible with AI technology. Integrating AI with these systems can be a significant challenge.

From a people perspective, leadership buy-in is imperative and not necessarily a given. Hiring staff with the suitable skill set is also challenging and expensive, especially when it is considered that large numbers of digitally trained people could be necessary. A general lack of expertise and capabilities to deal with technology has led to a war for talent. It is also a challenge to train people as it can take a long while. Staff are also afraid of being replaced by technology, leading to unemployment. Yet they have inflated expectations, thinking technology is more intelligent than it is. Financial and banking institutions in the UAE must invest in training and hiring skilled professionals to overcome these challenges.



Risk management and security remain a challenge. There is a risk that customers will be hesitant to adopt the technology as they do not like to use bots. Human error, even when dealing with AI, is another challenge that must be managed. There are always new risks, which require banks to redesign their operational processes to make them safe and effective and stop unwanted side effects. The risks are magnified by the speed of adoption and operation and the scale of the operations. This could put a bank out of business if they got an AI lending or payment authorization model wrong. In addition, criminals using AI could result in the non-detection of cybercrime and fraud, potentially leading to huge losses.

One of the most critical factors for successful AI implementation is the quality and availability of data. Data provides the ability to differentiate between opinion and fact. A frequent challenge is data scarcity and inaccurate databases on customers, which require regular maintenance and data cleansing. The same is valid for maintaining models. However, it remains essential to transform information into a digital format and determine the correct data set. The UAE financial and banking system must ensure their data is accurate, complete, and accessible.

From a governance perspective, there are also debates regarding the ethics of machine learning and the control thereof. Trust in systems is only sometimes a given and frequently lacking. In addition, there are concerns about potential unforeseen side effects and unintended consequences. Other issues include the problems of data privacy and the misuse of data. Legal issues must be identified and dealt with accordingly. The financial and banking sector is heavily regulated, and deploying AI technology requires adhering to strict regulations related to data privacy, security, and transparency. Therefore, the UAE financial and banking system must ensure its AI solutions comply with all relevant regulations.

To deal with many of the challenges, it is necessary to use collaboration among the various stakeholders to better understand the nature of the challenges and potential solutions. AI does provide the ability to replace human judgment, making decisions more scientific. Generating quick wins is essential to keep the transformation project rolling. In general, it is necessary to collect and clean data to ensure its quality and availability, collaborate with regulators to ensure that their AI solutions comply with relevant regulations, modernize legacy systems to be compatible with AI technology, invest in training and hire skilled AI professionals, and partnering with AI vendors and service providers to leverage their expertise and experience. By taking these steps, the UAE financial and banking system can successfully deploy AI technology and reap its benefits, including increased efficiency, accuracy, and personalized customer experiences.

#### **d. Emerging Trends and Future Directions in AI for Banking and Financial Institutions**

Generative AI, especially in the form of large language models (LLMs) like Kai-GPT designed specifically for the banking environment, is at the forefront of the new wave of AI innovation. Unlike public LLMs, these private models address key concerns such as the protection of personal identifying information, accuracy of responses, customizability, and legal compliance issues. The integration of generative AI into banking platforms is not just a leap into the future but a necessity to stay relevant and competitive in the rapidly evolving financial sector. These AI models offer an unprecedented opportunity to enhance customer experiences and financial decision-making processes, democratizing financial services by offering users unbiased and well-informed financial advice.

##### **Mitigating Risks and Leveraging AI's Potential**

While the adoption of generative AI opens up new vistas for innovation and customer engagement, it also brings forth new challenges, particularly in the realm of security and fraud prevention. The advent of AI has inadvertently empowered fraudsters, enabling the creation of sophisticated 'deep fakes' and other forms of digital deception. Financial institutions are thus tasked with the dual responsibility of harnessing the potential of AI to improve customer service and operational efficiency while simultaneously safeguarding the ecosystem against these enhanced risks. This necessitates a multi-faceted approach involving customer education,

stringent data protection measures, and the implementation of robust security protocols to ensure that interactions with AI-powered services are both safe and reliable.

### **The Road Ahead: AI-Driven Transformation in Banking**

Looking forward, the integration of AI in the banking sector is set to redefine the landscape of financial services. Financial institutions increasingly focus on deploying private LLM models like Kai-GPT in employee-facing scenarios to drive productivity and efficiency. The potential of AI to revolutionize customer experiences and make the financial ecosystem more efficient is immense. With generative AI, the future of banking is poised to be more inclusive, with AI-powered systems offering personalized and unbiased financial advice, thereby fostering a more financially literate and empowered customer base. However, this journey is not without its challenges. Ensuring the safe usage of AI technologies and addressing the accompanying risks and challenges will require collective action and a global commitment to embracing this transformative technology responsibly.

## **6. BLOCKCHAIN: ADOPTING THE UNKNOWN**

As is the case for the previous sections, a considerable number of benefits of blockchain were identified, as well as how it could streamline operations in the financial services section. The readiness of the UAE to adopt blockchain also evoked a lot of reaction, and several challenges were identified.

According to McKinsey, “blockchain is a technology that enables the secure sharing of information. Data, obviously, is stored in a database.” It is a “distributed database or ledger, with the power to update a blockchain distributed between the nodes, or participants, of a public or private computer network.” That is why it is known as distributed ledger technology (DLT). “Blockchain allows for the permanent, immutable, and transparent recording of data and transactions. This, in turn, makes it possible to exchange anything that has value, whether a physical item or something less tangible.”<sup>4</sup>

### **a. Benefits and Impact of Streamlining Operations**

Interviewees identified many benefits of blockchain. According to them, the technology facilitates the recording and verifying of transactions and their authentication. This vouches for the integrity and validity of transactions. It also increases the confidentiality of and trust in reported transactions and facilitates the tracking of assets. As each transaction on the blockchain is encrypted, only authorized parties can access the information using their private keys.

Blockchain harnesses the power of its secured layers built inside the technical architecture, streamlining the provisioning process faster, more efficiently, and more securely. Due to its ability to track all global transactions, blockchain technology can facilitate settling transactions promptly. However, while blockchain can and will be used for payments and moving funds worldwide, hybrid systems (blockchain technology and non-blockchain systems) will still be used for the foreseeable future.

From an efficiency perspective, while the speed of transactions is enhanced, blockchain also minimizes errors, thereby optimizing existing processes. It increases the economic multiplier effect by lowering the operational costs and increasing the efficiency of a sharing service, improves decision-making, and ensures a common understanding of the transactions. It also reduces costs. Account reconciliation between the various parties involved in the transactions can also be automated. Blockchain is, therefore, a welcome solution for businesses and customers. As blockchain offers a decentralized platform, there is no need to pay for centralized entities or intermediaries' services. Additionally, blockchain facilitates information storage and ensures that quality and authentic data are exchanged with a clear audit trail.

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4. <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-blockchain#>

From a risk management perspective, the risks associated with moving funds and fraud opportunities are reduced. Blockchain's distributed ledger system makes it almost impossible to alter or hack accounts, increasing security, and reducing the risk of cyberattacks. Blockchain technology can also improve transparency by providing a transparent and tamper-proof record of all transactions. This enhanced security will enable banks to offer their customers enhanced security measures, including anti-money laundering (AML) and KYC compliance. This technology can also be leveraged in the eKYC initiative of the FIT program to provide financial institutions with a shared KYC platform to reduce the risk of fraud.

From a governance perspective, blockchain enhances compliance and supports KYC. It is a helpful algorithm or technology for distributing trust across heterogeneous networks globally. Modifications are immediately available, and updates occur automatically. There is no need for human intervention, which streamlines the documentation process. Blockchain eliminates the need for intermediaries, reducing the risk of fraud, errors, and a fractious client journey.

Moving financial statements to a distributed ledger system has several benefits: it will increase transparency and reduce the risk of fraud. Blockchain technology significantly contributes towards cross-border payments, KYC, digital currency, and improved security due to its ability to disrupt financial industry applications for banking and finance industries. It can revolutionize the financial services sector in the UAE by streamlining processes and increasing efficiency and transparency while reducing time and costs. These benefits can lead to increased trust in the financial system as trust is a critical factor in financial decision-making globally.

## **b. How Ready is the UAE to Adopt Blockchain?**

The UAE government has adopted blockchain at a very early stage and has been a critical driver in the overall adoption of the technology in the country. The CBUAE supports this initiative, although the technology is only utilized across some functions in the financial services sector. The CBUAE reportedly explored the use of blockchain to improve financial transactions, reduce fraud, and enhance efficiency in the banking sector. EmCash, a digital currency based on blockchain technology, has also been introduced in Dubai. The UAE leadership has exhibited a can-do and will-do attitude towards blockchain and other technology, which has supported the adoption of blockchain in the country.

The UAE financial and banking system generally promotes the adoption of enabling technologies such as blockchain (distributed ledger technology - DLT) to improve efficiency and resilience in the financial system. The CBUAE, the Securities and Commodities Authority (SCA), the Dubai Financial Services Authority (DFSA), and the Financial Services Regulatory Authority (FSRA) of Abu Dhabi Global Market (ADGM) jointly issued guidelines to help financial institutions to adopt enabling technologies safely. These guidelines cover enabling technologies, including blockchain, and highlight the importance of cybersecurity and KYC. However, there is no clear indication of how ready the UAE financial and banking system is to move financial statements into a distributed and consensus-driven ledger.

Some interviewees opine that the UAE already has a thriving blockchain ecosystem, with the government and private sector investing in projects that utilize this technology. The Dubai International Financial Center (DIFC) has recently established a blockchain consortium that includes 14 leading banks and financial institutions in the region. This consortium aims to explore and develop blockchain-based solutions for financial services, showcasing the UAE's commitment to innovation in the sector. Furthermore, the CBUAE has recognized blockchain technology's potential and created a regulatory framework to govern its use in cryptocurrencies. As a result, several banks in the country have already implemented blockchain-based solutions in areas such as trade finance and remittances.

The Abu Dhabi Global Market (ADGM) announced in November 2023 the release of the Distributed Ledger Technology (DLT) Foundations Regulations 2023. This represents a "significant milestone in the evolution of digital assets regulatory frameworks across the region" and internationally. The Regulations aim "to provide a comprehensive framework for DLT Foundations and Decentralised Autonomous Organisations (DAOs), enabling them to operate and issue tokens recognising the

unique needs of the Blockchain industry. This new regime aligns with ADGM’s strategy to foster initiatives in the broader blockchain and digital asset realm.”<sup>5</sup>

Some interviewees believe that the UAE’s progressive economic policies and advances in technological infrastructure make it an ideal location to leverage the benefits of blockchain in the financial services and banking sector. The UAE already has a flourishing fintech community where innovation and out-of-the-box solutions are encouraged. Some other respondents believe blockchain technology is not new per se but has gained prominence with the rise of a new era of financial services characterized by instant payments, frictionless transactions, etc. Some banks use blockchain in functions such as KYC, smart contracts, and keeping track of the ownership of assets.

However, other interviewees believe most banks have not adopted blockchain due to the technology’s challenges. There is also an opinion that banks will not move solely to blockchain. They believe that many banks are still considering moving financial statements into a distributed and consensus-driven ledger because, technically, they need more time to be ready with the IT infrastructure required to build the blockchain-enabled ecosystem.

Some interviewees opined that the fundamental foundation for using blockchain in the UAE requires a standard protocol among different financial institutions on how to use it. This will take time to develop. This is driven by the view of some banks seeing blockchain as a solution looking for a problem to solve. The opinion exists that there is no universal case for why the UAE needs blockchain and whether it has the skills, technologies, vendors, and partners to implement it. Consequently, some banks believe the UAE financial services sector is midway through the adoption journey. It has gone through some hype cycles where blockchain was considered the solution for everything, followed by a phase where nobody could figure out what to do with it. The country is starting to see the adoption of actual use cases.

Despite this, the UAE is quite ahead of other countries in the region with some blockchain solutions being implemented (for example, one bank is now using blockchain to facilitate guarantee issuance). However, there is still a need for expertise and the ability to scale to ensure the banks address an existing need and have not adopted technology for the sake of technology itself.

Currently, there are two opposing views on the status of the adoption of blockchain in the UAE, as indicated above. This may be due to a lack of information or the different interpretations of the available facts and opinions. The actual status of blockchain adoption in the UAE must be determined. However, it is quite clear that there are some perceived benefits of blockchain, but it is still early days in terms of applying blockchain to the right problem, and there are implementation challenges such as lack of standards, lack of skills, etc.

At a global level, a recent study by OMFIF indicated that 72% of central banks are unsure that blockchain will be used in future payment systems.<sup>6</sup>

### c. Central Bank Digital Currencies (CBDCs)

CBDCs are digital or electronic forms of national currencies issued and regulated by a country’s central bank. They represent a sovereign currency in a digital form and are designed to be used as a medium of exchange, a unit of account, and a store of value, similar to traditional fiat currencies. Unlike decentralized cryptocurrencies such as Bitcoin, CBDCs are centralized and regulated financial instruments, providing the advantages of digital currencies without relinquishing state control over the monetary system.

The development of CBDCs is driven by the need to modernize financial systems, increase transaction efficiency, and address the challenges posed by the increasing prominence of digital currencies. CBDCs aim to offer a secure, efficient, and inclusive payment system that enhances

5. <https://www.adgm.com/media/announcements/adgm-introduces-the-worlds-first-dlt-foundations-regime>

6. <https://www.omfif.org/fop2023/>

monetary policy effectiveness and financial stability. As the digital economy continues to grow, central banks worldwide are actively exploring the potential of CBDCs to facilitate retail and wholesale transactions, with several pilot projects and research initiatives underway.

### **Potential Impact on the Banking and Financial Sector**

The introduction of CBDCs has the potential to significantly impact the banking and financial sector in various ways.

**Increased Efficiency and Reduced Costs:** CBDCs can streamline payment systems, reducing the time and cost of money transfers and settlements. By leveraging blockchain technology or other digital ledger technologies, CBDCs enable real-time, peer-to-peer transactions, eliminating the need for intermediaries and reducing operational inefficiencies.

**Enhanced Financial Inclusion:** CBDCs can provide a universally accessible digital payment option, reaching underserved or unbanked populations. By offering an easy-to-use, low-cost, and secure means of transaction, CBDCs can extend financial services to those currently excluded from the traditional banking system.

**Improved Monetary Policy Transmission:** With CBDCs, central banks can have a more direct mechanism for implementing monetary policy. By adjusting the parameters of the CBDC, central banks can more effectively manage economic variables such as inflation and interest rates, enhancing the precision and responsiveness of monetary policy interventions.

**Strengthened Financial Stability:** CBDCs can contribute to the stability of the financial system by offering a risk-free, digital alternative to bank deposits. This can reduce the likelihood of bank runs and increase trust in the financial system, especially during periods of economic uncertainty.

### **Challenges and Considerations in CBDC Implementation**

While CBDCs offer significant opportunities, their implementation comes with challenges and considerations that need careful deliberation.

**Technological Infrastructure:** Developing and deploying the technological infrastructure for CBDCs is a complex undertaking. It requires robust, secure, and scalable systems capable of handling high transaction volumes while ensuring user privacy and security.

**Regulatory and Legal Frameworks:** The introduction of CBDCs necessitates comprehensive regulatory and legal frameworks to address issues related to digital identity, data protection, cybersecurity, and cross-border transactions. Establishing these frameworks is crucial to ensure the smooth operation and widespread acceptance of CBDCs.

**Financial System Integration:** Integrating CBDCs into the existing financial ecosystem involves significant coordination among various stakeholders, including commercial banks, payment service providers, and regulatory authorities. Ensuring interoperability and compatibility with current financial infrastructures is vital to avoid market disruptions and ensure a seamless transition.

**Public Trust and Acceptance:** Building public trust and acceptance is essential for successfully adopting CBDCs. This involves transparent communication, education initiatives, and user-friendly interfaces to encourage the use of CBDCs and address any concerns related to privacy and security.

In conclusion, CBDCs represent a significant evolution in the architecture of money and the functioning of the financial sector. As central banks continue to explore and pilot CBDC projects, the banking and financial landscape is poised for a substantial transformation. The successful implementation of CBDCs requires a collaborative approach, involving policymakers, financial institutions, technology providers, and end-users, to harness the full potential of this innovative financial instrument while navigating the complexities and challenges it presents.

## d. Programmable Payments

### Emergence and Impact

Programmable payments automate financial processes, enhancing operational efficiency and minimizing human error. They empower financial institutions to craft innovative products and services, offering tailored solutions like dynamic pricing models and automated royalty distributions. Real-time transaction settlements improve liquidity and cash flow management for businesses, while the inherent transparency of blockchain ensures clear, compliant, and dispute-free processes.

### Challenges and Path Forward

Adoption challenges include ensuring interoperability between diverse blockchain platforms and traditional financial systems, navigating the evolving regulatory landscape, and addressing security and privacy concerns inherent in handling sensitive financial data. Moreover, widespread adoption hinges on effectively educating stakeholders about the benefits and practical applications of programmable payments.

In summary, programmable payments are setting the stage for a transformative era in financial services. As the sector navigates these challenges and leverages collaborative efforts, programmable payments are poised to become integral to the digital financial ecosystem, offering unmatched efficiency and customization in financial transactions.

## e. Identifying and Managing the Challenges Facing the Adoption of Blockchain

The interviewees identified several challenges to adopting blockchain technology in the UAE. It takes time and costs a lot to transform the existing system into one based on blockchain. A standard protocol for operations is also lacking. It also takes time to phase out legacy systems and bring in new technology. Blockchain is also seen as resource-hungry, while scalability can also be problematic. In addition, some experienced integrating blockchain into the traditional fiat money systems managed by governments as a considerable challenge.

From a people perspective, it can be challenging to get them involved. Banks face a culture of resistance to change, increasing the time for adoption. In addition, banks can be hesitant to invest in blockchain as they fear that a newer technology could arrive soon after adoption, making blockchain irrelevant. There is also a skills gap with a need for more talent. Some banks felt it possible to deal with adoption inclusivity through collaboration amongst the various stakeholders. Since blockchain is so tightly associated with digital assets and cryptocurrencies, it is difficult to avoid the perception that many things said about blockchain will not make sense to even traditional economists.

From a regulatory perspective, different regulatory and legal regimes exist in other countries, making cross-border transactions difficult. There is also a need for integration between regulators and bank databases. Some banks perceive a need for a regulatory framework at the CBUAE for blockchain.

At an operational level, integrating technology into operational processes can take a lot of work, while editing information can be more difficult due to the nature of the technology. There is also a view that blockchain increases the level of complexity in banking, requiring greater skill levels that are already in short supply, as indicated above.

Despite the view by some that blockchain can generate greater trust in products and services, one identified challenge concerns a need for more confidence in blockchain itself. The use cases are scattered as all have yet to accept the technology. Finding the proper use case can also be problematic.

Some see risk management as a potential challenge despite the stated benefit of blockchain to curtail fraud and corruption. They believe that the vast amount of fraud, scams, and Ponzi schemes in the crypto world makes it difficult to manage security in the sector. Cyber threats

remain a challenge. In addition, implementing complex IT infrastructure-related blockchain technology in multi-cloud ecosystems causes organizations to face more challenges.

From a governance perspective, some banks believe compliance and legal could be more blockchain-friendly.

The identified challenges require adopting a digital mindset to identify needs and propose innovative solutions. It is frequently necessary to secure the required talent internally or by collaborating with Fintech partners. It is imperative to improve the digital literacy of employees.

Furthermore, utilizing cloud computation and AI should be integral to the new solutions.

One interviewee quoted a report by the World Economic Forum (WEF) that indicated that non-technical issues are the biggest challenges facing the deployment of blockchain technology in the UAE financial services and banking system. The report highlights that regulatory uncertainty is the biggest issue identified by corporates (67%) and blockchain service providers (62%). Education and stakeholder awareness are among the top three challenges (faced by 48% of all organizations surveyed). A review of the landscape and opportunities of blockchain in the banking sector by Harvard Law School similarly identifies regulatory challenges as a significant obstacle to widespread adoption. The report suggests that regulatory frameworks must be developed and implemented to provide clarity and certainty to the industry.

Another challenge facing blockchain adoption is the need for more trust among blockchain users, which is the third major obstacle to widespread implementation, according to supply chain professionals in a survey led by the American Productivity & Quality Center (APQC). To address this challenge, stakeholders must be educated about the benefits and potential of blockchain technology, and efforts must be made to build trust through transparency and accountability.

In conclusion, these challenges can be overcome through developing and implementing clear regulatory frameworks, education and awareness campaigns, and efforts to build trust through transparency and accountability. There is a need for a regulatory framework that directly addresses blockchain implementation and sets the technology's restrictions and limitations. The security concerns due to the extensive amount of sensitive data stored on the blockchain must be addressed, as should the difficulties of integrating blockchain technology into the existing infrastructure of the financial system.

Overcoming these challenges requires regulatory clarity through dialogue with the UAE government and other stakeholders. Regarding security, it may be necessary to develop robust encryption methodologies and integrate these into blockchain technology.

Finally, blockchain technology can be successfully integrated through strengthening cooperation between financial institutions and technology providers.

## **7. FINTECH: AN OPPORTUNITY OR A THREAT?**

Fintech organizations have tapped into digital technology and developed new products and services, presenting either an opportunity or threat to traditional banks. Banks have responded in various ways to Fintech companies, depending on their views on the nature of the phenomenon they were facing. From the information gathered, there are diverse views on fintech organizations. For greater clarification, see Note on Page 10 above.

### **a. The Response of Banks to the Rise of Fintech Organizations**

There were several contrasting opinions on the role of fintech organizations. According to the interviewees, some banks see fintech organizations as merely a disturbance and sometimes as threats. Some of these collaborated to oppose an initiative by a non-bank, which launched a wallet as a financial product. Some banks believe that human interaction at banks is a source of competitive advantage against fintech. Some banks are also not enthusiastic about communicating with fintech organizations. Other actors who see fintech organizations as a threat

believe they can easily tap into the finance market. Some believe that as fintech organizations tap into bank markets, banks must tap into the market of fintech organizations, i.e., typically the unbanked at the bottom-of-the-pyramid. However, some banks also believe that while most banks used to see fintech organizations as a threat five years ago, they no longer do so. When fintech organizations are considered an opportunity, banks engage and collaborate with them. Some even acquired fintech organizations or invested in them as a source of innovation and R&D to improve their business models.

Some banks do not want to do everything on their own. These banks believe that partnerships between banks and fintech organizations are inevitable to build and optimize banking services. To deal with fintech organizations, banks must create trust with the market of fintech organizations and the fintech organizations themselves. They should offer small and startup fintech organizations the opportunity to tap into their banking products and are therefore willing to partner with fintech institutions. In recent years we are seeing increasing examples of investment by banks into fintech organizations.

It does seem that fintech institutions have had a positive impact on the banking sector. While fintech solutions have enabled banks to reduce costs, increase operational efficiency, and create better customer experiences by leveraging cutting-edge technologies such as AI, RPA (robotic process automation), VR (virtual reality)/AR (augmented reality), their footprint in the region is set to provide more efficient banking services than ever. Some banks have even created digital banks as a response to avoid legacy systems holding them back.

Among the banks, there is a perception that some have made the serious mistake of thinking that fintech organizations could not take business away and that they were not competition to the traditional banks. There is also an argument that fintech organizations cannot survive independently and must collaborate with banks. There is also a belief that if banks do not collaborate and partner with fintech organizations, Big Tech will do so and use them as a basis to attack banks. Some banks are, therefore, investing heavily in working with fintech organizations.

Banks and fintech organizations are believed to have different skill sets and risk appetites, with fintech organizations able to service certain types of clients that banks would or could not, such as the unbanked, SMEs, etc. Some believe that fintech organizations are here to stay and that there is a serious need for collaboration with these organizations. Fintech organizations can solve technology issues and deliver technology solutions better than traditional banks. By collaborating, banks and fintech organizations can develop complementary value propositions, each tapping into the benefits they bring to the sector. Fintech organizations can bring technology to the value proposition, while banks can reach consumers. This approach allows the banks to revamp themselves, and they will, therefore, not disappear.

A few banks are considering onboarding fintech resources into their organizations to meet their skilled resource demand.

It is also believed that banks and financial institutions are continuously tapping into the ability of fintech organizations to meet customer needs at an increasingly faster pace and develop innovative solutions quicker. This is happening as the disruption caused by fintech continues to accelerate in the region. Strangely, those banks that see fintech as a threat will probably fold and/or see an erosion of their business.

Some banks believe all stakeholders in the sector must operate on a level playing field. They believe it is unfair to allow “unlicensed, unregulated, or partially regulated institutions” to operate in the sector at a lower bar regarding data privacy, money laundering, etc. Should this be the case, the fintech organizations will have a lower cost base and more appealing products. However, in contrast to this opinion, some interviewees believe that central banks are putting in place regulations to ensure fintech organizations toe the line and control new entrants.

Note 2: In the UAE, however, there are comprehensive regulations in place to deal with all financial products and services. To put the above perceptions into proper perspective, it must be noted that the CBUAE is the “prudential regulator for onshore UAE and mainly regulates activities relating to banking and lending activities...”, including “the activities of ‘providing credit facilities of all types’, ‘providing stored values services, electronic retail payments and digital money



services’ and ‘providing virtual banking services.’” Dubai’s “Virtual Assets Regulatory Authority” (VARA) “regulates businesses relating to virtual assets, including cryptoassets and non-fungible tokens (NFTs) in the Emirate of Dubai.” The Dubai Financial Services Authority (DFSA) is the regulator for all regulated financial activities in the Dubai International Financial Centre (DIFC), with the Financial Services Regulatory Authority (FSRA) the regulator for all regulated financial activities in the Abu Dhabi Global Market (ADGM). The CBUAE also established the FinTech Office to promote the development of the fintech sector. However, it must be noted that the FinTech Office’s aim is to “embrace innovation and digital transformation but does not have its own regulatory mandate and has no regulatory purposes.”<sup>7</sup>

As a threat to banking, there are those banks who take a stronger stance in believing that fintech organizations do indeed present more challenges than ever due to their continuity in providing customer-focused products and leaving banks with no choice other than to collaborate with them and make their solutions an integral part of the banking ecosystem. Fintech organizations are forcing banks to move from traditional banking to digital banking platforms to meet increasing customer demand and improve operational costs. They are pushing banks to move faster toward using new technologies and offer more digitalized products to meet customers’ expectations. While banks have their own innovative technologies and are incorporating technology such as blockchain, etc., some banks believe that using modern technology typically developed by fintech organizations is an opportunity for banks to develop competitive products. It could be a threat if banks do not do the same, as it will give fintech organizations a competitive advantage. There is a perception amongst some bankers that fintech organizations have an advantage in the speed of technology development and adoption. Hence the need to collaborate or to copy their technology where appropriate.

According to a recent Finastra research, banks in the Middle East and Africa (MEA) region regard fintech partnerships as important for growth and innovation, with respondents looking to connect with an average of two fintech providers in the next 12-18 months. The UAE banks are taking the lead in digitization and fintech adoption. Furthermore, the CBUAE launched the FinTech Office in 2020 to develop a mature fintech ecosystem and position the UAE as the foremost fintech hub regionally and globally. (Finastra, 2023)

**Some interviewees have identified the following opportunities offered by fintech organizations:**

- Enhanced customer experience as fintech organizations are known for their user-friendly interfaces and customer-centric approach, which can help banks improve their customer experience and engagement.
- Cost savings as fintech can offer innovative and cost-effective solutions that can help banks reduce operational costs and improve efficiency.
- Fintech drives innovation in the financial services industry, pushing banks to explore new technologies and services to stay competitive.
- Fintech is creating new revenue streams for banks by offering complementary services such as payment processing, lending, and insurance.
- Fintech allows the banking sector to access new customers, especially young and tech-savvy individuals who prefer the convenience of digital banking rather than traditional brick-and-mortar institutions.

**Several threats were also identified:**

- Fintech organizations are disrupting traditional banking models by offering direct-to-consumer financial services, which can reduce demand for traditional banking services, thereby disintermediating banks.
- Fintech organizations are increasingly competing with banks for market share, especially in payments, lending, and wealth management.

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7. <https://www.lexology.com/library/detail.aspx?g=110a4b74-997d-4d24-9c05-8fbb1520aa26>

- Fintech organizations are often smaller and less established than banks, making them more vulnerable to cybersecurity threats. This can pose a risk to the financial system.
- Fintech organizations operate in a less regulated environment than banks (see Note 2 on previous page), which can create a competitive disadvantage for banks. However, regulatory challenges can also pose a risk to fintech organizations if they fail to comply with regulations.
- Fintech organizations can also offer financial products and services at a lower cost, thus providing greater competition to the banking sector. However, fintech organizations are disrupting traditional business models used by conventional banks and offering better and faster services through digital channels, which can lead to a decline in consumer loyalty to banks.

In conclusion, fintech organizations can be both an opportunity and a threat to the banking sector. While fintech organizations can help banks enhance customer experience, reduce costs, and drive innovation, they pose a risk of disintermediation, competition, cybersecurity, and regulatory challenges. Thus, banks must stay on top of fintech trends and embrace innovation while leveraging their strengths to remain competitive.

Banks in the UAE respond to this development in various ways, recognizing fintech's opportunities and challenges to the financial sector. Based on the above views, several conclusions can be drawn.

Several banks are partnering with fintech companies to provide innovative solutions to customers.

Secondly, banks in the UAE are taking a proactive stance by launching their fintech solutions and offering innovative solutions to customers. Some, for instance, have developed a mobile app that provides customers with virtual accounts, expense tracking, and financial health insights. Others have launched a chatbot service that enables customers to conduct banking transactions and receive financial advice using AI.

Finally, some banks in the UAE are investing in fintech organizations to keep up with the latest developments in the industry. One has invested in a global equity crowdfunding platform that supports start-ups in the UAE and provides alternative financing solutions. Another offers fintech organizations a platform to develop and fund their ideas.

Banks also felt that fintech organizations could suggest new products and services and new features on existing products and services. Fintech organizations must help banks achieve simplicity, integration, and embeddedness in consumers' daily lives in a seamless, frictionless, and ultimately successful way.

It is, therefore, clear that to survive in an increasingly technology-driven industry, banks must embrace technological innovation to remain competitive and collaborate with fintech organizations to offer new products and services. Fintech organizations are getting into the areas where banks thought they were the only license holder from the regulator to do certain business. Now, regulators worldwide, including in the UAE, are licensing them to offer certain products that were previously only provided by banks and exchange houses.

Banks must consider these developments and find synergies with fintech organizations because they bring agility and innovation into the banking sector.

## **b. Identifying and Managing Challenges Hindering Banks from Developing Fintech**

Unfortunately, fintech does not just offer opportunities. As seen above, some banks also perceive significant threats to the banking sector. Banks interested in developing their fintech divisions or collaborating with such fintech organizations reportedly face several challenges.

Some interviewees believe that banks generally need to understand the fundamental nature of fintech and grasp the idea that fintech organizations are looking for investment. These banks see fintech as looking to sell technology or an idea.

From a competence angle, banks cannot create the technology like fintech organizations can as it is not their primary business competence. They need the technology to function like fintech organizations in the first place. The perception exists that fintech organizations are better and faster at developing the latest technology. Banks also need the operating model to implement their business model should they embrace fintech and do not believe they can run a fintech organization.

Banks seemingly do not want to open a new company and label it a fintech organization. Some banks fear fintech, and there is disagreement on whether banks should be moving into the fintech sub-sector through startups or acquisitions at all, given the risks inherent in such a move. Convincing stakeholders can, therefore, be problematic. Trust is also an issue. Banks are also concerned about a potentially higher probability of defaults because fintech organizations typically attract customers with a lower credit quality/rating.

Some interviewees believe banks focus on old and outdated ways of buying and consuming technology. Due to this, technology procurement leads the banks toward big global players with substantial balance sheets and very low risk – an approach referred to as “all roads lead to Oracle.” This works against supporting fintech organizations as they cannot deliver the same risk mitigation strategies. The interviewee views this as part of the DNA of banks and their processes that will prevent the adoption of fintech. Fortunately, this challenge is not insurmountable.

Legacy systems infrastructure and legacy mindsets are seen as another challenge. In this area, a dependency on legacy systems, a lack of digital literacy, a lack of digital leadership, and a failure to consider increasing customer demands and new business models constrain banks from developing fintech services in the UAE financial and banking system.

To overcome these challenges, banks and financial institutions must continue exploring new business models, strive to meet customers’ increasing demands and improve operational efficiency. To meet such requirements, banks should consider fintech solutions as part of their digitally advanced ecosystems. Banks can overcome these challenges by partnering with or acquiring a fintech organization and applying a robust control framework for the company.

There are also potential concerns regarding the role of central banks. The rapid changes in technology transforming the financial system will allow central banks to enhance the execution of many of their core functions, such as currency issuance and payment systems. However, some aspects of fintech need to be addressed. Central banks have always been at the cutting edge of financial technology and innovation. In the past, the invention of the banknote, the processing of payments through debits and credits in book-entry accounts, and the successive transitions of interbank payment systems from the telegraph to internet protocols were all transformative innovations. Today, however, central banks are facing new and unprecedented challenges: distributed ledger technology, new data analytics (AI and machine learning), and cloud computing, along with a broader spread of mobile access and increased internet speed and bandwidth. Therefore, some central banks might not be able to fully manage the implications of new technology and the risks inherent in fintech.

Interviewees also suggested that traditional banks must rely on their expertise, know-how, client knowledge, and resources to deploy new technologies to keep up with changing consumer expectations and remain competitive. Automation is the core of digitalization, which will improve customer experience, reduce time to market, increase productivity, improve security, decrease human errors, mitigate the risk of manual intervention, and improve regulatory compliance.

Furthermore, a lack of collaboration between banks has made it difficult to create comprehensive fintech solutions that cater to customers’ needs. The siloed approach to service creation has led to duplication of services and inefficient allocation of resources. Collaboration must be encouraged to drive innovation and create comprehensive solutions. However, it must be understood that banks, like any competitors, will collaborate only on areas where there is a common need to do so. For example, cyber security (e.g. if one bank is hacked it can lead to contagion across other banks). Banks, as competitors, are unlikely to cooperate to provide better solutions to customers.

From a regulatory perspective, some believe that the government has taken several steps to create a conducive environment for fintech services. The UAE government must play an essential role in shaping the regulatory environment and creating policies that provide clarity and consistency for financial institutions. Some, however, still believe it is difficult for banks to launch new services.

Despite significant investments in education in the UAE, the pace of innovation has outstripped the availability of talent. To deal with this lack of expertise, it is suggested that the UAE government invest in creating programs to promote the development of fintech skills among UAE nationals and attract talent from other countries. There are currently training programs in place targeting UAE nationals (e.g. ADGM Academy offers programs in collaboration with the UAE government and the financial sector). There are also several fintech incubator/accelerator programs (e.g., NYU's StartAD, Khalifa Fund, Hub71, etc.) that help local and international entrepreneurs create/grow fintech organizations.

### c. How Will Fintech Affect Consumers?

In general, interviewees were quite optimistic about how fintech would affect consumers. They believe that fintech organizations can provide personalized advice to customers as they can better understand customers, prevent mis-selling, and improve fraud management. Fintech organizations will also positively impact service and product delivery with cheaper and better options and operational excellence. Other positives include the automatic storage of evidence of interaction with customers. Fintech can, therefore, enhance the customer experience, increasing the appeal to use bank services and products. Accessibility to products and services is improved, as is the comfort of interacting with financial institutions.

Fintech organizations will be able to provide services and products at much lower price points at a greater speed of adaptation. Transactions will be easier, including cross-border remittances, at lower rates. Generally, fintech organizations will provide the right customer experience, cheaper, faster, and more secure. The convenience, personalization, cost savings, and transparency that automated financial tools can provide may make them an appealing option for many customers. With the rise of mobile banking apps and digital wallets, consumers now have access to a broader range of banking services at their fingertips without being present at a branch.

Another benefit is improved efficiency. While true for fintech organizations, digital technology (fintech) per se has also benefitted traditional banks, enabling them to automate many processes, reducing the need for manual intervention and speeding up transactions. This has resulted in faster and more accurate processing of customer requests and a reduction in waiting times for many services. As is the case for fintech organizations, due to financial technology banks can now offer customer support 24/7, personalized recommendations and offers, and even financial coaching and advice using AI-powered chatbots. This enables banks to build stronger relationships with their customers and provide higher levels of services than ever before. However, given the challenge of scams and fraud, trust in fintech organizations is still challenging and hampers the adoption of fintech products and services.

## 8. CYBER SECURITY: AWARENESS OF CUSTOMERS IS KEY

Digital technology has not only brought about many benefits and opportunities but has also opened the door for criminals aiming to benefit from illegally accessing bank databases and financial accounts of banking clients. This section deals with cyber security threats and ways to deal with them.

### a. Primary Cyber Security Threats

The threat of cyber security is not static but is continuously changing. It has become a form of advanced organized crime in which fraudsters, scammers, and hoaxers participate.

Interviewees identified several cyber security threats to data. These include loss of data and data

theft, as well as negating data privacy. This impacts negatively on the confidentiality of customer identities. Hacking corporate data and information has become a common financial services threat.

### Typical attacks include the following:

- Distributed Denial of Service Attacks (DDoS)
- Ransomware hacking
- The hijacking of whole systems in which the bank itself is attacked to prevent it from doing business or allow clients to withdraw money from the bank
- Loss of reputation attacks (successful attacks reflect negatively on the target company/victim)
- Deep fakes
- Trojans, malware, and adware
- Phishing attempts
- Threats against banking infrastructure
- Man-in-the-middle attacks (whereby criminals impersonate a bank's website to obtain customer login information)

Successful countermeasures are constrained by state-sponsored cybercriminals seemingly targeting the UAE to disrupt the economy. It can also be challenging to identify the attacks for what they are.

Some interviewees believe cybercriminals target all the segments in the financial services and banking sector. Others believe that the corporate and commercial sectors, in terms of volume, were less targeted than the retail banking sector. However, the benefits for fraudsters in this segment are more significant as the opportunities are of a higher value. Smaller banks that do not have adequate investments in their cyber security systems are also being targeted.

There is also a perception that attacks against banks generally aim to destroy the reputation of banks, government institutions, and high-profile brands.

## b. Main Defense Strategies

Banks have developed a range of defense strategies to deal with cyber security threats. These include measures such as the following:

- Ongoing threat and vulnerability assessments and development of contingency plans to deal with threats. This requires a long-term view to determine what the world will look like in the coming years and plan accordingly, putting the checks and controls needed to deal with threats in place. Banks should also partner with external experts, including cyber intelligence agencies, security vendors, and investigative consultants to identify new attack methods and ways of dealing with them.
- It is essential to have in-depth defense mechanisms. Banks should not just have one control that can be breached but should have layers of defense mechanisms and monitoring systems. There must be dedicated teams within banks to deal with cybersecurity, and banks must practice proactive monitoring and control.
- Use of the latest standardized protection security measures. This includes continuous 24/7 monitoring (real-time) of internal and external traffic; the continuous upgrading of security infrastructure, policies, and procedures; Know Your Customer (KYC) programs; the use of biometric systems that are run with the MOI (UAE's Ministry of Interior) database; the validation of identity programs; the use of firewalls; and monitoring the IP addresses of clients to ensure authenticity. Customers are contacted for suspected fraudulent transactions to validate identities and transactions.
- Educate people about cyber security. This includes increasing digital controls and literacy of clients and personnel.

- Abide with government and central bank guidelines, including engaging with government agencies and cyber institutions. Banks also share best practices in the field of cyber security with each other.
- Use third parties to probe banking systems for vulnerabilities. They can also test physical security, looking for information passwords and post-it notes left in offices. It is essential to limit access to sensitive data and information.
- Banks must have an incident response plan to quickly respond to any cybersecurity incidents and minimize the impact on the organization.

### c. Primary Challenges to Improve Cyber Security

Unfortunately, there are also several challenges to improving cyber security. There is insufficient awareness among clients of cybercrime and insufficient education and digital literacy among customers and employees. They are also gullible and tend to be easy prey to scammers. Some interviewees also believe that the level of understanding of the threat and the need for countermeasures at the top level of the bank need to be increased.

The number of reported cyber incidents in the financial services sector have increased from 856 in 2013, to a high of 2527 in 2021, whereafter it decreased to 1829 in 2022.<sup>8</sup>

These shortcomings must be seen in the light that it does take time (frequently too long) and needs effort and resources to comprehend the threat fully and take the appropriate action to deal with the identified vulnerabilities. The smaller banks especially need more resources, including the financial means to procure the systems required. Added to this is the phenomenon of a continuously evolving cyber security environment, driven by rapid technological change, and creating a need for adapting countermeasures. For every protection, another hacker is attempting to break into that protection. Cyber security skills must, therefore, constantly keep up with new and emerging threats as banks are always playing catchup. The situation is aggravated by the challenging nature of sourcing the right people with the right skills to monitor and manage security programs. These people tend to be scarce as the demand for them is global.

## 9. TECHNOLOGY INTEGRATION: LEGACY SYSTEMS ARE THE MAIN CHALLENGE

New technologies must be integrated into legacy systems and the infrastructure of the financial services sector institutions. The interviewees identified several challenges to this necessity. They also identified several ways of dealing with these challenges.

### a. Primary Challenges to Integrating Trends and Technologies

**The interviewees initially highlighted three challenges:**

- Legacy systems reduce the speed of interfacing
- New systems implementation
- Security risks with new technology

Smaller banks must maintain and upgrade legacy systems as they frequently lack the means to upgrade all systems simultaneously, and at times, this is not even possible.

From a people perspective, the right talent must be improved as the significant skill gaps are problematic. A sense of complacency and resistance to change aggravate this. It does require constant programs to upskill and right-skill employees.

There is a massive cost of acquiring and integrating the new systems. In addition, the debate

8. <https://www.statista.com/statistics/1310985/number-of-cyber-incidents-in-financial-industry-worldwide/#:~:text=Global%20number%20of%20cyber%20attacks%20in%20financial%20sector%202013%2D2022&text=In%202022%2C%20there%20were%201%2C829,2021%20to%20477%20in%202022.>

whether to buy a new system or to build from scratch hinders progress and takes up time, frequently leading to stagnation.

Keeping systems up to date is problematic, as the fast pace of technology development can present challenges, as is the fast pace of redundancy. This is aggravated by the complexity that goes with the size of the respective banking groups. For example, one of the top ten banks in the world could run approximately 40,000 applications. Putting all the applications together creates much risk and can slow down the system. This is in addition to the complexity of the integration process itself.

Given the complexities involved, achieving any scale is difficult.

## b. How to Deal with Integration Challenges

Solid and strategic leadership is a prerequisite to successfully managing the integration process. Bank leadership needs a clear vision of the direction and strategy for the route ahead. Clarity of thought is essential, and new business models are frequently required.

It is necessary to balance banking regulations and compliance between the existing regulatory framework and the new digital framework. It is understood that technological developments at times must wait for the regulatory environment to play catch-up. These gaps must be bridged, and investments must be reprioritized from the old technology systems to the latest ones. Recertification is also required to deal with new systems.

It could be necessary to replace, write off, or transform existing systems to integrate the new systems. The different parts of the organization must be aligned and synced with clear time frames. Some interviewees also identified the need to create a middle layer where new applications and fintech organizations can integrate. It is important to understand where to integrate and where the gaps are. It is also essential to understand the need for unique interfaces between core systems and to standardize the language between the various systems.

Awareness is essential from a people's side, and all stakeholders must be informed about the progress. Programs must be launched to raise understanding and education levels.

## 10. CONCLUSION: AREAS OF COLLABORATION AND RESEARCH TO ENHANCE KNOWLEDGE ABOUT DIGITAL TRANSFORMATION

It is commonly agreed that digital transformation allows for mistakes and encourages learning, transparency, and open communication. For this reason, collaboration between banks and financial institutions is not an option but a necessity to augment the learning from mistakes and consequently build up common practices to enhance the pace and the efficiency of digital transformation. A collective effort is highly recommended to improve security measures. While being an ideal, harnessing the full potential of technology and developing meaningful service experiences for customers will remain issues upon which banks base their business models. To jointly overcome the challenges of digital transformation, UAE governmental authorities, financial institutions, and academics can collaborate to create a community of knowledge through sharing best practices and leading applied research projects around the following topics:

- **Digital Customer Experience:** Two aspects should be investigated. First, what features in the digital journey are key in creating a distinctive customized experience, and how would these features improve customer loyalty? The second important aspect, part of the first, is enhancing customer trust in digital financial services, especially in the face of security breaches or data leaks.
- **Artificial Intelligence, Machine Learning, Data Analytics, and Big Data:** Examine how to improve the deployment of these technologies to enhance timely information-based decision-making. Research should focus on how these technologies would contribute to financial institutions' performance through predictive analytics, accurate risk assessment, fraud detection, automated

decision-making in banking, real-time information about customers for better segmentation and customer insights, minimizing errors, and operational optimization.

- **Fintech:** Explore and analyze the most effective partnerships and collaboration models between brick-and-mortar financial institutions and fintech start-ups for a win-win strategy.
- **Blockchain and Distributed Ledger Technology:** Explore the practical applications of blockchain and DLT in financial services, including improving transparency, reducing fraud, and streamlining operations. Understanding how to improve its acceptance is also an important area to be investigated.
- **Cybersecurity and Data Privacy:** Identifying the most effective and advanced cybersecurity measures and data privacy solutions to data and transactions and developing mechanisms to identify potential cyber threats proactively. Developing awareness plans and programs to educate customers about their digital behavior related to their financial transactions.
- **Digital Payments:** Study the impact of emerging payment currencies (e.g., cryptocurrencies, bitcoin, etc.) and central bank digital currencies on traditional banking systems and identify ways in which the latter could cope with these new products.
- **IT Infrastructure:** Benchmark IT infrastructure solutions to identify the safest, most scalable, and most resilient ones that can support the continuously evolving demand for and innovation in digital technology.
- **Ethical matters, sustainability, and regulatory compliance:** Research can investigate how to design privacy and promote customer trust. Assessing the ethical and social implications of digital transformation in finance (e.g., issues related to bias in algorithms, financial inclusion, and digital divide concerns) and proposing solutions is also a key topic. Among the top priorities is identifying how digital transformation can contribute to promoting ESG values and responsible financial practices. Finally, how to develop an agile regulatory framework for digital transformation that would allow the needs of financial institutions to perpetually adapt to the fast pace of innovation and changes within the digital technology environment.
- **Change Management and Employee Training:** Identifying the common practices for successful digital transformation strategies and understanding how financial organizations collaborate, learn from mistakes, and capitalize on this learning would provide helpful insight into managing the digital transition. At this level, people are critical to the success of digital transformation strategies. Consequently, how to instill a digital culture, attract and retain talent, and develop digital leadership are priority research topics.
- **Strategic management of digital transformation:** A key area to be explored is how financial institutions should form and deploy their digital transformation strategies to differentiate themselves from direct competition, Fintech organizations, and Big Tech companies. Investigating opportunities to expand digital services globally, considering legal, regulatory, and cultural differences, is an exciting area of research.

Pooling resources and sharing expertise from the UAE government, banks and financial institutions, and academia to investigate the proposed research topics would foster innovation and know-how about digital transformation, which in turn will allow banks and financial institutions to be a more resilient and customer-centric financial industry reinforcing the position of the UAE as a hub of digital finance and banking.



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## 12. SUGGESTED READINGS ON DIGITAL-RELATED ISSUES

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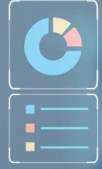
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