Course Book

INNOVATION AND STRATEGY IN FINTECH

DLMFAISFT01

iu
INTERNATIONAL
UNIVERSITY OF
APPLIED SCIENCES

LEARNING OBJECTIVES

The trend in almost any industry worldwide is the incorporation of technology into how things work. Recently, technology has been able to shape the various mechanics of daily life we enjoy. The financial service industry is moving with this trend. Technology in general has evolved together with the technical applications in the finance industry. This also speeds up innovations. These trends are important subjects to talk about if we want to keep ourselves updated and informed about the present and future of the finance industry.

The book will begin by introducing innovation and strategy in the FinTech industry followed by definition and brief explanation of basic concepts. These concepts will be put into their economic and social context. Finally, digitalization trends and their impacts will be critically evaluated.

On completion of this course book, you will be able to…

- develop an in-depth understanding of both theory and practical aspects of innovation in the financial services industry.
- understand the FinTech taxonomy and interconnectedness with other disciplines such as finance, technology, management, innovation, and economics.
- learn how the new digital banks are making inroads into the traditional financial system and how new business models are evolving such as P2P lending.
- explore and evaluate the evolution of cryptocurrencies and central bank digital currencies.
- understand how mobile payment apps are changing the landscape of the international payments sector.
- identify and evaluate the use of green fintech in impact investing, environmental, social, and governance (ESG) issues and challenges.
- gain an overview of issues such as cybersecurity, data protection and developments in fintech related regulation in various regions.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

UNIT 1

INTRODUCTION OF INNOVATION AND STRATEGY OF FINTECH

STUDY GOALS

On completion of this unit, you will be able to ...

- define FinTech and other related terminologies.
- decide what is important when it comes to FinTech and its application to the market.
- identify suitable technologies that emerge now in the finance industry.

1. INTRODUCTION OF INNOVATION AND STRATEGY OF FINTECH

Introduction

Business practice is governed by business informatics – this is the application and design of information technology (Alt & Puschmann, 2016). Business informatics play a huge role in the finance industry because information is the core of this sector. Information needs to be processed as quickly as possible for the system to work flawlessly. Business informatics affect the capital of the economies that we have today. Given the important role this plays in the functioning of the business practice, it is expected to see all sorts of advancements.

Digitalization has been a common trend in the past decade and banking has transformed because of its benefits we can get from its digitalization. Digitalization is both a technical and social transformation. Aside from being new in terms of analog signaling involved in the processes, digitalization also penetrated the ways of life in society (Alt & Puschmann, 2016). Overall, this created many opportunities and changes to improve the work processes needed by society. A common example to illustrate this is the banking sector and the growing market shares of FinTech during the past few years (Blackstad & Allen, 2018). FinTechs digitalization of financial flows creates a direct connection between investors and consumers, facilitating low-cost fundraising, account settlement, and collections (Shimada et al., 2017).

1.1 History of Innovation in the Financial Services Industry

The progress of digitalization in the financial services industry has a colorful history. Traditionally, the banking industry has maintained its position as an important player in financial services throughout various societies since its founding in the 12th century. Before, it was all about exchanging money for goods. But difficulties in carrying the correct amount of money needed per transaction spurred change. Denominations have changed, and bills have transformed to fit convenience needs. Payment systems also became more organized as time went on.

Eventually, the financial services industry took convenience to the next level. Manual processing of individual payments improved when machines were incorporated into the finance services. Electronic data processing and automated teller machines made their way to the public in 1978 (Alt & Puschmann, 2016).

Definition of Innovation, Strategy, Finance, and FinTech

This chapter dives into a timeline of key innovations in the financial services industry. First of all, some key terms will be defined.

Innovation

Innovation refers to the process of introducing new ideas, products, or procedures that add value to an organization. Innovation can be driven by a variety of factors, including technological advancements, changing market conditions, or the need to find new ways to solve problems or meet customer needs. Innovation can be either incremental, involving small improvements to existing products or processes, or radical, involving more significant changes or introducing entirely new products or processes.

Strategy

Strategy refers to the long-term plan of an organization for achieving its goals and objectives. Strategy involves setting clear goals, analyzing the competitive environment, and developing a plan of action that leverages an organization's strengths and opportunities while mitigating its weaknesses and threats. Strategy can involve a variety of activities, including market positioning, product development, and resource allocation.

Finance

Finance refers to the management of an organization's financial resources, including the sourcing and use of funds to support its operations and growth. Finance involves the planning, organizing, and controlling of financial activities, such as the acquisition of capital, the management of financial risks, and the optimization of the organization's financial performance.

FinTech

FinTech, or financial technology, refers to the use of technology to improve and automate financial services. FinTech companies often use innovative technologies, such as artificial intelligence, blockchain, and the Internet of Things, to create new financial products and services or to improve existing ones. FinTech can involve a wide range of activities, including digital banking, online payments, financial analytics, and investment management.

Digitalization

Digitization is a “strategically oriented transformation of processes, products, services through to the transformation of complete business models using modern information and communication technologies (ICT) with the goal to ensure sustainable value creation effectively and efficiently” (Becker et al. 2019, p. 9).

Digitization should transform essential business areas (processes, products/services up to business models) sustainably. Digitization is often equated with digital transformation. However, there is disagreement among practitioners. In order to be able to better clarify

this disagreement, digital transformation is first defined more precisely (Becker et al. 2019). According to Fitzgerald et al. (2014, p. 2), digital transformation (DT) is “the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable significant business improvements (e.g., improving customer experience, streamlining operations or creating new business models).” According to Gong and Ribiere (2021, p. 12), who have examined 134 definitions of DT, DT is “a fundamental process of change enabled by the innovative use of digital technologies, accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve* an entity and redefine its value proposition to its stakeholders. (*An entity could be an organization, a business network, an industry, or a society).”

The boundaries between definitions of digitization and digital transformation are fluid. It is therefore difficult to clearly distinguish between the terms. Bloomberg (2018) highlights the differences between digitization and digital transformation as follows: “An organization can undertake a range of digitization projects ranging from automating processes to retraining employees to use computers. Digital transformation, on the other hand, is not something that companies can implement as projects. Instead, this broader term refers to the customer-driven strategic business transformation that requires cross-discipline organizational change and the implementation of digital technologies.”

Digitization is the targeted conversion of processes, products/services, and business models using digital technologies (often in individual projects). Digital transformation, on the other hand, aims at a cross-departmental, holistic corporate transformation using digital technologies.

Digitalization vs. Digitization

In addition, a distinction between “digitalization” and “digitization” is widespread. According to Gartner's IT glossary, digitization is “the process of change from analog to digital form, also known as digital enablement” (Gartner, n.d.). In other words, digitization takes an analog process and transforms it into a digital form without altering the process itself in any other way. It is therefore a digital image of an analog process without changing its structure.

On the other hand, digitalization refers to the use of digital technologies to produce changes in a business model and open new opportunities for generating revenue and boosting the value of the business. Digitalization is about improving a business's efficiency and productivity to favor its revenue and develop its value.

The two terms are often confusing as they are usually interconnected. Digitization is the change toward maximizing digital technologies for a business. Along with this, digitalization is using these digital technologies for a business' improvement in performance.

Artificial Intelligence (AI)

Artificial intelligence (AI) is the application of advanced analysis and simulate human intelligence using computer systems (Gartner, n.d.) including the ability of a computer or controlled robot to skillfully perform tasks or complex processes (Copeland, 2022). AI

involves machine learning that allows fine-tuned interpretation of events, generating decisions, and making the necessary actions (Gartner, n.d.). From a business perspective, AI is useful for data analysis, decision-making, and automation. Still, constant improvements in AI do not mean that it can match human adaptability when it comes to the extent in skills and background knowledge.

Cloud Computing

Cloud computing refers to delivering various computing services, such as servers, storage, databases, software, intelligence, and analytics, over the internet (Gartner, n.d.). With this tech innovation, users can take advantage of flexible resources and faster innovation. Furthermore, cloud computing can reduce costs of resources and boost options of technologies that a business firm can use.

Metaverse

Metaverse is an umbrella term for virtual and 3D space, which can be seen as a hybrid of physical and digital reality in a virtual platform (Gartner, n.d.). The metaverse can be used in a business context for holding virtual events, training, and other collaborative activities.

Big Data

Big data is a term used to refer to a massive volume of structured and unstructured data (Gartner, n.d.). Business uses these online and offline data in their daily operations. Big data enables innovative information processing, advanced decision-making, and automated processes.

Internet of Things (IoT)

This is a collection of physical objects embedded in technology (Gartner, n.d.). These physical objects could be devices, vehicles, buildings, and other items and are classified as IoT as long as they are electronically embedded in software, sensors, or network connectivity. This interconnection allows these physical objects to exchange data. In business data, IoT is used for improving task efficiency, tracking inventory, and gathering data for business analysis.

Timeline of key innovations in the financial services industry

The banking industry has seen the evolution of how money is used and how transactions were made more efficient. The table below summarizes some key aspects of the innovations in how money is used in different eras. It is essential to point out how the evolution seen in these innovations is mainly for the benefit of society and the individuals who engage in these transactions.

Table 1: Key Innovations in the Financial Services Industry

5,000 B.C.	Bartering of goods is slowly being transitioned to payment using “metal objects” as a form of currency.

11th century	China's introduction of paper money transformed the original coinage system. Paper money acquired value in itself. Europe started using paper money systems only by the 15th century.
17th century	Banks emerged, starting with the Amsterdam Exchange Bank in 1609, the Swedish Reichsbank in 1656, and the Bank of England in 1694.
20th century	Innovations for further efficiency of transactions emerged. Cashless purchases started in 1946, and the first ATM was installed in Ohio, USA, in 1959. Then, in 1967, Barclays Bank in London introduced the first ATM in Europe, and internet banking was launched around 1994. 1999: The Norwegian Fokus Bank (today's Danske Bank) offers the first mobile banking service, which customers can use to send text messages, for instance, to carry out account balance queries.
2000's	**2000:** Founding of the payment service provider PayPal – a representative example of the complete digitization of money. This refers to many innovative payment methods and virtual currencies for payment processing via electronic channels and end devices. Since the same year, UBS customers in Switzerland have been able to track stock market prices and place stock market orders with Mobile Brokerage via the Wireless Application Protocol (WAP). **2001:** Citibank offers a multi-banking service called “Citibank's My Accounts Service.” This allows customers to display income and expenses as well as asset positions and liabilities from accounts from several banks on one website. The bank put an end to this service in 2005, followed in 2006 by a non-bank, mint.com, as a neutral provider. Alternative PC software solutions are Intuit Quicken or Microsoft Money. **2002:** Start of the Financial Transaction Service (FinTS) standard in Germany. FinTS includes a certificate-based authentication system as a supplement to PIN/TAN-based banking. In the same year, the Swiss PostFinance launched its Electronic Bill Presentment and Payment (EBBP, chapter 2.5.3) service with Yellowbill together with Lindt & Sprüngli and Helvetas, which allows electronic billing and payment via online banking. **2004:** The Chinese Alibaba Group launches Alipay.com, an online payment platform operating without transaction costs. The platform integrates more than 65 banks and card providers. In 2013, this platform was supplemented with additional financial products and now operates on the market as an independent bank with the name Zhejiang Ant Small and Micro Financial Services Group. **2006:** Publication of the Electronic Banking Internet Communication Standard (EBICS) by the association “Die Deutsche Kreditwirtschaft” (formerly ZKA, see above) to implement a multi-bank standard that regulates the transmission of payment transaction data via the Internet. EBICS is XML-based and is used, e.g., as a secure channel for SEPA payments. **2007:** Google and PayPal receive banking licenses for Europe and can thus act as providers of financial services (e.g., transfers, payment systems, advice). **2009:** Nokia introduced the mobile payment system Nokia Money based on the provider Obopay. Obopay operated between 2008 and 2012 especially in India. In 2009, the virtual currency “Bitcoins” was also created, which established itself as a payment and speculation instrument. The exchange rate rose from a few EUR per unit (BTC) in 2012 to around EUR 800 (12/2013) and around EUR 395 in April 2016. **2010:** The Kuwaiti Gulf Bank enables transactions to be carried out via an Apple iPhone app. In the same year, Comdirect in Germany became the first bank in the country to offer a banking application for iPhone and iPad. In September 2010, PostFinance launched the PostFinance App, the first Swiss iPhone app with a payment transaction function. **2013:** The Spanish Banco Sabadell implements “Augmented Reality” using Google Glass. The customer can use the glasses to display the nearest ATM, connect to the service center or “view” the customer advisor, e.g., about properties. **2014:** With the introduction of the iPhone 6, Apple initiates the mobile payment method Apple Pay, which operates with the credit card providers Amex, Mastercard, and Visa. The basis is a local connection to the device at the point of sale using near-field communication technology (NFC) or iBeacon3. **2015:** In March, the announcement of the competing Samsung Pay followed. Also, with the Apple Watch, banking services can also be used via a watch (e.g., at Barclays, Citibank, Comdirect, Consorsbank, DAB, Deutsche Bank, Finanzblick, NatWest, Outbank).

Since 2025	2015-2016: • Emergence of mobile payment solutions and peer-to-peer (P2P) lending platforms • Growth of crowdfunding and alternative financing options 2017-2018: • Adoption of blockchain technology in finance and rise of initial coin offerings (ICOs) • Expansion of financial services into new areas such as insurance, wealth management, and remittances • Introduction of open banking, which allowed third-party developers to access financial data with customers' consent 2019-2020: • Further growth of digital wallets, mobile banking, and robo-advisory services • Increased use of artificial intelligence and machine learning in financial services, such as fraud detection and loan underwriting • Rise of digital-only banks and neobanks, offering a range of financial services without traditional brick-and-mortar infrastructure 2021 and beyond: • Continued growth of digital finance, particularly in emerging markets, where many people still lack access to traditional financial services • Emergence of new technologies such as 5G and quantum computing, which are likely to drive further innovation in finance • Greater regulatory scrutiny of fintech companies driven by the need for better consumer protection Overall, the fintech industry has been growing rapidly in recent years, driven by advances in technology, increased consumer demand for more convenient and accessible financial services, and the need for greater financial inclusion.

Source: Alt & Puschmann, 2016, p. 4-8.

This table provides an overview of the digital innovations in the finance industry. The earliest recorded innovations started in 1998 when the early prototype of digital banking and e-banking made its way to the financial sector. Eventually, the technologies used in digital banking improved to more web-based and transactional changes. These changes were adopted between 2003 and 2008. The third and fourth significant change in digital banking mainly meant refining the prototypes of the early years. As time went on and digital banking became more innovative, customer expectations also linearly increased along with it.

1.2 Overview of FinTech

FinTech is currently seen as a subfield of banking and **financial informatics**. The road to the digitalization of financial industries leads to FinTech solutions based on proprietary developments (Alt & Puschmann, 2016), and FinTech is a broad topic encompassing such digitalization improvements.

Financial informatics
This is a structured means of storing, processing, and communicating data in the finance sector.

In the financial industry, insurance services are part of the products offered, including mortgages, endowments, term life insurance, and property insurance. Insurtech is a variant of FinTech, which is the term used for the innovations of start-up companies in the insurance sector (Alt & Puschmann, 2016).

The digitalization of financial systems means that human-based paradigms in their current regulations and methods are changing swiftly (Blackstad & Allen, 2018). The financial sector has been developing towards digitalization, using digital means in its systems to boost innovation, promote economic growth, and create better financial products and services for its clients.

The swift change may be challenging to manage due to a lack of consensus on its management. Regtech is a subfield in FinTech concerned with regulatory processes in technologically modified financial services and may be the key to provide solutions in this rapid paradigm shift.

Drivers of FinTech Evolution

There are several drivers of FinTech evolution, including the widespread adoption of smartphones and other mobile devices, the increasing availability of high-speed internet, and the growing need for convenient and accessible financial services. Additionally, advances in technology such as artificial intelligence, blockchain, and cloud computing have also played a role in driving the growth of the FinTech industry. Here is a more detailed list of the drivers of FinTech evolution:

- **Low cost:** FinTech evolution uses technological advancements such as artificial intelligence and machine learning that have enabled companies to offer more efficient services. And this helped cut down the costs of resources to a much lower range. Also, services offered can be rated at much cheaper costs as technologies are doing the bulk of processing needed.
- **Ease of use**: The growth of cloud computing has made it easier for FinTech companies to store and process large amounts of data, allowing the development of more sophisticated financial products and services. From a provider's perspective, FinTech offers easier usage of their systems. The digitalization of banking services also provides easier transactions to clients as transactions can be completed at their most convenient time, with only a few taps on their mobile devices.
- **Faster services**: The fast-paced world made it necessary to invent more convenient and accessible financial services. Therefore, FinTech has been driving innovative technologies such as mobile payment systems and online banking which offer faster services than the traditional banks (with its regular queues).
- **Better features**: The rise of FinTech and blockchain technology created new financial services and features. These include cryptocurrencies and smart contracts, which include more advantageous features for the users. Furthermore, the increasing availability of high-speed internet has enabled financial institutions to offer a wider range of services online.
- **Personalized products:** The increasing popularity of social media and other online platforms has made it easier for FinTech companies to promote their services and connect with consumers.

FinTech investments and interest massively grew in 2021, as evidenced by the $27.5 billion investment peak in the Asia-Pacific region in 2021, paired with a record of 1165 deals (KMPG, n.d.). The volume in investment in 2021 is almost twice the 2020 investment amount of $14.7 billion.

By 2030, FinTech is expected to reach a $325 billion market share. FinTech even has the potential to surpass this figure because of the rise in digital payments in e-commerce boosted by the COVID-19 pandemic, where people got used to cashless transactions.

Europe has a large market for FinTech as these companies are worth twice in comparison to companies in other tech-related sectors in the region. They were worth $11.16 billion by June 2021 (Mordor Intelligence, n.d.). Furthermore, 65 per cent of US-based consumers use FinTech-related services (Statista, 2022). This reflects the appeal of the industry on the consumer level. Security, personalization, and a more user-friendly financial service experience are further benefits from the FinTech innovations enjoyed today.

Evolution in banking services is all rooted in society's needs as they push towards innovations for convenience. Understanding the market is one thing, but efficiently carrying out the needed changes is a different problem. For example, it is tough to build a new bank because of the time and capital it takes. However, addressing the central issue of banking from the perspective of customers is much easier. Hence, the focus of FinTech in pioneering innovations in this industry is all about meeting consumer expectations and mobile fetishism (Blackstad & Allen, 2018).

Customer expectations fuelled the need for FinTech evolution. In 2008, the lost trust of customers in financial institutions drove FinTech companies to be the new go-to place by charging lower fees, having better accessibility, and faster transactions.

Additionally, COVID-19 accelerated the implementation of FinTech. According to the Swiss Finance Institute, during the pandemic lockdowns, download rates for FinTech apps rose from 29.2 per cent to 32.8 per cent (SiaPartners, 2021). Even cautious clients flocked to FinTech to manage their funds since traditional banks were ill-equipped to handle most banking operations remotely.

The growth of the FinTech market is positively impacted by leading tech companies targeting financial services, including Google, Amazon, Facebook, and Apple. Big internet companies continue to add subordinate banking services to their current offers without adopting full-stack banking.

Benefits of FinTech to the financial services industry

FinTech has brought several benefits to the financial services industry, including the following:

- **Improved access to financial services:** FinTech has made it easier for individuals and small businesses to access a wide range of financial services, even if they are unbanked or underbanked.
- **Increased competition:** The rise of FinTech has increased competition in the financial services industry, leading to lower prices and more choices for consumers.
- Enhanced security and fraud prevention: Many FinTech companies use advanced technologies such as blockchain and biometric authentication to strengthen the security of their services and prevent fraud.

- **Faster and more convenient transactions:** FinTech has made it possible for consumers to complete transactions quickly and easily using mobile phones and other devices.
- Greater financial inclusion: FinTech has helped to bring financial services to people who did not have access to them in the past, for example in developing countries.
- **Improved customer experience:** Many FinTech companies are focused on providing a seamless and user-friendly experience for their customers, which has helped to improve customer satisfaction and loyalty.
- **New business opportunities:** The growth of the FinTech industry has created new opportunities for entrepreneurs and businesses to innovate and create new products and services.

The following financial service segments are profitting of the benefits of FinTech:

Payment

FinTech has great impact on the payment industry by providing innovative digital payment methods that are faster, easier, and more secure than traditional payment methods. For example:

- **Mobile Payments:** With the widespread use of smartphones, mobile payments have become increasingly popular, allowing users to make payments using their mobile devices. This has made payments more convenient and accessible, especially for people who do not have access to traditional banking services.
- **E-wallets:** E-wallets allow users to store and manage their financial information and make payments online. This has made online shopping and other transactions more secure and efficient, as users no longer have to manually enter their credit card information for each purchase.
- **Faster Payments:** FinTech has enabled instant or near-instant payments, making it possible for consumers to receive or send money in real-time. This has revolutionized the way people transfer money to each other and has reduced the time it takes for funds to become available.
- **Increased security:** Digital payment methods provided by FinTech companies often use advanced security measures such as encryption, biometric authentication, and multi-factor authentication, making it more difficult for fraudsters to access sensitive financial information.

Banking

FinTech has brought significant changes to the traditional banking industry by providing new and improved services that are more convenient, accessible, and user-friendly. Some examples include:

- **Online account opening:** FinTech companies have made it possible for customers to open bank accounts online, eliminating the need for them to visit a physical branch. This has made the process of opening a bank account faster, easier, and more convenient.

- **Digital lending:** FinTech companies have revolutionized the lending process by offering digital loans that can be applied for, approved, and disbursed online. This has made it possible for borrowers to access credit faster and more easily, and it has reduced the time and costs associated with traditional lending.
- **Budgeting tools:** FinTech has made it easier for consumers to manage their finances by offering budgeting tools that provide a clear and concise picture of their spending habits. These tools can be used to set financial goals, track spending, and manage budgets more effectively.

Wealth management

FinTech has brought major changes to the wealth management industry by making it more accessible and affordable for consumers to invest their money and grow their wealth. Some examples include:

- **Robo-advisory services:** FinTech companies have introduced robo-advisory services, which use algorithms to provide personalized investment recommendations based on a customer's financial goals, risk tolerance, and investment history. These services are more affordable than traditional wealth management services and have made it possible for consumers to access professional investment advice and manage their portfolios with ease.
- **Personalized investment recommendations:** FinTech wealth management services use advanced algorithms to analyze a customer's financial data and provide personalized investment recommendations. This helps customers make informed investment decisions and achieve their financial goals more efficiently.
- **Increased accessibility:** FinTech wealth management services are often available through mobile apps and websites, making it possible for consumers to manage their investments from anywhere, at any time. This increased accessibility has made wealth management more convenient and accessible, especially for those who have no access to traditional wealth management services.

Capital markets

FinTech has had a significant impact on the capital markets industry by making it more efficient, reducing costs, and increasing transparency. Some examples include:

- **Automation:** FinTech companies have introduced automation technologies that have streamlined various processes in the capital markets, including trading, settlement, and reconciliation. This has reduced the time and cost associated with these processes and has made the capital markets more efficient.
- **Big data analysis:** FinTech companies use big data analysis to provide valuable insights into market trends and customer behavior, enabling market participants to make more informed investment decisions. This increased data analysis has made the capital markets more transparent and has improved the overall efficiency of the market.

- **Blockchain technology:** FinTech companies have introduced blockchain technology, which has the potential to revolutionize the capital markets by providing a secure and transparent ledger of transactions. This has the potential to reduce the risk of fraud and increase the efficiency of various processes in the capital markets, including trading, settlement, and reconciliation.

Lending

FinTech has disrupted traditional lending by introducing new lending models such as peer-to-peer (P2P) lending, which connects borrowers directly with lenders, bypassing traditional financial institutions. This has led to a reduction in the cost of borrowing and has made it easier for people to access loans, especially for those who had previously been excluded due to traditional lending criteria. Additionally, FinTech lending companies use advanced technology to make the loan application process more streamlined and efficient, reducing entry barriers.

Regulation

FinTech has created new regulatory challenges for governments and financial regulators. As new FinTech business models emerge and disrupt traditional financial services, regulators must deal with how to balance the need for innovation with the need to protect consumers and ensure stability in the financial system. At the same time, FinTech has also helped regulators to better monitor and enforce rules. One of the ways FinTech has done this is by increasing transparency in financial transactions. For example, many FinTech companies utilize blockchain technology, which creates an immutable record of all transactions, making it easier for regulators to track and monitor financial activity. Additionally, FinTech companies have also developed compliance tools that help financial institutions and regulators ensure that they are following the rules. For example, some FinTech companies have developed sophisticated anti-money laundering and know-your-customer technologies that can help financial institutions detect and prevent financial crime more effectively. In conclusion, while FinTech has created new regulatory challenges, it has also provided new tools and technologies that can help regulators better monitor and enforce rules, increasing transparency and improving compliance in the financial system.

Insurance

The impact of FinTech on insurance has been significant. One of the main ways in which FinTech has transformed the insurance industry is by making it more accessible to consumers. With the rise of online insurance comparison tools and mobile apps, it has become easier for consumers to compare different insurance products, which has increased competition and reduced prices. Another key aspect of FinTech in insurance is the use of telematics technology. This technology allows insurance companies to gather real-time data on a policyholder's driving habits and behavior, which can be used to more accurately price insurance policies. This leads to more personalized and tailored insurance products, which can save policyholders money on their premiums and provide them with a more satisfactory insurance experience. Overall, the rise of FinTech in insurance has led to a more efficient and customer-focused industry, making it easier for consumers to find the right insurance products for their needs and budget.

Property management

FinTech has transformed the property management industry. With the rise of property management software and mobile apps, many of the manual and time-consuming tasks involved in property management have been automated. For example, FinTech solutions now allow rent collection and payments to be made digitally, reducing the need for manual checks, writing and deposit processes. Additionally, FinTech has made it easier for tenants to submit maintenance requests, with many property management solutions offering a digital platform for tenants to report issues and request repairs. This has streamlined the process and improved response times, leading to a better overall experience for both landlords and tenants.

Furthermore, FinTech has also improved the way property managers keep track of lease agreements, payments, and other important documents. By using cloud-based solutions, property managers can access all of this information from any device, reducing the need for paper-based systems and improving overall efficiency. Overall, FinTech has transformed property management by automating processes, reducing administrative overhead, and improving the overall experience for landlords and tenants.

The automation of payment infrastructures led to better access to resources. The algorithms and ecosystems for payment acceptance and trades made it much easier for consumers. And when these resources are used, there are more opportunities for various businesses to grow. FinTech also offers users individualized experiences with AI and big data, in addition to increasing customer retention through speed and ease. Due to their previous purchases and financial condition, customers can better access business services and products.

Types of FinTech services

Fintech refers to the use of technology to improve and automated financial services and processes. There are many different types of FinTech services, including:

- Digital payments and transfers including online and mobile payment platforms, digital wallets, and mobile money transfers.
- Lending and borrowing including P2P lending, online lenders, and crowdfunding platforms.
- Investment management including robo-advisors, online brokerage platforms, and digital wealth management services.
- Personal finance management including budgeting and financial planning apps, and digital money management tools.
- Insurance including digital insurance brokers and telematics-based insurance products.
- Blockchain and cryptocurrency including decentralized digital currencies, digital asset exchanges, and blockchain-based platforms for financial transactions.

Key players in the FinTech industry

The FinTech industry is highly competitive, with many players ranging from startups to established financial institutions. Some of the key players in the FinTech industry include:

- **PayPal:** Founded in 1998, PayPal is one of the pioneers of digital payments and is now a leading provider of online payment solutions. It offers a range of services, including peer-to-peer payments, online checkout, and mobile payment services.
- **Square:** Square provides payment and point-of-sale solutions for small businesses. It offers a range of products, including card readers, mobile payment services, and invoicing and payroll solutions.
- **Robinhood:** Robinhood offers commission-free online trading, making it easier and more accessible for individuals to invest in stocks and other securities.
- **Wise (TransferWise):** Wise provides online money transfer services, offering competitive exchange rates and low fees compared to traditional banking services.
- **SoFi:** SoFi, or Social Finance, offers a range of financial products and services, including student loan refinancing, personal loans, and online investment management.
- **Coinbase:** Coinbase operates a leading cryptocurrency exchange, allowing users to buy, sell, and store digital currencies like Bitcoin and Ethereum.
- **Stripe:** Stripe provides payment processing and infrastructure solutions for businesses of all sizes, making it easier for them to accept payments and manage their financial operations.
- **Ant Financial:** Ant Financial is affiliated with the Alibaba Group, providing financial services such as mobile payments, wealth management, and insurance.
- **Monzo:** UK-based Monzo offers a mobile-first bank account and a range of financial services, including spending analytics and budgeting tools.
- **N26:** N26 is a German FinTech company that offers a mobile-first bank account and a range of financial services, including budgeting tools, investment management, and insurance.

Challenges Faced by the FinTech Industry

The FinTech industry faces several challenges, including the following:

- **Regulation:** FinTech companies must navigate a complex and ever-changing regulatory landscape, which can be a significant barrier to entry.
- **Competition:** The FinTech industry is highly competitive, and new entrants face significant challenges in differentiating themselves and establishing a foothold in the market.
- **Security and data protection:** FinTech companies must ensure the security of sensitive financial and personal data, which can be a challenge in an industry where cyber threats are constantly evolving.
- **Integration with existing financial systems:** FinTech companies must ensure that their services are compatible with existing financial systems and processes, which can be complex and time-consuming.
- **Scaling and growth:** FinTech companies face significant challenges in scaling their operations and expanding into new markets, especially as they compete with established financial institutions.

1.3 Role of Innovation in Strategy in Business Models

Innovations and inventions may sound like they refer to identical concepts, but there are subtle differences between them. Economic growth depends on innovations and inventions so that society's needs are better satisfied. An invention is creating something new – a product, service, or method. Innovation is about how people make new uses of these inventions.

Many businesses strive to innovate their services to ensure they can keep up with the mass of technological improvements. Innovations' primary characteristics include effectiveness of a business model, novelty, and allowing automation of services. In this way, complex problems in business models can be addressed. An option is to use external and internal sources for innovating strategies.

Addressing business problems appropriately is beneficial to productivity. It allows firms to maximize their use of resources, give them a competitive advantage, and improve their overall revenue. Each innovation in the financial sector leads to growth in opportunities in the market. The use of artificial intelligence, metaverse, blockchain, and other innovations in the financial industry allow more flexibility and convenience in completing transactions. This provides options unavailable to established banks.

Innovations fall under four main types:

1. **Breakthrough innovation:** This means in-house innovations including changes in the product, services, and process are its core features. An example of breakthrough innovation is the broad application of voice or text-operated chatbots using natural language processing technology. Some enterprises that utilize these FinTech chatbots include Bankia, N26, Ant Financial's, and Kabbage Inc. It is important to note that these chatbots are not replacing humans in the work environment. Instead, human workforce and breakthrough innovation work hand in hand. It can solve structured problems like payment processing which is prompt and direct. With such breakthrough innovations, better solutions can be found with regard to the common problems faced by finance services.
2. **Sustaining innovation:** This focuses on improving a product, service, or the process performance. Banks giving online options to customers are a modern example of sustaining innovation. FinTech neo banks like Aspiration, Chime, Dave Inc., and others use these sustainable banking options. Since online banking is relatively new, these banks should have a management plan to ensure that their innovation is sustainable. This falls under the subcategory of efficient innovation when innovation helps to streamline a company model or improve a process.
3. **Basic research:** Creating better and more inclusive retail financial services can be attributed to successful basic research. It can also contribute to client satisfaction, retention, increased revenue, and stable bank revenue. Instead of academics, service

design for large organizations may involve consultants. The technology-related research, such as in information technology, the Internet of Things, chip technology for bank cards, or biometrics, has interdisciplinary use cases.

4. **Disruptive innovation:** This type of innovation relates to a business model strategy and is labeled as disruptive because it is over-reliant on technologies and online platforms. Known companies that are considered to be affected by disruptive innovation include Aldi, Apple iTunes, and Netflix. Some business models under disruptive innovation are marketplace lending, peer-to-peer systems, mobile remittances, robo-advisors, and micro-investing.

Financial Business Models and the Role of Strategy in Business Model Innovation

A business model refers to a set of values and structure of a company so that it can maximize profit (Ovans, 2015). The company must identify the product or service they intend to sell, its target market, and the resources needed to implement its plans. Business models are essential in any firms for developing image, attracting more investors, building a talented set of employees, and maintaining motivation and sustainability.

Innovations support the strategies in business models. For instance, Capital One, a US bank, started using chatbots in its operations (an SMS-based chatbot called Eno). Later, the bank pushed further and introduced mobile banking that allowed easier balance checking, payments, and query bill due date checking. Sustaining innovation in these business models is crucial if they offer online banking. The online banking experience is very different from the brick-and-mortar models we know. Online banking may have changed human capital in banks as fewer cashiers are needed, and more information technology specialists are required.

Regardless of what particular innovation an institution would use, planning and strategizing leads to better results in the long run.

1.4 Innovations in Digital Finance

People have transformed financial services. Traditionally, financial services are conducted in person as the consumer goes to a facility like a bank to process transactions. But now, many of these services, like payments, deposits, and credits, can be accessed on digital platforms such as smartphones.

Definition of Digital Finance

Digital finance refers to digital delivery of financial services using devices like computers, tablets, or smartphones (Gartner, n.d.). These are services that operate online, and consumers can use them as long as they have access to the internet. Although there is no agreed-upon definition of digital finance, there is a general understanding that it includes all products, services, technologies, and infrastructures allowing people and businesses to access payment, savings, and credit facilities online (Shofawati, 2019).

Various Elements of Digital Finance

The digital financial service ideally needs three key components. These are digital transaction platforms, retail agents, and a device like mobile phones (Shofawati, 2019). The three key components of a digital financial service are critical for ensuring its success and widespread adoption. Let's expand on each component in more detail:

1. Digital transaction platforms: These constitute the digital infrastructure that enables customers to carry out financial transactions (making payments, transferring funds, and accessing financial services). These platforms can include mobile applications, websites, or other digital tools. They must be user-friendly, secure, and reliable in order to attract and retain customers.
2. Retail agents: Retail agents play a key role in providing access to financial services, particularly in areas where traditional banking services are not available. These agents are trained and authorized to offer financial products and services, such as opening accounts, making transactions, and providing advice. They can be physical retail locations, or they can operate as mobile agents. Retail agents can also provide a valuable source of customer feedback and market intelligence.
3. Devices like mobile phones: Devices such as mobile phones are the means by which customers access digital financial services. Mobile phones are particularly important for digital finance, as they are widely available, even in remote and underserved areas. The use of mobile phones for financial services enables customers to transact anytime and anywhere, greatly increasing their financial inclusion and convenience.

When these three components are combined, they provide a comprehensive digital financial service serving customers in a wide range of locations and circumstances. This increases financial inclusion, provides access to financial services for underserved populations, and supports economic growth and development. It is expected that more people can be reached by financial services through the components and that they can take part in the system. This, in turn, is beneficial for businesses and companies using the innovations in digital finance.

Digitalization in finance helps lowering the barrier that prevents customers from using the services. An effective digital financial inclusion program can be tailored to meet the needs of the excluded and underserved population. Moreover, it could be priced adequately so that providers can run it profitably while remaining affordable for customers (Shofawati, 2019). This is only possible if the excluded and underserved population understands and can be convinced of the intended benefits of digital financial inclusion. Financial inclusion is seeing a steady increase due to these digital novelties. By the end of 2022, 76 per cent of adults worldwide were expected to have a mobile account, from 51 per cent back in 2011 (WEC, 2022). Moreover, in developing countries, account ownership rose to 71 per cent in 2021 because of mobile money services.

Brief Overview of the European Commission Digital Finance Package & Digital Finance Strategy

Key innovations are often triggered by dramatic events. This ist also true for the digital finance sector. In reaction to the financial crises of 2008 to 2009, traditional banks changed how they provide their services. They raised their risk capital requirements, improved compliance and monitoring standards, and also accelerated customer technology adoption, lowering the cost of services. Digitalization transformed financial services that had previously been carried out in person. In Europe, digital finance strategy outlines how the region can support its financial sector's digital transformation as years go by. Mitigation and regulating the risks of this digital transformation is also part of Europe's digital finance strategy. Essentially, the main priorities of this digital movement include building a digital single market, adapting the existing regulatory framework the the field of innovations, and promoting a data-driven financial sector. Europe's general strategy for digital finance creates more opportunities, develops better products for consumers, and provides an accessible system to the population.

Another catalyst of digital finance innovation was the COVID-19 pandemic. The pandemic pushed people to try more cashless means of payment to ensure social distancing. The pandemic may have contributed to the 52 per cent yearly increase in switching bank accounts to providers with improved online banking in the United Kingdom during the first quarter of 2020 and the 59 per cent preference for online applications relating to their finances (The Fintech Times, 2022).

Because of the digitalization trend, social inclusion and financial progress became significant benefits of the modern financial system. Key innovations in this sector are currently, adapting and working on better distribution models, more customer access opportunities, and better back-office management.

Because of the rise in FinTech innovations, customers now have new opportunities, including quick access to funding for expanding their firms and highly flexible award terms. Customers can receive instructions on how to use new digital tools, and the use of these tools can become more regular in various parts of the world (Manta, 2017).

By facilitating easy access to a wide range of financial products and services, and even some credit facilities for individuals and businesses, digital finance can increase the gross domestic product of digitalized economies. Digital finance can also boost financial intermediation and economic stability for consumers as well as the local economy where they live and raise their families. For instance, a study exploring the effect of network-based infrastructure SWIFT found that they had large and long-term profitability (Shofawati, 2019). Furthermore, digital finance allows governments to benefit as they provide a possible platform for expenditures and financial transactions.

The financial services market was projected to have a compound annual growth rate of 9.9 per cent worldwide and raise up to $22.5 trillion by 2021. A massive chunk of this rise in financial services market could be thanks to FinTech firms. They were able to grow their

transaction by 13 per cent and increased their asset volumes by 11 per cent worldwide (Bayani, 2021). Aside from FinTech, there was also a massive increase in digital payments with a total rising to $5.2 trillion in 2020 (Fortunly, 2021).

Microfinance is still expanding in the midst of the financial crisis, giving younger generations new digital prospects. Indeed, the innovations in the digital finance sector are life-changing and will continue to mold the industry's future.

1.5 Contemporary Issues in Banking Technology

The rise of the FinTech sector allowed banking technology to progress and solve previous shortcomings of its services and overall efficiency. The following are some of the latest banking technology applied in banking technology (EBA, 2018):

- biometric authentication using fingerprint recognition
- robo-advisors for investment advice
- big data and machine learning usage for credit scoring
- distributed ledger technology (DLT) and smart contracts for international trade finance
- integration of DLT in customer due diligence and customer ownership of data
- using mobile wallets for touchless payments
- outsourcing core banking/payment system to the public cloud

Modernization Tools of the Changing Technology

Because of the change in technology, modernization tools at the core of finance technology are the following:

Artificial intelligence

Artificial intelligence (AI) is a powerful tool that is increasingly used in the financial technology sector. One of the key applications of AI in finance is fraud detection. AI algorithms can analyze vast amounts of transaction data to identify patterns and anomalies that may indicate fraudulent activity. This allows financial institutions to quickly detect and prevent fraud, improving overall security for their customers. Additionally, AI is also being used to improve customer service. AI-powered chatbots, for example, can provide 24/7 support to customers, answering their questions and resolving their issues quickly and efficiently.

Cybersecurity

Cybersecurity is also a critical issue in the finance industry. With increasing digitization, financial institutions are increasingly vulnerable to cyber attacks, which can compromise sensitive customer information and result in significant financial losses. To protect against these threats, companies are investing in cybersecurity measures, such as encryption, firewalls, and intrusion detection systems. These tools help preventing unauthorized access

to sensitive data, minimizing the risk of data breaches, and ensuring that customer information remains protected. Additionally, companies are also training their employees to be aware of cybersecurity risks and to follow best practices to minimize the risk of a successful attack.

Cloud

The cloud is a shared computing service on the internet. When incorporated into a financial system, the cloud can act like one giant computer holding millions of other computers together to work seamlessly (Farrar, 2018). Cloud facilities can be scaled for any business as it provides flexible tools.

For many years, customers had access to cloud services, for example for internet banking. Staff used cloud services remotely due to the COVID-2019 pandemic to a greater extent. The banks had previously preferred that employees work at offices, even though many had access to the cloud from their homes. The pandemic as well as the financial crisis both had an impact on attitudes fostering remote work. As a general rule, established banks prefer to adopt technology more cautiously than the FinTech companies.

Process robotics

Process robotics can make automated processes and repetitive tasks more efficient. They can also reduce operating costs for the organization. Robots can carry out tasks like data entry (human employees do not have to do it anymore). Because of this, more resources are freed within the institution, and people can focus more on tasks with real business value (Farrar, 2018).

Visualization

This serves to give an organization access to increasing amounts of raw data. Important organizational facts are easier to understand for laypeople outside the finance sector by converting typical spreadsheet measurements into images and infographics. Visualization technologies can also aid in accelerating procedures when using data and investigating scenario planning and prototyping (Farrar, 2018).

Challenges and Opportunities Created by Technology Adoption

Newly available technology for financial institutions opens both challenges and opportunities. There is increased pressure on these banks to adapt and innovate if they want to avoid recession in the future.

Currently, there are more threats in these sectors. A 2022 report showed that the financial services industry had a 35 per cent increase in ransomware attacks (Hayashi, 2022). This means numerous cybersecurity threats exist, and urgent digital transformation is needed to ensure customer safety.

Communication issues

Banks are required to interact with their clients on a certain platform. This means that they must offer newer means to ensure this is done efficiently. However, a challenge here is that the growth of communication channels opens more problems. Security and compliance are the largest challenges in digital banking client communications (Hayashi, 2022). Social channels are open to malicious intrusions and prone to staff negligence.

Technological competence

Banks have been using digitalization strategies such as mobile banking for around 50 years already. There are many opportunities to reach out to IT specialists to make their digitalization flawless. However, these banks still have an alarming lack of technological competence. It can be challenging to switch from outdated banking systems to a contemporary, digitally connected environment. The necessary costs for constantly keeping up with the needed technological competence are a common hurdle for banks and companies. In addition, to maximize one's investment, the workforce and the entire staff will need to be trained and kept up to date.

Managing security issues

The risk of security issues has always been a problem. There are criminals trying to steal data or breach a bank's digital system. Aside from the threats, banks face another problem: the huge number of clients, the cloud, and the computer networks that they must overview.

Inevitably there are challenges and opportunities for digitalization in the financial industry. Still, the industry must remain guided by its goal of meeting customer satisfaction and boosting the industry's efficiency.

SUMMARY

Technology in the financial services industry has changed rapidly within the past decades. Historically, there has been a constant need to innovate and invent new means of working on transaction efficiency and customer convenience. Because of this common trend, FinTech has been incorporated into many banking needs. FinTech, as finance and technology piece together, refers to computer technology that allows banking and financial services in modern times. Many aspects helped speed up digitalization in the finance sector. Some include events like the COVID-19 pandemic and the financial crisis of 2008. FinTech and digitalization proved beneficial in banking, payment transactions, and wealth management. Innovations can be grouped into four major types: breakthrough innovation, sustaining innovation, basic research, and disruptive innovation. The innovations in the financial industry fall under these categories and eventually made their way to the public according

to the theory of innovation diffusion. Customers now have new opportunities because of FinTech innovations' growth, including instant access to finance for growing their businesses and incredibly flexible conditions. The growth of digitalization in the financial industry is expected to bring more benefits in the future, assuming that challenges in communications, technological knowledge, and security problems are addressed and taken care of.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

UNIT 2

DIGITAL BANKS AND BUSINESS FINANCING

STUDY GOALS

On completion of this unit, you will be able to ...

- define the terms and differentiate between the bank and P2P lending.
- evaluate the relevance and efficacy of machines such as AI, algorithms, etc., within the context of digital banking.
- identify the changes and benefits of open banking, digital banks, and business financing.

2. DIGITAL BANKS AND BUSINESS FINANCING

Introduction

Banking innovations provide consumers with new and enticing products, services, and systems for their consumers. Most, but not all of the time, the owners of FinTech and banking products would make a nerve-wracking brainstorming to squeeze out the best ideas for their consumers and banks.

Similar to how modern times change, the mechanics of these innovations change as well. Basically, the modern banking era is characterized by basing new strategies on what the customers want to a greater extent than before.

And this is a brilliant opportunity. Many financial institutions have comprehensive information about their customers and channels available to get feedback. With all the input of customers stating what is important to them, banks are moving towards two goals at a time – first, they gather information about customer preferences in their systems, and second, they get hints about how to add something new and innovative to their banks.

As a result, financial institutions are emerging that cater to the needs and wants of the customers. And here is where the incorporation of numerous technological tools into banking and the rise of digital banking in the modern era comes into play.

2.1 FinTech and Traditional Financial Institutions

Financial crisis of 2008
This is a series of events caused by cheap credits that led to a major markets reckoning.

Catalysts for the change that lead to the digitalization of traditional financial institutions include the financial crisis of 2008 to 2009 and, more recently, the COVID-19 pandemic. The **financial crisis of 2008** pushed some consumer bank branches to close in order to cut costs. As physical branches closed down, operations could still continue with telephone and online banking options. These are the initial technological applications that proved how much benefits there are to online banking. The reluctance of consumers to go to physical banks during the COVID-19 pandemic pushed digitalization even further. People turned to remote access to these services while they comfortably and safely stayed at home.

These developments fostered a more competitive banking industry. New products and services have been on the rise including non-banks with a massive global presence, like Google and Apple, and the development of Amazon and PayPal. Financial institutions

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

grasp the need for such innovations. They adopt the FinTech solutions available and develop their own ecosystems at the same time. Along the incorporation process, the three competencies that banks should focus on include (Alt & Puschmann, 2016):

1. Products and processes: they should have the core functions of traditional banks and their classic core competencies
2. Regulation: this includes incorporation, modification, and observation of complex regulatory frameworks in the financial sector
3. Safe custody: this refers to the reliable handling of money

Financing Model of Traditional Financial Institutions

Traditional financial institutions serve three core functions: holding assets, lending money, and moving money. Holding assets pertain to these institutions' acceptance of deposits and securities from stakeholders and customers. Similarly, they lend money in the form of mortgages, consumer credit, and business lending. Lastly, the money they manage and hold on to means they are responsible for moving it through payments and international money transfers.

How FinTech Differs from Traditional Financial Institutions

As the theory of evolution goes, one trait dies out as a newer and more efficient one arises. Humans evolved from walking on all fours to walking on two legs, as these are more beneficial to the survival of our species. And this is the case with financial institutions as well. Traditional financial institutions are moving towards digitalization because they have inherent challenges that are best addressed with the benefits of fintech and other technology. Automating these banking systems proved to be faster and more efficient to carry out the three core functions of traditional financial institutions. FinTech and banks have several differences including (Sharma, 2021):

Structure and Function

FinTech revolves around a customer-centric concept. Structure and functions are made simpler because this is what customers want. Furthermore, FinTech uses technologies to make its customer-centric function a much faster means of seamless banking delivery. In contrast, traditional banks are much more restricted and cannot be as customer-centric as FinTech. Hence, traditional banks are more process-oriented.

Regulation

Traditional banks need to deal with regulations issued by national and local authorities to enforce banking transparency and security. FinTech firms are less regulated than traditional banks. Many FinTech companies have arisen due to simpler start-up guidelines.

Growth potential

The growth of FinTech has been exponential, especially during the pandemic. The FinTech market is characterized by more digital transformation and better trends than the traditional banking market. Consequently, traditional banks have been adapting the same digitalization scheme that enables FinTechs to be successful (features like mobile banking and digital remittances).

Risk

Many find FinTechs a better option than traditional banks. However, FinTech companies are under looser and more flexible regulations and are prone to more risks. The tight guidelines on traditional banks made them more secure for consumers.

Table 2: Comparison of Traditional Banks and FinTech

Characteristics	Traditional Banks	FinTech
Function	Banks are institutes that are licensed to carry out financial services and focus on client security.	FinTechs improve and automate the delivery of financial services by focusing on customer requirements.
Regulation	They are regulated by the national or central banks of the country.	There is no particular regulation for FinTech companies.
Growth	Banks have limited market distribution.	FinTech companies have a larger market distribution because of the new trends and technologies.
Risk	Strict regulations lower the risk factor.	Flexible nature makes it riskier than banks.

Source: Itesh Sharma (2021).

The table above provides a brief summary of differences between FinTech and banks. New technologies do not automatically provide an advantage or benefit. Instead, digital transformation necessitates consideration of these three areas. In any case digitization is critical with regard to upcoming modifications to the banking model and network. Banks must not only examine their value chain, but also consider interactions with potential clients and the provision of cutting-edge goods and services.

2.2 Open Banking

Open banking, or open bank data, is a practice where a third-party financial service allows unrestricted access to some of the most essential banking needs. Consumer banking, transactions, and money transfer are some of the most important aspects we can get from

this new system. And as open banking is meeting the demands of the consumers in the finance industry, it is now a significant innovator that is constantly changing the way of the banking industry (Investopedia, 2022).

Through open application programming interfaces (APIs), third parties, such as payment service providers or data aggregators, can access banking systems in a managed, authorized, and secure manner (Blackstad & Allen, 2018). Regulators and the FinTech sector are eager to see APIs extended beyond the banking industry to foster competition and the creation of cutting-edge new products for clients. Leading digital companies like Amazon and Google use APIs to transform customer experiences.

In open banking, essentially, a bank accumulates consumer data so that it can use it for regulating access, usage, and sharing of their services. The infrastructure of banks enables consumers to benefit from secured services. Before the open banking services reach the customers, banks makes use of open APIs and third party services like apps on smartphones. Consumers and small businesses mainly benefit from open banking because of cost savings, better money management, and more personalized services. On a global view, many regulators are now pushing for more open banking, here are some examples (Blackstad & Allen, 2018):

- **Payments Service Directive (PSD2):** This refers to the directive of the European Union to make changes in the payments industry. The goals of PSD2 include better customer authentication for strengthening e-commerce transactions. Furthermore, this directive can mitigate fraud to avoid unwanted challenges in customer banking needs.
- **UK's open banking initiative**: The UK (United Kingdom) enabled their consumers to access services regarding card transactions over open banking. The UK is providing secure and trusted assistance for banks and FinTech that allows them to adapt to the needs of retail banking. More than 6.5 million UK consumers and businesses take advantage of this open banking initiative.
- **Open banking regime for Australia**: As in the UK, accredited open banking gives users a personalized banking experience which makes transactions faster. Australia allows services such as transaction processes, credit charges, term deposits, and debit transactions.

Europe seems to steadily incorporate these innovative banking efforts, but worldwide this is not yet the case (Blackstad & Allen, 2018) despite good reasons for adopting such innovations (Bush, 2020):

- Banks need to comply with the regulations of their countries. But if their country has not yet established rules, incorporating open banking means they can learn from other's experience for developing their own guidelines.
- Digital agility will be an advantage as it will improve banking services. Plus, banks can get enhanced security and transparency for the best customer experience.
- Increased customer satisfaction is probable because open banking gives customers more freedom in any financial service.

Many of these advantages lead to higher client lifetime value (Bush, 2020). Open banking enhances security, creates new opportunities for collaboration, and permits banks to make bolder bets with more of their financial services and products.

Rationale and Risks of Open Banking

The movement of the previously mentioned countries is not a surprise because open banking presents numerous benefits and opportunities for streamlining banking services. For instance, the Australian open banking regime provides Australians better access to their banking data and improves interactions with the banking system (Blackstad & Allen, 2018).

Open banking relies on a centralized system that processes financial services securely by using financial data with other institutions involved in the transaction. From cash-based payments are more and more replaced digital systems. Cash is still the predominant payment means in Europe, but these transactions dropped from 72 per cent in 2019 to 59 per cent in 2022 (European Central Bank, 2022). The same pattern is seen in Southeast Asia, where the Philippines, Indonesia, Vietnam, Singapore, Malaysia, and Thailand opt for cash, but had a high adoption rate to digital payment too(Ganbold, 2022). In the US, customers are predominantly opting for the use of credit cards, with credit card transactions accounting for 70 per cent of all digital transactions in 2022 (de Best, 2023).

At the same time, there are still some risks to take into consideration. First, there is anxiety about security breaches. Unscrupulous people can put severe risks to the privacy and security of consumers (Investopedia, 2020). This is a problem because financial institutions are liable for losses and damages. Market consolidation in financial services is problematic, too. Tech giants are excessively using customer data for profit instead of improving a novel digital system.

Furthermore, there are several factors disrupting FinTech. FinTech disruptors means the development of newer technologies with the potential to replace the currently employed providers of services. Fintech disruptors can be explained by the case of PayPal and Nordigen. PayPal is a well-known platform for financial transactions worldwide. Consumers must have their accounts registered on the platform to access services like money transfers.

Nordigen is a go-cardless platform that allows companies to connect bank accounts and data needed for transactions. PayPal's payment system operates in connection with Nordigen. As the current provider of open banking services, PayPal is being disrupted by Nordigen, which offers available banking services to small businesses access by tapping into their PayPal data.

Higher expectations for value-added services from businesses and consumers, a regulatory environment that is constantly shifting, the emergence of FinTechs, and an increase in payments-enabling technologies have all contributed to the emergence of a new payments ecosystem. These methods of moving value, such as non-bank payments and

blockchain-based transactions, bypass the banking system and payments infrastructure. Non-bank payments refer to unregulated financial services, while blockchain-based transactions pertain to a decentralized public ledger that records worldwide transactions.

2.3 Lending (Crowdfunding, P2P Lending)

Financing ecosystems are also undergoing changes that allow them to be more flexible and accessible to those who need it. Communities in earlier times were considered self-financing. For example, local merchants only lended money to producers they knew well. Eventually, large banks made lending mechanics different. But this used to marginalize small and individual investors with standardized lending products (Blackstad & Allen, 2018). The better option for these smaller investors is peer-to-peer lending and crowdfunding. Both have massive potential in the 21st century because these can be used by many start-up companies and growing businesses. With the aid of an online platform, money lending becomes more accessible to many businesses. A pool of money from groups of individuals makes money lending possible for firms that need financial support. Moreover, the digitalization of these lending systems makes it easier to complete transactions and keep track of records. Crowdfunding and P2P lending have a lot of potential for the future of digitalized money lending.

Social media platforms boosted the demand for crowdfunding activities, too. Platforms such as Facebook, Twitter, and LinkedIn are used to gather funds from investors. Plus, the same platform distributes them to interested borrowers. This scheme has further been polished with the incorporation of AI and machine learning in more sophisticated crowdfunding platforms.

Crowdfunding is expected to reach $1.1 billion in 2023 but with a meager annual growth rate of 2.46 per cent worldwide. In India, crowdfunding is considered successful, but only reached $9.4 million in 2021 (Statista, n.d.). This is small relative to the financial needs of a densly populated country like India. Furthermore, P2P lending in some regions remains stagnant. To illustrate, Canada's P2P lending total amount rose to only $19.5 million in 2020 from the previous year's $19.4 million. As seen in the usage of crowdfunding and P2P in several regions, this novel money lending is socially accepted, but it is not yet on par with traditional lending schemes.

Even with the emergence of crowdfunding and P2P lending, traditional lending is still the most preferred way of transactions. These two are not the first preference, and this is a reason for further improvement of these systems. P2P lending and crowdfunding create better options for micro-businesses in some developing countries. Smallholdings and tiny trading outlets are examples of micro-businesses in emerging economies that face numerous obstacles to growth and sustainability. Many people lack access to financial institutions because they are not able to access the necessary documents to confirm their identification, credit histories, or land ownership, and mediators frequently take advantage of small producers by unfairly inflating prices (Blackstad & Allen, 2018).

Traditional lending, such as bank loans and mortgages, continues to dominate the lending market. It accounts for more than 80 per cent of the total lending market. However, the market for alternative lending instruments, such as peer-to-peer (P2P) lending and crowdfunding, has been growing in recent years. While the share of P2P lending and crowdfunding in the overall lending market is still relatively small, it is expected to continue to grow as more people become aware of these options and technology continues to improve. Additionally, P2P lending and crowdfunding can offer benefits such as lower costs, faster funding, and greater accessibility to borrowers who may not qualify for traditional loans.

The global lending market size was valued at approximately $15 trillion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 7 per cent from 2021 to 2028. The market is divided into traditional lending instruments, such as bank loans and mortgages, and alternative lending instruments, such as P2P lending and crowdfunding. It is important to note that the market share and growth rate of alternative lending instruments can vary depending on the region and the specific market. Additionally, the regulatory environment can also have a significant impact on the growth of alternative lending instruments.

Crowdfunding and P2P lending have gained popularity in various regions and countries in recent years, although the exact figures can vary greatly depending on the specific market. Here are a few examples (figures from 2020):

- In the US, the crowdfunding market is estimated to be worth over $17 billion, while the P2P lending market is estimated to be worth over $200 billion.
- In the UK, the crowdfunding market is estimated to be worth over £6 billion, while the P2P lending market is estimated to be worth over £5 billion.
- In China, the P2P lending market has grown rapidly in recent years, with an estimated market size of over $150 billion.
- In Europe, the crowdfunding market is estimated to be worth over €7 billion, while the P2P lending market is estimated to be worth over €10 billion.
- In India, the P2P lending market is estimated to be worth over $1 billion and is expected to grow significantly in the coming years.

These figures are only approximate and can vary greatly depending on the specific available data. The size of the traditional lending market and the growth rate can vary greatly depending on the specific region and country. Here are a few examples (from 2020):

- In the United States, the traditional lending market is estimated to be worth over $10 trillion, with a compound annual growth rate (CAGR) of approximately 4 per cent.
- In the United Kingdom, the traditional lending market is estimated to be worth over £1 trillion, with a CAGR of approximately 3 per cent.
- In China, the traditional lending market is estimated to be worth over $10 trillion, with a CAGR of approximately 8 per cent.
- In Europe, the traditional lending market is estimated to be worth over €7 trillion, with a CAGR of approximately 5 per cent.
- In India, the traditional lending market is estimated to be worth over $2 trillion, with a CAGR of approximately 12 per cent.

Crowdfunding

Another growing investment approach is crowdfunding. This is where entrepreneurs in their pre-seed stage raise capital using online platforms to support their business growth. Crowdfunding operates on a website and connects fundraisers and the public (a “crowd”) (European Commission, n.d.). Because of the structure of crowdfunding, many have been gearing towards engaging with it to seize the opportunity. However, it is unsuitable for some businesses, even in developed countries (Alt & Puschmann, 2016).

Some companies proved that crowdfunding can be successful. Companies like Oculus VR, Allbirds, Popsockets, Peloton, and MVMT watches began their journey by campaigning on the crowdfunding platforms Indiegogo and Kickstarter. These companies are now multi-billion firms.

How it works

Crowdfunding typically operates on an equity basis. Business owners are offering investors shares of their company. Crowdfunding is the result of the accumulation of many small sums contributed by a large group of people. In contrast, traditional funding is handled by one large entity to provide the amount needed. This entails a lot of paperwork and due diligence handled by the crowdfunding platform. However, crowdfunding incurs costs for entrepreneurs who must give up about 10 per cent of the money earned, and because of regulatory requirements, some nations' entrepreneurs may be unable to participate (Alt & Puschmann, 2016). Crowdfunding can be risky from the investor's standpoint, particularly for the numerous small investors who choose assets without sufficient investment understanding.

Advantages

Here are the advantages of crowdfunding (NiBusiness, n.d.):

- There are no upfront fees.
- It can draw media attention and boost your business or project.
- It is an additional option for those struggling with bank loans and traditional funding.

Disadvantages

There are also some disadvantages (NiBusiness, n.d.):

- The process is not necessarily easier than traditional options.
- If you do not reach your target amount, all money that you gathered is returned to the investors.

Successful crowdfunding platforms

- Kickstarter has helped bring many creative projects to life, such as new products, films, and games.

- Indiegogo offers a wide range of funding options, including flexible funding, where backers receive their funds even if the campaign does not meet its goal.
- GoFundMe focuses on personal causes and charitable initiatives, such as medical expenses, education costs, and disaster relief efforts.

P2P Lending

One type of crowdfunding is P2P lending (European Commission, n.d.). P2P lending can provide financial help to individuals as they can obtain loans directly from other individuals without a financial institution as a middleman. In other words, P2P lending is a form of FinTech where people lend or borrow money from another person without the need to inform or go through a bank. Otherwise known as social lending or crowd lending, the first P2P lending initiatives started in 2005. Some reliable institutions offering P2P lending are Prosper, MyConstant, and Funding Circle. Aside from skipping some bank processes, people use this type of lending because it is the alternative to traditional banking and generally offers lower interest rates (Kagan, 2022).

How it works: Many P2P websites like Prosper, Upstart, or StreetShares connect borrowers to lenders. The website has its set of rates and terms for each transaction. An investor first creates an account on the website and deposits money that will be used to fund loans. The risk category allocated to the loan applicant's financial profile influences the interest rate that the application will be required to pay. The loan applicant then checks offers and chooses one. The money transfer and the monthly payments are handled through the platform. Lenders and borrowers can engage in negotiations or have the entire process automated.

Because of the direct system in P2P lending, it encompasses both secure and unsecured loans (CFI team, 2022). Overall, P2P is a decent alternative in money lending and another source of financing.

Advantages

P2P lending offers these advantages to its borrowers and lenders (CFI team, 2022):

- Higher returns to investors
- More accessible for borrowers as a source of funding
- Lower interest rates for the borrower

Disadvantages

Here are some of its drawbacks (CFI teams, 2022):

- High credit risk
- Lack of insurance, legislation, and government protection

Successful peer-to-peer (P2P) lending platforms

- LendingClub connects borrowers with individual investors who are willing to provide loans at a lower cost than traditional banks.
- Prosper provides personal loans for a variety of purposes, such as debt consolidation and home improvement.
- Upstart uses AI and machine learning to underwrite loans and provides more personalized loan options to borrowers.

2.4 The Use of Credit Evaluation Tools

The **crediting bank** assesses whether a borrower can return the credit. Such creditworthiness helps banks and financial institutions minimize credit risk when allowing borrowers into their crediting system.

crediting bank
This is an institution that grants loans to corporations or individuals for their businesses.

The Five Cs of the Credit System

Both traditional and modern credit systems boil down to the five Cs of assessment. The five Cs of the credit system are character, capacity, capital, collateral, and conditions. Lenders need to consider these factors when approving a borrower's application. It would be inefficient for a lender to approve all the applications of credit that they receive because there is always the risk of not getting their credit returned to them. The system evaluates the likelihood of default and, consequently, provides an analysis of the lender's possible financial loss risk by considering the loan terms and borrower attributes (Segal, 2022).

Character

Character refers to the borrower's credit history. The history reflects the borrower's reputation, the record of credits, and the track of their ability to repay them. Uncovering borrowers' characters will reveal probable demeanors they can manifest when getting a loan by an institution. If they have good track history, then it is highly likely that they pose minimal risk for the lender.

Before approving a borrower for a new loan, many lenders have a minimum credit score requirement. Every lender has a different minimum credit score requirement, as does every loan type. The general guideline is that a borrower has a higher chance of approval, the higher their credit score (Segal, 2022).

Capacity

Capacity pertains to the borrower's ability to give back the credited loan. Usually, their income is compared against the debt through the debt-to-income ratio, or DTI (Segal, 2022). There is no set rule on what DTI is acceptable for lenders. Generally, a lower DTI

may give the borrower a larger chance of obtaining their loan. A borrower's capacity must consider all sources of income of the borrower. These may include gigs, freelance work, and supplemental income.

Capital

Some borrowers can make a potential investment as a capital contribution (Segal, 2022). A larger initial contribution can help the borrower prevent default in the future. Investing in the capital is a financial responsibility. Lenders must consider the potential for the borrowers' growth and the risk of losing the capital if unfavorable investment situations arise.

Collateral

Collaterals are a borrower's option to secure loans. This allows a form of guarantee that the lender can get back some of the investment in the case of a default. All they need to do is recover their investment by using the collateral. Most of the time, items are being used as collaterals. Some industries where collaterals are a prerequisite include mortgages and auto loans (Segal, 2022).

Conditions

Lastly, the overall condition of the loan is taken into consideration. This encompasses a comprehensive look into the conditions relating to the loan. This can include the length of time of the borrower's employment at their job, the performance of the industry, job stability, and much more.

The Use of FinTech in Credit Evaluation Tools

One of the first developed methods of placing a numerical value over an applicant's creditworthiness is using the FICO score. This was developed by the mathematician Earl Isaac, and it aims to create more objective credit rating systems. However, as humans do it, there are still some discrepancies and inaccuracies. Credit evaluators under FICO also do not have time to look into hundreds of financial records of dozens of applicants applying at the time. Therefore, humans who manually evaluate credit may not be the best choice.

FinTech credit is a profitable addition to the classic evaluation methods. Technological advancements make the process more efficient and stimulate further innovation. The credit information sharing made possible with fintech increases bank stability. The capacity to predict defaults is improved by combining information from credit information-sharing bureaus and digital footprints. Therefore, credit information-sharing businesses contribute to increasing bank stability (Nguyen et al., 2022). FinTech helps with regard to credit services needed by small and medium-sized enterprises. It can provide a more accurate credit evaluation. The software or system has a quicker way of going through all applicants' records and compiling their creditworthiness based on a logical algorithm. It nees fewer resources and less human working hours to manually do the job.

Financial institutions use FinTech as a reliable credit-scoring tool. Artificial intelligence is used to screen applicants and assess who is the most ideal borrower. Further improvement of the incorporation of FinTech in the credit evaluation process will enhance the process and could be the blueprint for other institutions that want to incorporate a similar credit-scoring scheme.

A Japanese group named Fujitsu is creating a cloud-base AI credit-scoring software tool (Shimazu, 2019). Eventually, similar programs will be used to boost the investment systems and eventually enhance economic growth. Another example is the FinTech credit risk assessment done in China. The study's results, which analyzed 1.8 million transactions in a primary Chinese online bank, concluded that it was better to use FinTech in credit evaluation (Huang et al., 2020). Traditional financial data and strategies are less effective and less efficient.

Overall, we can see the trend toward using FinTech in credit evaluation. With the benefits and features offered by this novel technology, it would only be a short time before all credit evaluation tools go digitalized.

2.5 Machine Learning and AI for Risk Management

Banks handle numerous services, and each has a certain degree of risk. Traditional banking and digital banking have their means of managing these risks. Currently, a large amount of data that digital financial institutions manage needs higher computing power and **open-source software**.

Open-source software
This is a free-to-use software or free code scripts.

Definitions of Terms

In dealing with the topic of artificial intelligence in risk management in financial institutions, here are some essential terms to define first:

Machine learning (ML)

One of the many branches of AI is machine learning. ML is a computer science that focuses on algorithms that copy the way humans learn with even have better accuracy in the long run (IBM, 2020). Because of this innovation, ML is taking part in the larger data science field. It is used in different businesses as larger amounts of data are used.

Risk management

Risk management refers to discovering, evaluating, and managing the risks to the resources and profits of an organization. The risks assessed are caused by numerous factors including financial unpredictability, legalities, technical problems, poor management, accidents, and calamities (Tucci, n.d.).

AI Strategy Framework

AI is a technological tool used within a strategic business framework. The use of AI in the financial sector entails consideration of its stakeholders. These stakeholders include the government, private sector, investors and entrepreneurs, and civil society (Azar & Haddad, 2021). In any case, all stakeholder benefit from AI because it can carry out specific and personalized tasks. The stakeholders can use it combining with key technologies such as IoT, Big Data, and Machine Learning. These technologies can refine the AI strategy framework and personalize it based on the stakeholders' needs. Implementing an AI strategy can be beneficial for all involved sectors of society.

Use of AI in Risk Management for Financial Institutions

Before the emergence of new machine learning tools, banks gave binary result to the credit scoring whether the client will or not default. A binary result refers to obtaining a definite verdict on their credit scoring. For instance, applicants are either accepted or rejected in a credit or loan. Now more divers default probabilities can be provided using support vector machines, which are learning algorithms that are used for data classification. There is a constant risk of transaction fraud. The widespread use of digital transaction for paying for goods and services makes it prone to fraud due to the large volume of money in use.

AI applications include the following features (KMPG, n.d.):

- **Providing high-quality forecasting accuracy:** The novelty of AI allows capturing non-linear relationships in the economy. Often, this is not achieved with traditional forecasting models. With AI, the system formulates the most accurate forecast based on how variables and risk factors affect non-linear relationships.
- **Optimizing selection processes**: FinTech uses AI to help assess applicants' credit scores by extracting necessary information, computing based on an algorithm, and producing decisions based on these data-driven processes.
- **Mitigating the risk:** Software can be tuned to trader characteristics allowing language processing and tracking history data to predict whether an individual will do misdeeds. Analyzing trader behavior can prevent problems before it occurs.

These AI applications are changing traditional banking models. The incapacities of our traditional models are currently being addressed by AI, as seen in the following cases:

- **Credit risk modeling**: AI can make decisions based on a logical algorithm. This helps make fair and consistent credit risk assessments that are also based on real data.
- **Fraud detection:** The large bulk of digital transactions that occur every moment means that there are higher chances of fraud. To prevent problems regarding fraud, it can be easily identified with an AI in place.
- **Assessing regulatory compliance**: AI can flag transactions or users who are not in compliance with regulatory laws. It can identifiy strange user behavior or unauthorized transactions.

Various new models can be applied across financial service operations for both classifications and predictions. It is usual for regulators to monitor banks through risk assessments. Machine learning tools can suit banks as they must monitor various risks day-to-day (Leo et al., 2019), especially with regard to financial risk. Financial risk means the possibility of loss or decreased value of an investment due to various factors, such as changes in market conditions, economic indicators, or events that are beyond the control of the investor. Financial risk can be inherent in various types of investments, including stocks, bonds, real estate, commodities, and currencies. The level of financial risk can vary greatly depending on the specific investment and the investor's goals and risk tolerance. In general, investments with a higher potential for return are also likely to have a higher level of financial risk. Some typical types of financial risk include:

- **Credit risk:** This refers to the chances of loss of money when a borrower does not repay their loan or meet obligations in their contract.
- **Market risk:** This refers to the risks of an investor losing money because of the instability or uncontrollable factors in the financial sector. Market risks can be dictated by fluctuating foreign exchange, high-interest rates, or lack of collaterals.
- **Principal risk:** This pertains to the possibility of a loss of value of a transaction given that another party did not oblige to their contract responsibilities.
- **Liquidity risk:** This is the risk associated with losses from failed payment obligations.

Non-financial risk refers to the potential negative impacts on an organization or investment that are not related to financial performance. These risks can be in the form of operational, reputational, legal, regulatory, or strategic risks, among others. They should be carefully considered and managed, too.

- **Operational risk:** This is a risk from the failure of technical aspects such as cybersecurity, financial crime, fraud, outsourcing, or unauthorized activities.
- **Reputational risks:** These can arise from negative publicity or loss of customer trust.
- **Legal and regulatory risks:** These can result from non-compliance with laws and regulations.
- **Strategic risks:** These can be related to changes in the competitive landscape or shifts in consumer preferences.

For a more concrete visualization of AI in action, we can see how it can effectively help in managing risks in these three cases:

- **Fraud detection**. Banks use AI to assess which transactions are more likely to be fraudulent. For instance, credit card payments use digital work engines to encode the details of the transaction. AI can be trained to detect which are fraudulent from non-fraudulent using massive volumes of data processed by AI.
- **Credit risk modeling.** Credit risk models are used to decide and trace clients' transactions with existing loans and dues. AI can easily track them with its algorithm and capacity to look into many data simultaneously.
- **User behavior.** AI can be taught to process natural language to decipher possible market manipulation or insider trading. All the system needs is the transaction details and trends in data to predict misconduct.

Portfolio management, client service, data analysis, and risk management are the key areas where AI can be used in financial services. Additionally, AI makes it possible to analyze various economic situations and anticipate the future of the financial and economic sectors with a high degree of accuracy.

2.6 Creativity, Challenges, and Innovation in Modern Banks and Investment Companies

The innovations in modern banks and investment companies are characterized by the challenges and the creative ways of overcoming them. Processes are improved and activities in the bank are carried out efficiently. The number and quality of new products and services offered by companies (and banks, specifically) serve as indicators of creativity in banking services (Al-Salaymeh, 2013).

Innovation-Related Challenges Faced by Banks

Digitalization-driven innovations in banks are focusing on meeting customer needs and demands. The assessment of the quality of innovations has revealed the following challenges:

- Ensuring compliance of all parties involved has not been strengthened even with FinTech tools.
- The expectations of customers as well as the competitors in the FinTech industry place a massive burden on companies which can disrupt the efficiency and success of their work.
- Banks and investment companies have problems containing the costs. Especially with investment companies, the newer benefits of technology do not provide them with solutions to the long-standing problem of having the costs they need to operate.
- The economic fluctuations makes it difficult for investment companies to have a constant supply of capital resources. The financial recession has been a major drawback in the economy, and many are losing their interest in investing. Without enough capital, investment companies fail to keep up with the necessary tech innovations.
- Investment companies and banks perceive new technology as a threat. For example, FinTech is providing financial services by cutting costs on resource use and replacing human workforce.
- Some lending policies have failed because of poor promotion, similar to the Goldmann Sachs consumer credit. This is a money lending scheme conducted on a digital platform. Unfortunately, its launch ended in debt and market risk as poor promotion led to low levels of stock prices.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

The 2008 financial crisis pushed banks to prioritize survival in the market. Hence, banks focused on three principles: Higher technological investments, better design, and a deeper understanding of customer experience (Szewczyk, 2020). These three principles are crucial for banks because they summarize the market needs and the direction of change. For this reason, FinTech has become the gold standard for innovation.

However, innovations still face challenges. The transition of banks into a digital approach created security problems (Szewczyk, 2020). This is a financial institution's liability which creates a risk of loss of finances for the customer.

Managing a vast amount of data in a set of technological tools that are relatively new in use is undoubtedly prone to security problems. Technological tools often have bugs and minor errors. Banking information is very sensitive. There are attempts to steal the data of digital banking customers. The remote work of banking institutions, fostered during the pandemic, brings up more cybersecurity issues. As more remote computers are working to serve the customers, there are more chances of a breach. The poorer protection in remote working can lead to problems in terms of cybersecurity.

How Banks and Investment Companies are Overcoming such Issues and Challenges

Digital banking security is not stagnant. Along with innovations in banking services, digital banking also moves toward a better shield against cybersecurity problems. Some recommendations for facing these problems include (Al-Salaymeh, 2013):

- Simplifying the ideas and needs of the customers
- Providing better distribution of work in the resources
- Showing care of the workforce's physical and psychological needs

AI and robots may be at the forefront of FinTech innovations, but it is important to see that technologists and data scientists are still real humans working behind the scenes. Traditional banks have begun to rethink the situation in the last five years, viewing FinTech as potential partners rather than competitors. Digital banks and contemporary investment brokers may be innovative and have positive customer relationships, but traditional banks have more expertise, stability, security, and equity. Banks are forming collaborations and purchasing services from other digital businesses to keep up with the worldwide trend of modernization and stop opposing it.

SUMMARY

Digital banks create numerous innovations. The transition from traditional banks to a digital bank is due to numerous factors and was catalyzed by the 2008 financial crisis and COVID-19 pandemic. FinTech and traditional financial institutions can be compared based on their struc-

ture and function, regulation, growth potential, and risk. FinTech innovations happen in all of these areas and have created open banking as well as new lending and financing options.

Open banking is a practice that allows a third-party financial service to access banking needs and make it easier for customers to use. Money lending has been improved with FinTech innovations. Crowdfunding and P2P lending are alternative options available for lenders and borrowers on an online platform. FinTech also made its way into the crediting system. The traditional process of assessing who is eligible for loans in a bank is now easier with technological options. Major considerations of credit systems include the borrower's character, capacity, capital, collateral, and condition. There are also inherent risks to this new system, mainly with regard to the security of the massive data that is now digitally onboard. Overall, the innovations in banking and similar institutions remain creative and geared toward customer satisfaction.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

UNIT 3

CRYPTOCURRENCIES AND CENTRAL BANK DIGITAL CURRENCIES

STUDY GOALS

On completion of this unit, you will be able to ...

- define cryptocurrencies and central bank digital currencies.
- understand the developments in digital currencies and their relevance and implications.
- identify the advantages and disadvantages of digital currencies in payments and remittances.

3. CRYPTOCURRENCIES AND CENTRAL BANK DIGITAL CURRENCIES

Introduction

The technologies we enjoy today are a product of the constant movement of humanity toward ingenuity. People have always invented new tools and technology to help in almost all aspects of our lives. All of the industries we have, including financial markets, supply chains, and business-to-business services, have undergone radical change as a result of these developments.

Similar to any other form of innovation, cryptocurrency was another product of technology. Cryptocurrency is a development that can benefit the economy because it offers immediate transaction settlements, lower fees, decentralization, better access (Nafis & Nazim, 2020). However, this innovation is not always a good thing. One of the cons of cryptocurrency is that it needs improved regulation and monitoring, and investors may find themselves in chaos due to the poor management of the current system.

Currently, the cryptocurrency market is gaining popularity, and it is possible that it will get more influential. The entire digital economy holds a lot of potential for the future of the finance sector. Hence, it is essential to understand the key features of these novelties and predict how these could be improved.

3.1 Overview of Cryptocurrencies

Cryptocurrency has constantly become more important in the financial industry as a form of alternative online payment. Popular examples are Bitcoin, Litecoin, and Ethereum (Oswego, n.d.).

Definition and Evaluation of Cryptocurrencies

Cryptocurrency means any form of currency that only exists in a digital platform without a central regulatory body that manages it (Merriam-Webster, n.d.). A decentralized system allows the recording of transactions within the cryptocurrency used, handles the issuance of units, and prevents fraudulent transactions.

Encryption algorithm
This is a method that specialists use to transform data into ciphertext.

As a form of digital currency, it is made possible with **encryption algorithms** (Oswego, n.d.). A peer-to-peer system makes transactions possible without using physical money and cash. Everything is a digital entry that is placed in an online database. Essentially, holders of cryptocurrency do not have anything tangible. Instead, individuals get a record of what they have using underlying technologies.

Currencies come in different forms; here is a quick overview:

- **Digital Currency:** This is a medium of exchange that is used electronically. This kind of currency is not represented in physical form, but is exchanged, generated, and stored in an electronic medium. Examples of digital currency include Bitcoin, Litecoin, Ripple, and Ethereum.
- **Physical Currency:** This consists of coins and notes holding a value for transactions and exchange of goods and services.
- **Virtual Currency:** This is a representation of value in electronic form.
- **Electronic money:** Similar to a digital currency, this is any currency, money, or assets used digitally or over the internet. Electronic money differs from a digital currency as it is the fiat money that users store in their bank account. Examples of electronic money include transactions with debit and credit cards.
- **Fiat Money:** This is a currency that is used as a legal tender by authorities even though the material have no inherent value.

The idea of cryptocurrencies started in the 1980s when they were previously called cyber currencies (Guardian Nigeria, 2021). Eventually, Satoshi Nakamoto and a team of anonymous programmers created and introduced Bitcoin (founded 2009). Currently, Bitcoin is the best known cryptocurrency, but there are a lot of other booming cryptocurrencies.

The Cryptocurrency Market Status

A common trend is that cryptocurrency and digital currency are becoming synonymous. However, their technical definitions do not refer to the same thing. Cryptocurrency is a currency underpinned by various crypto technologies, such as Bitcoin, Litecoin, and Ethereum. In contrast, the digital currency has a more extensive scope that pertains to all digital exchanges (Blakstad & Allen, 2018). Therefore, cryptocurrencies belong under the scope of digital currencies.

Currently, there are 180 currencies issued by central banks circulating worldwide and used for transactions in their respective countries. On the other hand, there are 21,844 cryptocurrencies, accounting for a total of $830 billion in market capital. Bitcoin holds the largest bulk of this capital. The market status of cryptocurrencies is accelerating as the trading volume runs around $55 billion every 24 hours (Howarth, 2022).

Why were cryptocurrencies created in the first place? Cryptocurrencies provide the capacity to do financial transactions without needing a bank. In the past, users could only do financial transactions with a bank or a government as an authority to look over the details and process of the financial transactions. But with cryptocurrencies, there is now the option to engage in these transactions without these go-betweens. The advantages that cryptocurrencies offer are an important reason for their growth and social acceptance. As abstract as cryptocurrencies appear to some individuals, it offers several advantages that these 180 currencies do not have. For example, cryptocurrencies are decentralized. Therefore, they will not easily collapse, given a financial crisis. Also, cryptocurrencies offer cheaper and faster money transactions for their users.

Cryptocurrencies are always associated with market volatility. The headlines about these digital transactions are primarily about how unstable the market is, and there are many alerts about ensuring that people remain vigilant of these volatilities. Bitcoin experienced

an all-time high decline of more than $68,000. This decline in cryptocurrencies may be exacerbated by the bitcoin mining ban in China, followed by a general lack of public trust in the cryptosystem. Eventually, crypto market prices had a massive drop of up to 70 per cent (Wood, 2022).

This can be illustrated by taking a look at the price changes of Bitcoin from 2017 to 2021:

- In January 2017, the price of Bitcoin was around $1,000. By December, the price had risen to nearly $20,000, an increase of approximately 1,900 per cent.
- At the end of 2018, it had fallen to around $3,500, a decrease of approximately 82 per cent from its all-time high.
- In 2019, the price of Bitcoin was hovering between $3,000 and $14,000.
- In the beginning of 2020, the price fell to around $7,000, a decrease of approximately 50 per cent from its 2019 high. However, the COVID-19 pandemic and its impact on traditional markets led to a surge in the price of Bitcoin in the latter half of the year. By December, the price had risen to around $30,000, an increase of approximately 329 per cent from its 2020 low.
- In 2021, the price of Bitcoin continued to rise in early 2021, reaching a new all-time high of around $64,000 in April. From there, the price fluctuated and by the end of 2021, it had fallen to around $40,000, a decrease of approximately 38 per cent from its all-time high.

This kind of pattern is not only seen in Bitcoin, but it in all other cryptocurrencies, too. It invites speculative trading rather than long-term investements based on solid fundamentals. Long-term investors in cryptocurrency usually take advantage of price declines to increase their holdings. However, it is important to note that these declines in the financial sector are not new. Other assets and equities used worldwide had these massive drops as well. Amazon had a significant drawdown in 1997, Meta, previously Facebook, had a 52 per cent decrease in stocks, and Netflix lost 70 per cent of its stocks this 2022. In any case, the crypto economy has the potential to grow and mature in the future (Wood, 2022).

Underlying Cryptocurrency Technologies

Technological innovations made cryptocurrency possible in the first place. Encryption technology allows cryptocurrencies to be a currency and an accounting system at the same time.

Prior to utilizing cryptocurrencies, a cryptocurrency wallet needs to be created, which is a software under a cloud-based service (Oswego, n.d.). Depending on the particular cryptocurrency, it can be in the form of a mobile app or stored on a personal computer. These wallets will store encryption keys, confirm the holder's identity, and provide the holder with a secure link access the cryptocurrency assets.

The blockchain is the underlying technology for most cryptocurrencies and is a decentralized ledger that records transactions in a secure and transparent manner.

What is Blockchain?

Blockchain refers to a decentralized data ledger that is safely shared with individuals involved in the transaction. Blockchain technology makes data sharing among a group of chosen members possible. Transactional data from different sources are gathered, integrated, and disseminated under blockchain cloud services. Moreover, cryptographic hashes are used as unique identifiers to chain shared data blocks and transaction history. It is called Blockchain because each of the blocks of transaction records is chained to the previous one and is recorded in a peer-to-peer network. Hence, this chain revolves around accountability, transparency, and security among the users. This innovative solution can be used by any business that needs a shared but safe, up-to-date record of transactions. There is no central point of vulnerability because everything is kept across multiple locations, improving security and availability.

Key aspects of a blockchain include the following:

- **Cryptographic Algorithms:** These are the backbone of blockchain security and privacy. They are mathematical functions that transform plain text into encrypted text, allowing secure data transfer and storage. Common cryptographic algorithms used in cryptocurrencies include SHA-256, Scrypt, and Ethash.
- **Consensus Algorithms:** These determine how transactions are verified and added to the blockchain. They ensure that all nodes in the network agree on the state of the blockchain and prevent double spending. Popular consensus algorithms include proof of work (PoW), proof of stake (PoS), and delegated proof of stake (DPoS).
- **Decentralized exchange (DEX):** A decentralized exchange is a platform for trading cryptocurrencies without relying on a central authority. Users hold their own private keys, which gives them full control over their funds. DEXs provide a more secure and private alternative to centralized exchanges, as they reduce the risk of hacking and theft.
- **Tokenization:** This is the process of creating digital tokens that represent a real-world asset, such as a stock or real estate property. Tokens can be traded on blockchain platforms, providing a more efficient and secure way to invest in and trade assets.
- **Lightning Network:** This is a layer-2 scaling solution for blockchain networks, such as Bitcoin and Litecoin. It enables faster and cheaper transactions by creating payment channels between users, reducing the burden on the main blockchain.
- **Atomic Swaps:** These are a type of cross-chain trading, where two users can exchange cryptocurrencies without the need for a centralized exchange. They are achieved through the use of hash time-locked contracts (HTLCs), which allow trustless transactions between different blockchain networks.

Types of Blockchain Technology

Blockchain networks fall under four categories, namely public, private, consortium, and hybrid blockchains. Here are their descriptions, benefits, disadvantages, and uses:

Public blockchain

Public Blockchain is popularized as the decentralized distributed ledger technology that distributes stored information to a peer-to-peer network (Parizo, 2021). This type of Blockchain is permissionless as it depends on the transparency and independence of the ledger system. Unfortunately, it has a lot of probable security risks. This Blockchain is observed in cryptocurrencies like Bitcoin.

Private blockchain

Private Blockchain is more restrictive as it is controlled by a single entity (Parizo, 2022). This kind of blockchain is run on a smaller network of a particular organization instead of the usual system of allowing multiple users to access and make transactions. For example, a private blockchain is exclusive to the retail sector, healthcare profession, insurance firms, or the government. Its advantage includes faster transactions than public blockchains. However, some claim this is not a true blockchain because it does not adhere to the definition of blockchain in decentralization.

Hybrid blockchain

Hybrid Blockchain combines a permission-based system with data that can be publicly opened (Parizo, 2021). This is possible by giving access using a smart contract. A known example of a hybrid blockchain is the IBM food trust. This kind of blockchain can help provide cheap and fast transactions. Its use includes strong cases like real estate, retail, and public companies.

Consortium blockchain

Lastly, consortium blockchain is a federated blockchain with both private and public features. They offer the service with limited access and controlled preset nodes that validate each transaction. So, this type is more secure but less transparent than other kinds of blockchains. For example, we have Hyperledger as an example of this secure type of Blockchain.

Figure 1: Types of Blockchain Technology

	Public (permissionless)	**Private** (permissionless)	**Hybrid**	**Consortium**
Advantages	+ Independence + Transparency + Trust	+ Access control + Performance	+ Access control + Performance + Scalability	+ Access control + Scalability + Security
Disadvantages	- Performance - Scalability - Security	- Trust - Auditability	- Transparency - Upgrading	- Transparency
Use cases	• Cryptocurrency • Document validation	• Supply chain • Asset ownwership	• Medical records • Real estate	• Banking • Research • Supply Chain

Source: Christine Campbell Parizo (2021).

Experts use blockchain technology to issue the cryptocurrencies that we use today. Furthermore, blockchain ensures that all transactions in their system are time-stamped and recorded as blocks. Blockchains are a global ledger without a central database and are purely run by volunteers worldwide (Library of Congress, n.d.). A digital record of bitcoin transactions is then created. These digital records are difficult to hack since these records have a complicated security system. Public and private keys provide the necessary virtual security to maintain safety in the accounts. Technology provides many benefits that fill the gaps in our current financial system. Some predict that blockchain technology will replace the outdated methods used by the banks. This is because more and more people worldwide are equipped with a gadget like a smartphone and digital money is a well-accepted means of transaction (Library of Congress, n. d.).

3.2 Current Developments in Central Bank Digital Currencies

The shortcomings of traditional currencies led to the development of novel payment transactions such as cryptocurrencies. Since cryptocurrencies do not need the mitigation of authorities like banks, banks had no direct connection with the developments involved with cryptocurrencies. But this does not mean that the central bank is not working on developing its systems and adapting them to newer technologies.

Central bank
This is a public institution tasked to manage the currency and money supply of a country.

Central bank digital currencies (CBDCs) can be confusing because they are mistakenly used to pertain to cryptocurrencies. However, its definition is all about the type of cryptocurrency issued by a **central bank** (Blackstad & Allen, 2018). The central bank understood the need to have an alternative means of money transactions. 95 per cent of the countries worldwide are exploring the use of CBDCs, and three countries have already launched this digital currency. These three countries include the Bahamas, Jamaica, and Nigeria. In 2023, more than twenty countries, including Australia, Brazil, Thailand, India, South Korea, and Russia, will follow the trend set by these three countries and begin pilot testing their own country's CBDC. Also, China has already launched their pilot CBDC and has reached 260 million people since it started (Atlantic Council, 2023).

What are CBDCs?

A CBCD is a new money system that is only utilized in a digital form. These digital tokens work the same way as cryptocurrencies, but the main difference is that CBDCs are issued by the central bank. The central banks are issuing digital currencies instead of printing notes and manufacturing coins. Hence, the central bank is moving towards better access to financing through digital media.

Initially, the fiat money comes in the form of bills and coins. These are used by people when they do transactions and purchase goods and services. However, there exists the need to supplement the fiat money. And to do this, financial institutions made a way to a credit-based model that can record and process these transactions in a digital platform.

From this, transactions are expected to be easier to complete and less hassle for the clients. Because of blockchain technology, financial services have benefited from more convenience and efficiency. Central banks have seen the benefits of utilizing these technologies in their system.

However, as a new platform is being used, the central bank is aware of risks involving safety issues and volatility of value. But unlike cryptocurrencies, CBDCs are backed by the government and can be controlled by the central bank. So, CBDCs are more stable, and consumers can be sure that no severe value fluctuations will occur on this platform. There are two main types of CBDCs (Seth, 2022):

Wholesale CBDCs

Wholesale CBDCs have reserves in the central bank. The bank can grant the client deposits or interbank transfers. Then, the central bank can impose monetary policies for the applicable lending and interest. Essentially, wholesale CBDCs are for the use of financial institutions.

Retail CBDCs

Retail CBDCs are used by real consumers and enterprises. Retail CBDCs closely resemble the use of physical currency. Transactions under this kind of CBDC can fall under token-based retail CBDC or account-based retail CBDC. In token-based transactions, validations allow anonymous execution of a transaction. Account-based CBDCs, in contrast, require identification before transaction execution.

CBDCs and cryptocurrencies

It is sometimes difficult to grasp how central banks want to be involved with cryptocurrencies. Firstly, banks are strictly regularized, while cryptocurrencies like Bitcoin are relatively unregulated. Central banks are responsible for national currencies under very controlled circumstances. Also, they are operating in both physical and digital formats, unlike cryptocurrencies which are purely virtual run (Blackstad & Allen, 2018). Despite these disparities, many central banks are examining the benefits of releasing a central bank-issued, government-controlled digital counterpart of their national fiat currency.

The central bank's motivation for developing the development of CBDCs is based on these motivations (Atlantic Council, 2023):

- Ensure that services are be accessible to parts of the population with limited access to banking services
- Allow safer access to banking services
- Build a more resilient domestic payments market
- Increase transaction efficiency
- Minimize transaction costs

The COVID-19 pandemic boosted the shift toward digital transactions. Hence, the e-commerce sector made it quicker to allow users to digitally create their purchases and money transfers. Also, other cryptocurrencies are getting their systems more refined. These improvements in the different cryptocurrencies mean that central banks already have a blueprint for a stable digitalization of their systems.

Examples of CBDCs

Here are a few examples of Central Bank Digital Currencies (CBDCs) currently in circulation:

- **Digital Yuan (China):** Launched in 2020, the Digital Yuan is the first large-scale CBDC launched by the People's Bank of China. It is designed to coexist with physical cash and is aimed at reducing the usage of physical cash in the country.
- **e-Krona (Sweden):** This is Sweden's CBDC and being developed by the Riksbank, Sweden's central bank. It aims to provide a digital alternative to cash, particularly for transactions made in remote and rural areas where access to physical cash can be difficult.
- **Digital Euro (European Union):** The European Central Bank is exploring the possibility of launching a digital euro, which would complement physical cash and provide a secure and accessible way to make digital payments across the European Union.
- **Sand Dollar (Bahamas):** The Sand Dollar is the world's first sovereign CBDC, launched in 2020 by the Central Bank of the Bahamas. It is aimed at improving financial inclusion in the country and reducing dependence on traditional banking services.

These are just a few examples, and the features and purposes of CBDCs may vary from country to country, but the overall goal is to offer a digital alternative to physical cash that can increase accessibility, reduce the reliance on traditional banking services, and improve financial inclusion.

Opportunities and advantages of CBDCs

Central banks issue CBDCs. Hence, these are under the jurisdiction of this authority. CBDCs can have the same qualities as cryptocurrencies, such as borderless transactions. CBDCs are an option for central banks to better serve the needs of their stakeholders. A key opportunity for CBDCs is that they can be programmable and thus have more predictable behavior, unlike cryptocurrencies with their the high volatility.

Here are other important advantages of CBDCs in comparison to cryptocurrencies (Blackstad & Allen, 2018):

- They can be used for national or regional tax payments.
- They have more defined times of availability for transactions.
- The money supply is controlled.
- Exchange rates are more predictable as they match fiat money. Fiat money is a currency issued by the central bank and can be better controlled.
- All issuance controls are under the central banks or authorized groups.
- Individuals can open accounts at the central bank.

Core features of CBDCs

With more and more people getting access to digital services through their laptops and smartphones, the ultimate goal of CBDCs to have an inclusive financial system in the world can be attained. But rather than serving as a means of exchange, the importance of cryptocurrencies comes from their ability to store value. Commercial organizations and monetary authorities issue stabilized cryptocurrencies and CBDCs as workable solutions for mainstream payments.

The table below illustrates the essential core features of CBDCs, broadly categorized under instrument and system features (Coin Telegraph, n.d.).

Table 3: CBDCs

Instrument features	
Convertible	A CBDC should exchange at par with cash and private money
Convertible	CBDC payments should be as easy as using cash
Accepted and available	CBDCs should offer the ability to make both online and offline transactions
Low cost	CBDC payments should be available at very low or no cost to end users
System features	
Secure	Cyber attacks and other threats should be extremely difficult to penetrate for a CBDC system
Instant	End users of the system should have access to instant or near-instant final settlement
Resilient	A CBDC system should be exceptionally resistant to failures and disruptions in operations
Available	The system's end-users should be able to make payments 24/7 /365
Throughput	CBDCs should be able to process a !arge number of transactions
Scalable	CBDCs should be able to accommodate the potential for large future volumes
Interoperable	CBDCs should allow easy flow of funds between systems
Flexible	A CBDC system should be flexible and adaptable to changing conditions

Source: Coin telegraph (n.d.) (a).

Stakeholders of CBDCs and their Motivation for the Innovation

Innovations of CBDCs had a lot in store for the entire banking system and all the stakeholders that utilize it. Various parties from the economy hold the needs and motivations for CBDCs. Here are some of the stakeholders and their possible grounds for CBDCs (Blakstad & Allen, 2018):

- **Central banks:** They maintain stability in the economy by issuing currency notes, authorizing money supply, and managing policies.
- **Government:** They provide fiscal policies and ensure political alignment with the financial system.
- **Commercial banks:** They are tasked to follow the standards set by authorities while adhering to their goal of revenue generation.
- **Corporate customers:** These include charities, educational establishments, and NGOs that need to have a bank manage their wholesale operations.
- **Investors:** They invest under government bonds for stable and consistent returns.

Are CBDCs viable?

Digital currencies are taking a major step as it attempts to replace the traditional concept of money like paper notes and coins. Computer-based money assets introduced by the digital currencies are not very recent. In fact, **DigiCash** in 1989 and e-gold in 1996 have had similar attempts of issuing digital currencies (Coin Telegraph, n.d.). Although these have not been as booming as digital currencies we have today, the attempt to make a viable innovation was on its way already.

DigiCash
This is one of the first electronic money companies that use cryptographs to govern transactions and set currencies.

The recent COVID-19 pandemic has pushed the need to shift to digital payments. So, this was one of the catalysts for CBDCs to innovate much faster. Now, they are more than a digital replica of what we used to do with banknotes and coins. CBDCs are now programmable money that can aid in solving challenges in financial efficiency and inclusion (Coin Telegraph, n.d.).

3.3 Advantages and Disadvantages of Cryptocurrencies

Crypto-Assets and Types of Cryptocurrencies

Crypto-asset is a digital asset that has been known as early as Bitcoin entered the financial industry in 2009 (Nafis & Nazim, 2020). In a more accurate description, cryptocurrencies are under the crypto-assets category, and other categories exist under it. Crypto-assets include:

- **Currency coins/tokens:** These virtual currencies resemble money as people in different transactions or payments use it. (Example: Bitcoin, Litecoin, Peercoin)
- **Utility tokens:** These are assets that can perform a particular action in the Blockchain. Since these are decentralized, different utility tokens have different uses. (Examples: Filecoin, HLC)
- **Equity tokens:** These refer to an equity certification that individuals have collected or owned certain assets. (Example: DAO)
- **Commodity tokens:** These are digital currencies with real-life assets as their counterpart, like gold and oil. (Example: OneGram)

- **Hybrid tokens:** These are tokens, a mix or combination of any other previously mentioned crypto-assets. (Examples: Ether, Petro)

Since cryptocurrency regulations are more lenient, various types exist. Bitcoin is the most popular cryptocurrency and holds the most assets. The way Bitcoin works is not necessarily how other platforms of cryptocurrencies work. Every cryptocurrency claims its particular function and specification. There is Ethereum's ether, which is a smart contract platform, and Ripple's XRP, which facilitates transfer between different locations (Frankenfield, 2022). Altcoins are other known cryptocurrencies that are somehow clones of Bitcoin. Other cryptos made from scratch include Solana, Litecoin, Cardano, EOS, and Ethereum.

Advantages of Cryptocurrency

The booming nature of cryptocurrency made many speculate that it can achieve a larger height in the future. As it matures, it further benefits its users, especially if they have been investing in crypto for a very long time. Cryptocurrency can provide these opportunities and advantages for businesses as long as they understand this digital currency and strategize well:

Efficient transactions

Cryptocurrency transactions are much faster and hassle-free (NiBusiness, n.d.). Transactions like transfers to digital wallets are done conveniently using smartphones or computers. Furthermore, public and private keys allow for secure decentralized transfers (Frankenfield, 2022).

Maximizes blockchain

All transactions done in crypto are recorded in blockchain. History tracking is made easy and accurate. Hence, identifying overspending or other unscrupulous transactions can be done to ensure security in the system.

No processing fees

Crypto removes the need for banks or intermediaries to pay additional processing fees. So, you do not see these fees in crypto.

Decentralized

In the crypto system, transactions between parties are under their trust over each other. Therefore, it lacks intermediaries like those in banks and established financial institutions. Consequently, a cryptocurrency-based system reduces the chance of a single point of failure.

Increasing popularity

The increasing popularity of crypto gives it the potential to be widely used. Eventually, it is not impossible to see the use of it in organizations, both large and small.

Disadvantages of Cryptocurrency

On the other hand, cryptocurrencies also hold disadvantages that might be deal breakers for some people. Here are some of the disadvantages that need to be discussed:

Risk of losing your digital wallet

Theft has been common in cryptocurrency. There is always the risk of hacking or fraud that would steal all your money invested in the crypto. Between June 2021 and June 2022, the loss of crypto platforms to hackers and thieves rose to $44 billion (Sjouwerman, 2022). Cyber-attacks often happen, and it would be difficult to retrieve stolen investments. Moreover, when a user's data is stolen, it is very easy to lose all the money they invested in their wallet.

Market volatility

The value of cryptocurrencies changes at a rapid and unpredictable rate. To some, it can be a tolerable change. However, not everyone would feel secure placing their money in such a rapidly changing environment.

The risk of losing value

Aside from market volatility, cryptocurrencies can lose their value if companies and consumers suddenly stop using them.

Lack of regulation

An authority does not regulate cryptocurrencies. It is easy for users to lose their coins and business as there is no law or rule to protect them from mishaps.

Anonymity is questionable

Cryptocurrencies are pseudonymous, meaning they can still leave a digital trail that can be traced by agencies like the Federal Bureau of Investigation (FBI). This completely reverses the idea that cryptocurrencies are safe in removing the identity in each transaction.

Illicit transactions

Many unscrupulous people who are involved in illicit transactions such as money laundering use cryptocurrencies. Hackers also take advantage of cryptocurrencies to spread ransomware, or some even use the crypto marketplace for illegal drugs. It is not unusual to see criminals target cryptocurrencies for their cyberattacks, as there is no law to protect the users of the crypto market.

Decentralization is questionable

Even though cryptocurrencies are marketed on seemingly decentralized platforms, this does not translate to what is seen in the crypto market. In fact, ownership of the values is concentrated and not evenly distributed.

3.4 Blockchain Use in Payments and Remittances

Remittances have been a driver of the economy as they fuel the financial flow that benefits developing nations. These transactions are primarily handled by financial authorities such as banks and currency exchanges. Remittances are growing each year. The trend in low and middle-income places is that remittances increase by 4.9 per cent, leading to more than $626 billion in total in 2022 (Migration data, n.d.). As we have discussed, numerous innovations to traditional financial transactions, remittances, and payments also found significant improvements and alternatives. Blockchain-based remittances are an alternative for these international payments.

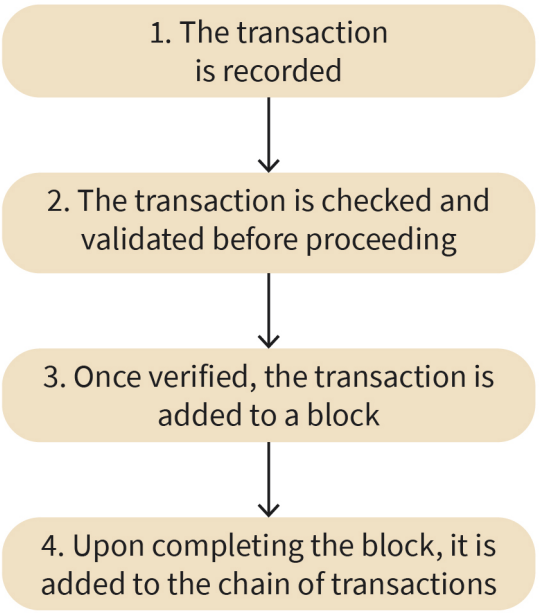
Remittances
This refers to cross-border payment transactions that drives financial flow in various nations.

Blockchain is a virtual ledger that lists all data in blocks linked together in a systematic chain of sequence. It can be used in applications, such as payments and remittances.

The blockchain transaction's can be summed up as follows (Edmondson, 2022):

1. The transaction is recorded. A record in blockchain refers to any information inputted in the database. The record of a transaction's digital signatures and other important details are placed here.
2. The transaction is checked and validated. The system of computers will verify if the transaction is real.
3. Once verified, the transaction is added to a block. A block refers to o bundles of records. A verified transaction will be added to a block using a unique code called the hash. This unique hash allows the users to locate their transactions in the blocks.
4. Upon completing the block, it is added to the chain of transactions. Lastly, completing the block, add it to the chain chronologically.

Figure 2: How Blockchain Works



Source: Gereon Wellmann, 2023.

Blockchain is being adapted to remittances and related transactions because it can work on several incapacities of traditional systems. The figure above shows how blockchain allows transactions from one party to another without needing a third party. This is the main benefit of blockchain that traditional banking models cannot do at the moment. Traditional banking needs a third party to process all the transactions, causing delays and added fees to every transaction (Edmondson, 2022).

Other challenges solved by blockchain technology in remittances and transactions are:

- Financial interoperability. This means that blockchain technology allows integration of the financial model easily and swiftly connects transacting parties to each other without in high intermediary costs.
- Security. Blockchain offers an easy-to-track record of every transaction. With this, fraud can be easily spotted and prevented.

In January 2023 the central banks of Switzerland and France successfully tested the first cross-border payment on the blockchain as part of a series of projects around central bank digital currencies (Financial Times, n.d.).

Advantages of Blockchain in the Payments and Remittances Sector

People from different economies benefit from remittances. Cross-border payments are often done with traditional methods. A transaction usually takes up to five days before receiving it overseas. Unfortunately, the lag time from receiving the payment is inefficient and unreasonable. Also, there are issues with the lack of transparency and high transac-

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

tion fees (Dhuddu, 2022). Therefore, innovation in the payments and remittances sector needs to focus on these shortcomings to make these transactions more affordable and accessible.

Because of the potential of blockchain in remittances and payments, it can be more widely adopted in the future. The following are the advantages of blockchain in the payments and reminttances sector:

Reliable and lesser intermediary fees

Blockchain can ensure reliable, real-time transactions with lesser fees from intermediaries. The only intermediaries would be a mobile wallet, a banking app, and the blockchain network needed (Dhuddu, 2022). Then, service providers can send and receive money between two persons, anywhere globally, using blockchain-based payment systems.

Quicker completion of transactions

Remittance transactions will be completed more quickly and at lower costs, if unneeded third parties can be cut out of the transaction system. In this situation, a remittance transaction can arrive at its destination in minutes or even seconds.

Enhanced security

A possible issue stemming from blockchain remittances is security problems. Fortunately, the technology can work its way around security issues. Cryptography is used in blockchain remittance for security and verification (Dhuddu, 2022). Most blockchain transactions will be recorded on a public ledger, while corporations may establish private blockchain networks where a single organization controls the network. Blockchain organizes data into blocks, which are tied together and nearly impossible to alter. Therefore, a public ledger guarantees the utmost level of privacy while being accessible to everyone. Remittance transactions on blockchain will therefore be private, secure, and verifiable. In the future, blockchain remittances can develop the currently flawed financial system.

3.5 Use of Smart Contracts

Developments in the financial sector and blockchain technology cascaded to the use of smart contracts. Smart contracts are a vital component of blockchain ecosystems as these digital contracts help enforce a transaction that is quick, decentralized, autonomous, and transparent.

A smart contract is a computerized transaction protocol that independently allows the execution of contract terms. These are made between the creator of the contract and a recipient. One of the differences of a smart contract with the regular human contract is its medium. The regular contracts we know of are usually administered face-to-face or has a written document that needs to be signed. However, a smart contract is used in blockchain. Hence, they are irreversible and can be executed right away. Contracts generally

refer to a kind of agreement between two parties with set terms and agreements. In a smart contract, these terms are recorded in computer language rather than legal language (Nasim & Nafir, 2020). Therefore, it is automatically carried out on the computer when needed. The smart contract is an innovation that executes transactions between contracting parties without any central authority or external force to make it happen. Moreover, the digitalized aspect of smart contracts makes it easier to keep track of all transactions that occur and boosts transparency.

The steps of the general process of carrying out smart contracts in blockchain technology are transaction definition, transaction authentication, block creation, block validation, and block chaining (Nasim & Nafir, 2020). Furthermore, the following elements matter as well:

- **Agreement:** This is needed to happen between at least two parties.
- **Conditions:** When the parties involved agree to be under a smart contract, they will decide on the requirements for completing their obligation.
- **Coding:** The conditions agreed upon by the parties are then coded into the system.
- **Blockchain:** Then, a blockchain system will record the transactions.
- **Execute:** The parties are then ready to oblige to their contract terms.
- **Recording:** Completion of the parties' end in the contract is recorded and assessed if adequately carried out.

Benefits of Smart Contracts

Smart contracts are innovations that we continue to expand. This is due to the benefits we obtain from there, which we cannot achieve with the traditional models we previously have. Here are some relevant benefits of smart contracts (IBM, n.d.):

- Efficient and accurate. Smart contracts are digitally executed so that as the computer recognizes that the condition it requires is already met, it will perform the contract immediately. There is no more paperwork or process time that traditional contracts would have needed.
- Transparent. Encrypted records are shared among the parties involved in the smart contract. Moreover, no third party is involved, so the information is guaranteed to be unaltered.
- Secure. Encrypted blockchain transactions are difficult to breach by hackers.
- Increased savings. Smart contracts are independent and do not need an intermediary. Hence, fees to cater to the supposed middlemen are removed from the process.

Application and Use Case of Smart Contracts

The application of smart contracts has extended to various sectors. The following are some of the application and use cases of smart contracts (Cryptopedia, 2021):

Finance

Of course, smart contracts are maximized in numerous financial transactions. The decentralized finance (DeFi) dApps are an alternative to many financial services because they are more transparent and efficient than traditional options. The DeFi dApps are very similar to banking as they involve lending, trading, or borrowing money.

Gaming

Non-fungible tokens (NFTs) are made using the same way as cryptocurrencies are. These are assets in the digital world which are purely based on blockchain technology in the gaming industry. These are unique digital assets, and these rely on smart contracts. An NFT owner would have this asset as their unique property. With blockchain technology, purchasing and selling products in games will be implemented better.

Legal industry

Most recently, with the introduction of e-signatures for legally binding agreements, technology has been driving smart contract innovations in the legal sector. Another recent development in this area is the emergence of smart contracts, which could soon provide parties to legal agreements with a choice and perhaps reduce the expense of engaging lawyers and other intermediaries.

Real estate

The expenses in traditional real estate transactions could be decreased or eliminated by smart contracts that operate automatically and without the need for go-betweens. Experts also assert that smart contracts can assist parties by simplifying complex credit or mortgage agreements, insurance policies, and rental agreements. The necessity for legal advice or other advisory services becomes less critical with using smart contracts and Blockchain in real estate, potentially lowering costs.

SUMMARY

One of the newest innovations we enjoy are cryptocurrencies and central bank digital currencies. Cryptocurrencies are an alternative form of online payment, and popular types include Bitcoin, Litecoin, and Ethereum. These only exist in a digital platform, and no central regulatory body manages the entire ledger. An encryption algorithm makes sure that transactions are possible given a decentralized system. However, cryptocurrencies are also disadvantageous due to their unpredictable market volatility. Cryptocurrency technologies like blockchain allow these innovations. A global ledger compiles all transactions and makes them transparent to all involved individuals. Some advantages of cryptocurrencies include efficient transactions, no processing fees, decen-

tralization, and constant increase in popularity. On the other hand, its disadvantages are risks of losing digital wallets and massive market volatility.

Central bank digital currencies are a product of blockchain technologies incorporated into the financial sector. This helps parties obtain more efficient transaction processes. These digital currencies have also been catalyzed by the increased need to shift from traditional transactions to digital payments. Blockchain also allows improvements in payment and remittances. Along with blockchain, smart contracts ensure the digitalization of currency and financial transactions works seamlessly in the finance sector, gaming industry, real estate, and much more.

UNIT 4

DIGITAL TRANSFORMATION IN PAYMENT SECTOR

STUDY GOALS

On completion of this unit, you will be able to ...

- explain the digital transformation in the payment sector.
- review the global changing landscape in the payments sector.
- analyze the role of payments in the global banking sector and economy.
- explain the evolution of mobile money.

4. DIGITAL TRANSFORMATION IN PAYMENT SECTOR

Introduction

The COVID-19 pandemic brought severe consequences for the global economy. Similar to all sectors, the payment industry has been growing since 2012 but experienced a decline in its growth prospects since 2019 (McKinsey & Company, 2022). One of the common cause of such decline in the decrease in the revenue of the global payment system is the pandemic. Such pattern also emerged for the payment sector after the 2008 global financial crisis. We have witnessed government and regulatory institutions propose various measures to ensure the payment sector has a fast recovery amid the adverse impact of the pandemic. However, Sénant et al. (2021) predict a strong growth prospect for the global payment sector led by five global trends: (1) deeper payment integration, (2) bank engagement, (3) faster pace of digital currency activity, (4) improved open banking infrastructure and (5) increase in merger and acquisition.

The United Kingdom (HM Treasury, 2021), for example, has embarked on a vision to modernize the payment sector by making proper use of the latest development in technology and innovation. Such a vision is crucial as it allows regulatory institutions to set their priorities; and for the UK regulators, the primary focus is on ensuring faster payment systems, offering a secure open banking channel which offers cross-border payments and future-proofing the regulatory framework to allow payment system grow at a rapid pace in a post-pandemic economy.

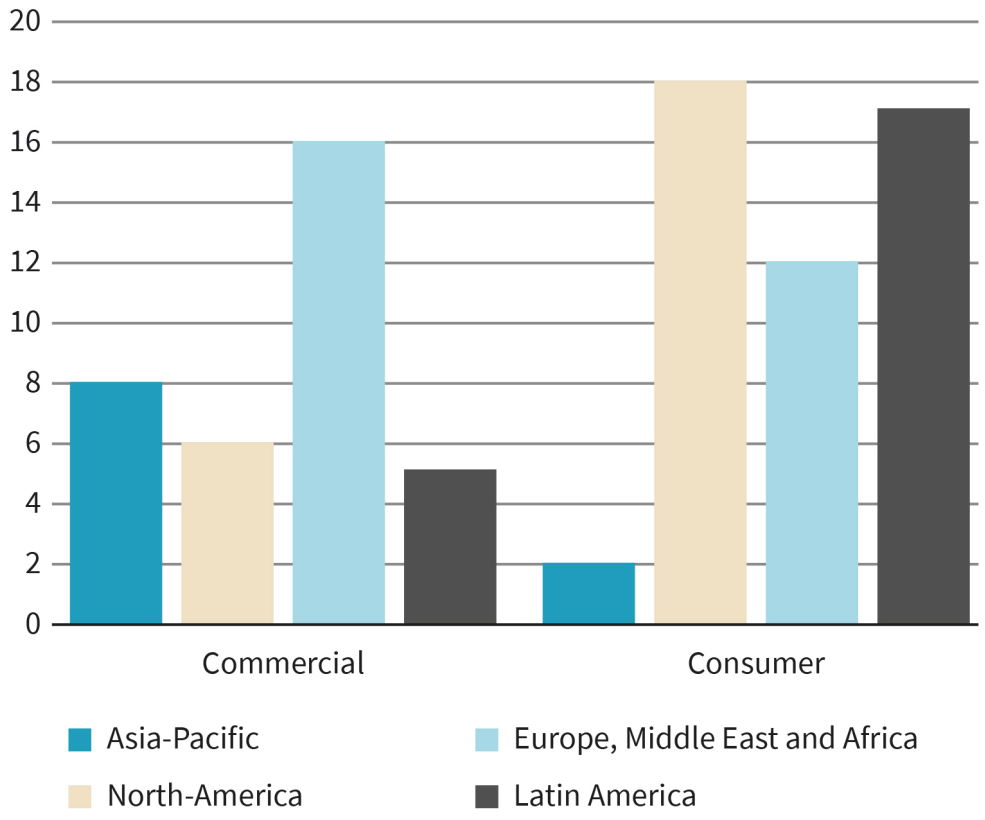
The Financial Stability Report 2021 published by Deutsche Bundesbank (2021) indicates that the German banking sector has performed well during the pandemic. However, the report identifies several vulnerable areas for the German financial system, which include (1) an increase in loss allowance in the banking sector, (2) the prevalence of a low-risk premium in lending rates and (3) high allocation risk.

The Committee on Payments and Market Infrastructures of the Bank for International Settlements (2020) identified five focus areas to overcome the ongoing challenges of ensuring a secure cross-border payment system.

- First, the need for a public-private partnership in cross-border payments.
- Second, it is essential to review current regulatory practices in global payment systems to develop a uniform oversight framework that could reduce bureaucratic impediments.
- Third, the report identifies the need to improve the current payment infrastructures and agreements.
- Fourth, the quality of data and transparency need to improve to ensure a higher level of accountability in the global payment structure.
- Fifth, the global payment sector should review and integrate technological development to modernize the payment process for the end users.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

Figure 3: Share of Global Cross-border Transactions



Source: Based on McKinsey & Company (2021).

The figure above demonstrates the global volume of commercial cross-border transactions. While Europe, the Middle East and Africa (EMEA) region dominates the commercial cross-border payments, North America has the largest share in the global consumer cross-border payments in 2020.

4.1 The Global Changing Landscape in Payments

How does the Global Payment Sector Function?

The World Bank's (2022) Global Payment Systems Survey (GPSS) surveys effortlessly capture the core components that drive global payment systems. While the first GPSS survey was initiated in 2010, there have been several changes in the focus of the survey. The 5th version of the GPSS survey titled “Payment Systems Worldwide – A Snapshot” covers ten components of the global payment sector. A summary of each component is given in the table below.

Table 4: Components of the Global Payments Sector

No	Components	Remarks
1	Legal and regulatory framework	In the global setting, there are variations in the legislation that regulates payments and settlement systems. Central banks of countries in all regions except South Asia (80 per cent) have issued regulatory requirements to guide the payments industry.
2	Large-value payment systems	There are three broad payment systems frameworks present in the payments industry, i.e. real-time gross settlement (RTGS), cheque clearing house and other systems. RTGS is the most common-use system as 76.8 per cent (96 out of 125 jurisdictions) have adopted this framework.
3	Retail payment instruments and systems	A cheque clearing house is still common as 68 per cent (78 out of 115 countries) use this system. Only a few high-income OECD countries have moved away from the cheque-clearing system.
4	Settlement of foreign exchange transactions	The foreign exchange market plays a significant role in the payments industry. The US dollar remains one of the most dominant currencies for international trade.
5	International remittances and other cross-border payments	The flow of remittance varies across the globe. The high-income countries are mostly sending countries while the emerging economies are receiving that remittance.
6	Securities settlement systems	There are three types of securities handled by the central securities depository, which include (1) both governmental and corporate securities, (2) only governmental securities and (3) only corporate securities.
7	Payment system oversight and cooperation	The objective of the oversight function is to carry out the payment system directed by the policy document approved by the Central Bank Governor or by senior management.
8	Payment services	The wide variety of payment services includes (1) payment gateways for e-commerce, (2) mobile money services, (3) merchant aggregation, (4) bill aggregation and (5) payments initiated by a third party.
9	FinTech	The payment services industry has evolved due to the insurgence of activities from the **FinTech** industry. Some of the accepted activities from the FinTech industry include consumer lending, cross-border remittances, crowdfunding, insurance, microfinance and trade finance.
10	Reforming the payment system	The need for reform in the payment system is led by: (1) the need for improved efficiency, (2) response to fintech innovations, (3) expanding innovative products to align with the financial industry, (4) reducing systematic risk affecting the growth prospect of the payment services and response to the stakeholder demand.

FinTech
This uses latest technologies to offer banking and financial services.

Source: World Bank (2022).

The Role of Payments in Global Banking and Economy

Payments play a vital role in the banking industry by facilitating transactions. Efficiency in facilitating transactions can make a positive impact on the profitability of the banking sector. Silva et al., (2021) report that the payments sector contributes up to 30 per cent of the

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

income of the global banking sector. The growth of FinTech-based payment solutions has opened new and innovative payment solutions for bank customers. More recently, the growth of the finance industry has been adversely affected by the COVID-19 pandemic. As such, the banking sector finds the need to embrace new ways of ensuring sustainable growth which would require the adoption of innovative payment solutions for its customers. Several actions could foster the growth of the global financial sector:

- **Leverage partnerships and ecosystem:** The banking sector needs to embrace technological advancement and provide a safe and convenient digital payment experience for its customers. In the long run, banks could consider modernizing payments and services as a strategic move which would require partnership with FinTech firms.
- **Provide data-driven insights:** Banks have the experience and resources to provide data-driven insights to their customers during e-commerce transactions. Several services have greater prospects for improving customer satisfaction, for example, same-day funding and cash-flow loans.
- **Modernize technology and data capabilities:** Banks should consider adopting a business model that integrates data-driven, automated and connected services. Integration of artificial intelligence (AI) into the traditional banking business model could be vital for developing a competitive business model.

Functions of the Banking Sector in the Payment Industry

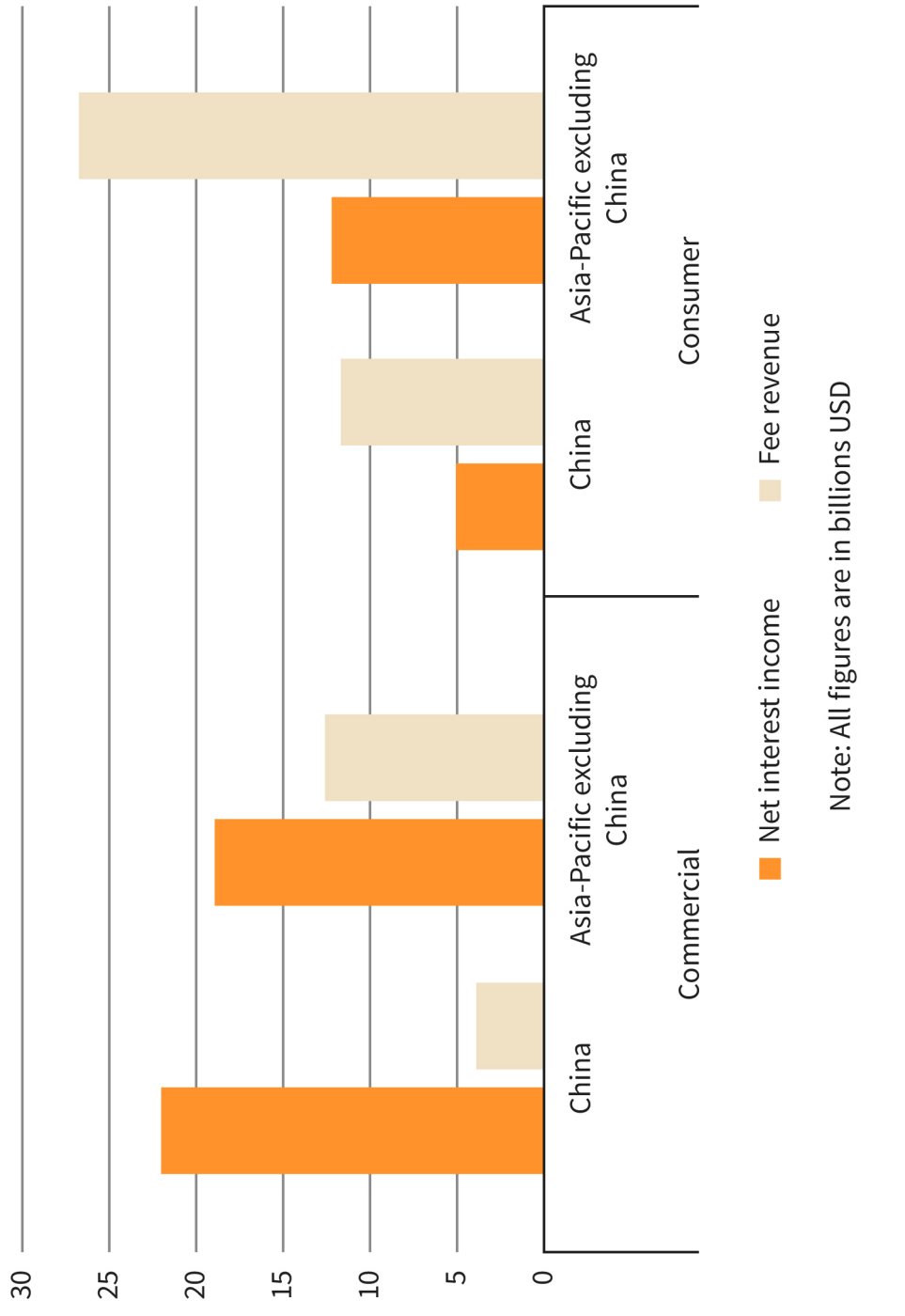
1. **Making loans:** Banks play a vital role in maturity transformation in the payments system. Maturity transformation is the process of converting short-term liabilities (for example deposits) to long-term assets (for example loans). The difference between the interest rate bank pays to its borrowers and receives from its lenders contributes to a significant proportion of their operating income. The banking sector provides a meeting place for borrowers and lenders which provides a unique opportunity for the payments industry.
2. **Creating money:** Banks can create money. The process involves holding on to reserve instead of converting deposits to loans. Some portion of deposits could be converted to cash. Banks also contribute to money creation by recycling excess cash. Banks can also make money by trading securities and customer fees.
3. **Transmitting monetary policy:** Banks play an important role in money transmission by working closely with regulatory bodies. The central bank can manage the money supply by controlling the statutory reserve requirements for the banking sector.

Revenue Contribution of the Payment Sector to the Banks

Recently, payment systems have become an essential part of e-commerce transactions. Therefore, the traditional banking model has to find ways to integrate innovative payment systems to satisfy broader customer expectations in digital transactions. In the past, payments were largely associated with processes that allow exchanges between buyers and sellers. However, this definition has changed with the development of FinTech and the increase in digital transactions due to the recent pandemic. Now, payment systems are expected to provide an end-to-end money movement process in e-commerce platforms. Payment systems can contribute to the revenue of the banking sector. The figure below indicates the growth of payments in the banking sector. In the Asia-Pacific region, China

dominates the growth in commercial net-interest income ($22 billion) while other countries in the Asia-Pacific region (excluding China) have the largest share in consumer-level fee revenue ($26 billion).

Figure 4: Payments Revenue Dynamics for the Banking Sector across Asia-Pacific



Source: Rashedul Hasan (2023).

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

Such growth prospects of payment services require careful consideration of the following areas:

1. **Development of an eco-system that combines payments and banking:** The direct interaction of the payer a payee should play a vital role in shaping a shared eco-system. The endpoint of the payment value chain contributes the largest share of the revenue for the financial sector. As such, it has become essential for the banking sector to introduce data-driven solutions to consumer-facing problems in digital transactions.
2. **Enablement of commerce, sales and trade:** The banking sector should acknowledge the pressure they face from the non-bank market and take adequate strategic actions. Some of the core challenges include the inability to reach prospective buyers and sellers, inefficient payment facilities and the inability to use data analytics to resolve conflicts. Several solutions could allow banks to enable e-commerce for their customers, for example, affiliate marketing and B2B trade directories.
3. **Balance-sheet-based offerings:** The "buy now pay later" (BNPL) mode of financing has attracted customers around the world during the pandemic. In the UK alone (VISA, 2022), the market size of the BNPL e-commerce market has reached £120 billion in retail sales in 2020 with an annual growth forecast of 200-300 per cent. Low upfront cost, optionality and simplicity are the driving force for such growth in BNPL. The banking sector needs to embrace such innovation and integrate it into the traditional financing model to ensure consistent growth. While payment technologies will continue to drive transformation, established payment operators will play a key role in shaping the sector's future prospects. The seven forces shaping the future of payments are discussed below:
    - **Open banking:** A new bank payment mechanism and a framework for payment innovation have been produced by open banking. Open banking introduces a new method for initiating payments, which is effectively open payments even if it does not offer a new set of payment rails. Application programming interfaces (APIs) offer additional flexibility, such as the ability to demand variable recurring payments (VRPs).
    - **Real time payments:** RTPs transport money from one end to the other in real time using payment rails. Osko by BPAY, for instance, is the first value-added service to be introduced through the new payment platform (NPP) in Australia. These solutions have demonstrated success in assisting RTP networks in scaling and delivering on their value offerings.
    - **Cross-border payments:** Payment technologies are transforming the cross-border payments business model (both wholesale and retail) and customer experience. The potential of digital assets, cryptocurrencies, and DLT technology to assist enhance and revolutionize clearing and settlement procedures is beginning to be acknowledged by all payment providers. The Financial Stability Board (FSB), in collaboration with the Committee on Payments and Market Infrastructure (CPMI) and other pertinent bodies, has established a plan for enhancing cross-border payments.
    - **Buy now, pay later (BNPL):** A more recent kind of payment called buy now, pay later (BNPL) gives fast credit decisions as well as instalment payment choices at the time of sale. BNPL is now available in non-discretionary purchases including healthcare, legal services, and vehicle repairs.

- **Digital wallets:** The Asia-Pacific (APAC) region has seen the greatest adoption of digital wallets and smart applications. Digital wallets give users a single location to handle their funds while drastically lowering payment transaction fees. Outside of APAC, digital wallet providers are increasing their selection of omnichannel services, including contactless payment methods, and more.
- **Embedded payments:** These are related to business models where non-financial services providers (like Uber or Shopify) give their company clients payment capability. PayTechs continue to play a significant role in accelerating adoption rates, and embedded payments are anticipated to grow and become more invisible.
- **Digital currencies:** These and CBDCs are moving to the top of the list for payment providers looking for regulated alternatives. Main advantages of digital currencies will be instantaneous and atomic settlement, more automation, transparency, and efficiency. Digital currencies will also provide a new infrastructure that will allow for instant settlement via DLT, programmability, smart contracts, and tokenization.

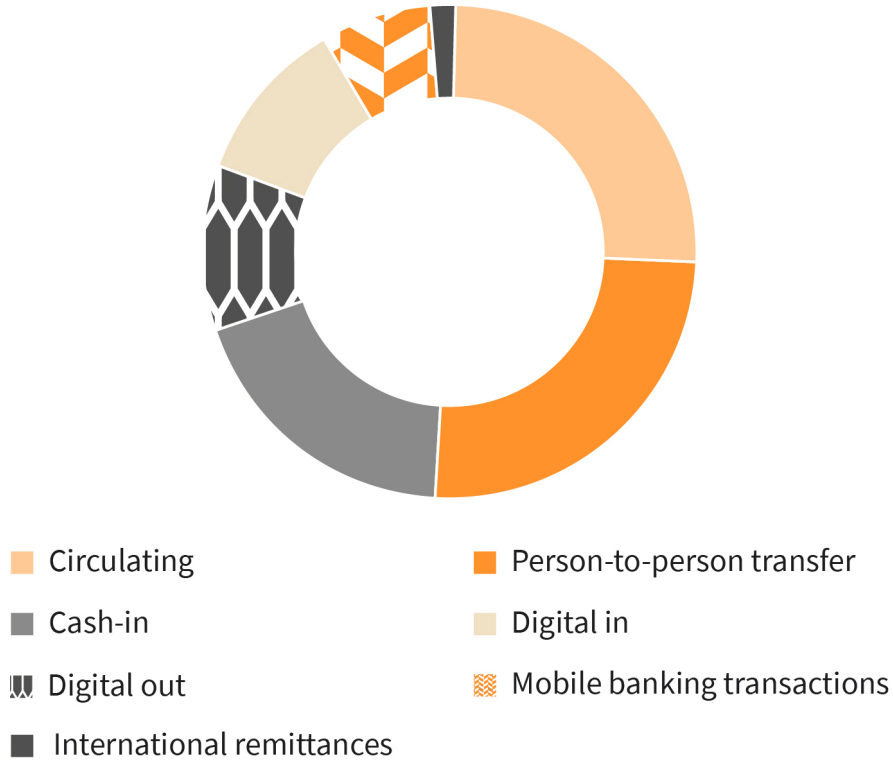
4.2 Mobile Payment Apps

The advancement of the Internet of Things (IoT) has transformed our money management practices in the past decade. The Royal Bank of Scotland was the first to launch a mobile banking app in 2009 which allowed customers to check their account statements via text. Since then, we witnessed several advancements in mobile payments services. China has witnessed tremendous growth in this sector through mobile apps such as Alipay and WeChat. The range of services we can access through mobile payment apps has improved in recent years. The GSMA (2022) indicates the following statistics for the mobile money market in 2020:

- There are 1.2 billion registered account holders of mobile money apps, a 13 per cent increase from 2019.
- The transaction volume has a 15 per cent increase in 2020 with a total value of 767 billion.
- The global number of active agents of mobile money services is 4.8 million, an 18 per cent increase from 2019.

The figure below indicates a greater prospect for mobile banking transactions as it only takes 9 per cent of the total value of the monthly transactions. The major portion of mobile money is in circulation (33 per cent), and the second and third place goes to cash-in (24 per cent) and cash-out (19 per cent) transactions via various mobile money apps.

Figure 5: Mobile Money Transactions in December 2021 (in per cent)



Source: GSMA (2021).

Mobile Money Models

Bank model: in this type of **mobile money** model, all transactions occur through the bank. Customers need to maintain an account with the bank which allows them to use a mobile wallet facility provided by the bank. This model might restrict the customer to perform a transaction with only an authorized agent registered in the mobile wallet platform. Countries such as Indonesia, Nigeria, Kenya, Brazil and Bangladesh adopt a bank model for mobile payments. For example, one of the most popular mobile payment methods in Bangladesh is Bikash, launched by Brac Bank in 2010. Customers can perform the following transactions using their Bikash account: mobile top-up, utility bill payment, and mobile banking. Customers are also able to receive money in foreign currency using SMS or in-app notification as Bikash has partnered with Western Union.

Mobile money
This allows customers to access financial services using their mobile devices.

Mobile Network Operator Model: in the mobile network operator (MNO) model, mobile payments occur through the messaging services of a cell phone operator. The MNO takes responsibility for all transactions in transit and does not require to integrate a bank to monitor the transactions. As such, this model faces less regulatory security as compared to the bank model. MNO is a popular type of mobile payment method in Tanzania and Uganda. For example, easypay, owned by Payline Holdings (U) Ltd, I one of the most popular mobile payment system is Uganda that uses MNO model. Easypay provides two types

of mobile services: (1) mobile money deposit and (2) mobile money payment. Currently, easypay only accepts payments within Uganda only and has plans to include international transfers in their services soon.

Hybrid Model: there are two types of hybrid models available. First, the bank and MNO models can be combined which allows a cell phone operator to liaise with a bank to provide mobile payment facilities. The second model allows the government to partner with a bank to provide mobile payment services. Such as hybrid model is available in Pakistan. For example, Jazzcash allows customers to maintain a mobile waller at the same time perform bank transfers.

Benefits and Drawbacks of Mobile Payments

Benefits

1. **Financial inclusion:** Mobile payments advance the cashless economy agenda and improve financial inclusion. Individuals excluded by the traditional financial channels can access finance through mobile payment services. According to the Global Findex Database (Demirguc et al., 2018), thirty percent of the world population are unbanked.
2. **Convenience:** Mobile payments allow instant access to a diverse range of financial services to its customers. Fund transfer and e-commerce activities have become more convenient due to the recent developments in the mobile payments sector.
3. **Employment opportunity:** Financial inclusion possible through the advancement of mobile payment services have allowed small and medium enterprise to create more employment opportunities and make a positive impact on the economy.

Drawbacks

1. **Pseudo banking:** The increase of non-bank mobile payment operators, for example: Google Play, is threatening the growth prospects of the banking sector. The non-bank sector does not fall under extensive regulatory guidance as compared to the banking sector. Such freedom could lead to a new financial crisis in the future.
2. **Interference:** Non-bank mobile payment operators are in direct competition with the mobile payment services offered by traditional banks.
3. **Deposit mobilization:** Customers are now able to mobilize their deposits instantly by using various mobile payment apps. This is a clear drawback for the banking sector as they are forced to invest in the latest financial technology. Failure to make the necessary changes could make the banking sector lose its market share to the non-bank payment operators.

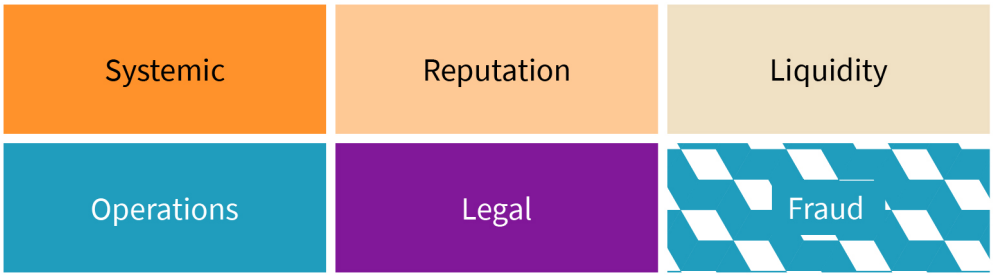
The Risk Faced by the Mobile Money Sector

The figure below depicts various risks faced by the mobile payments sector (Lake, 2013):

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

1. **Systemic:** These are risks that might result in the financial system collapsing or suffering major damage or damage that could have a negative impact on public opinion are among the topics covered by the Bank of England's Financial Conduct Authority (FCA) during its pre-inclusion review of banks and financial institutions.
2. **Operations:** This is a risk that is a serious, unexpected or unexpected failure of one or more of the major stakeholders in a company or organisation - i.e. one that causes a direct or indirect loss due to inadequate internal systems, people, or procedures.
3. **Reputation:** This could damage the reliability of the payment system among the stakeholders.
4. **Legal:** This could reduce operational efficiency due to regulatory pressure or increase lawsuits.
5. **Liquidity:** This could affect the working capital and the ability of the payment services to meet cash obligations to its users. When their mobile wallet is depleted, the users are unable to execute any more services.
6. **Fraud:** This could expose customers to financial loss due to inefficient security frameworks. The use of online and mobile payments entails a risk that transactions may be targeted by fraudsters. Payment systems are the perfect target for fraudsters since their primary goal is financial gain. In 2020, 38 per cent of retailers would have lost at least 6 per cent of their income to payment fraud.

Figure 6: Risks Faced by the Mobile Money Sector



Source: Rashedul Hasan (2023).

4.3 Regulation and Supervision of the Sector

Regulatory Changes in the Payment Sector in Various Regions/Countries

Payment services have witnessed tremendous growth in the past decade due to advancements in the FinTech industry. Such growth has led regulatory institutions around the world to evaluate at and make necessary reforms to ensure payment services are governed under adequate guidelines. A summary of recent regulatory changes in payment services in selected economies is presented below:

United Kingdom: The United Kingdom focused on financial stability and proposed various reforms for the payments sector since the beginning of the 21st century. In the post-Brexit era, the payment sector in the UK has witnessed cross-border reforms. The key regulatory change and regulatory initiates in the UK centres around three prominent areas:

1. **Market change:** The payments sector takes advantage of self-regulatory initiatives to tackle challenges posed by market changes. For example, technological advancement requires the payments sector to perform a wider review of the systematic and unsystematic risks of their business. The regulatory body in the UK can perform a sector-wide review of the current practices to ensure proactive engagement of market participants and ensure legislative changes to ensure both customers and agents have the necessary protection.
2. **Regulatory coordination and public policy:** The regulatory authority plays an important role by proposing a balanced framework for the payments sector that allows flexibility and considers the cost-benefit perspectives.
3. **Cross-border coverage:** The UK payments sector provides international coverage to its customers. Therefore, an agent operating in the UK payments sector focuses on offering cross-border solutions to its customers. In the post-Brexit era, the payments sector participants (both customers and agents) are affected by a diverse range of regulatory requirements from the EU. In such a situation, the regulatory bodies in the UK can provide greater support to the payments sector by aligning its regulatory framework to international requirements.

The following legislative frameworks have shaped the UK payments market: (1) The payments systems regulator's (PSR) agenda, (2) European legislative developments, and (3) interchange fee regulation. These frameworks paved the way for the future regulatory framework (FRF) review (Latham & Watkins, 2022) which proposes expansive regulatory interventions from a diverse group of bodies. The role of these institutions in the current regulatory landscape is as follows:

- **HM Revenue and Customs:** Focus on anti-money laundering and combating financial terrorism.
- **Bank of England:** Focus on maintaining monetary and financial stability.
- **Financial conduct authority:** Focus on operational resilience and reviews the payments landscape to propose necessary reforms.

United States: The Federal Reserve established the Payments System Policy Advisory Committee (PSPAC) which takes responsibility to develop generally accepted definitions and guidelines for the payments sector in the US. The PSPCA is led by the Vice Chair who is assisted by the Governor and President of the Federal Reserve System. The committee's purview includes:

- Assessing risks related to transactions handled by the payments sector
- Maintaining financial stability in the payments sector
- Building links between the payments sector and financial institutions
- Ensuring public and private sector collaboration to enhance the efficiency of the payments sector

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

The Federal Reserve has the responsibility of ensuring the cost-recovery objective of the Monetary Control Act that requires that cost and benefit should match in the long run. To fulfil such objectives, the Federal Reserve has taken various initiatives as follows:

- Emphasis on the full recovery of the cost in the long run
- Provide services with the yield maximum public benefit
- Reduce risks associated with payment services
- Ensure unique services which are efficient and equitable for customers

While banks in the US are subject to various prudent regulatory restrictions, non-bank payment processors need careful attention from the regulators. The Federal Reserve needs to identify applicable laws for the operations of non-bank payment processors. There is a need to review the application of the regulations for the non-bank sector and make necessary reforms to ensure successful transitions. This involves the Financial Crimes Enforcement Network, the Electronic Fund Transfer Act, and the Bank Secrecy Act.

Cybersecurity, data privacy, consumer protection, financial access, and market concentration are other areas that the regulatory bodies have to consider.

European Union (Euro Area)

The European payments sector has seen tremendous change in recent years as a result of innovation, digitization, shifting consumer behaviour, and new regulations. Digital payment options are replacing conventional payment methods like real cards. New types of currency, like cryptocurrencies, are also becoming available.

The Second Payment Services Directive (PSD2) of the European Union is propelling change and innovation in the payments sector. The directive's tenet is to prevent payment fraud while having the least possible negative effects on the customer experience, or without adding excessive friction to the payment process.

Accounts Information Service Providers (AISP) will provide access to a customer's bank and the ability to show data about their account. For instance, a consumer could combine data from many accounts to get a comprehensive picture of their financial condition.

The European Banking Authority (EBA) has revoked its internet payment security guidelines. These guidelines were released ahead to the 2016 implementation of the updated Payments Services Directive. The updated Payment Services Directive (EU 2015/2366, or PSD2) went into effect in January 2016.

The COVID-19 pandemic has made an adverse impact on the economy which increased the financial burden at individual and commercial levels. Both individuals and businesses are finding it difficult to maintain liquidity due to various restrictions on normal business activities. As such, governments around the world have introduced regulatory interventions to ease financial pressure. The table below presents the most common regulatory responses to allow mobile money to make a significant impact on assuring liquidity for individuals and businesses. A fee waiver is the most common response as 26.7 per cent countries have reduced fees to encourage consumers to use mobile money as the use of

cash for transactions was restricted during the pandemic. However, the mobile money agents received the least amount of support from the regulators as only 2.3 per cent of countries introduced measures to support agents.

Table 5: Regulatory Responses to Mobile Money Transactions after COVID-19

	Per cent of countries
Fee waivers	0.267
Increasing transaction and balance limits	0.233
Social and humanitarian transfers	0.163
Flexible KYC	0.105
Promoting electronic payments	0.081
Promoting sandboxes	0.070
Mobile money essential services	0.058
Support to agents	0.023
Note: The figures are in percentage.	

Source: GSMA (2021).

4.4 Example: Klarna

The Klarna Group was established in 2014 when the firm bought SOFORT. Klarna provides 150 million active customers with better and more flexible shopping and buying experiences across more than 450,000 merchants in 45 countries. Customers may pay when and how they choose using Klarna's direct payments or instalment plans.

Regulatory Status

In Sweden, Klarna Bank AB (publ) (corporate registration no. 556737-0431) is under the supervision of the Swedish Financial Supervisory Authority. In the United Kingdom, Klarna is registered with the Swedish Companies Registration Office. As a result, the Financial Conduct Authority does not oversee Klarna's Pay in three Instalments and Pay in 30 days agreements in the UK. Klarna has its banking license in Sweden and, therefore, is subject to the regulatory requirements prescribed to Swedish Financial Supervisory Authority (SFSA). Klarna is required to abide by a number of pertinent Financial Conduct Authority (FCA) requirements, which are outlined in the FCA handbook as they are processing a banking licence in the UK.

Governance of Klarna

The board and CEO's use of the policies and directives that have been created to specify the division of responsibilities within the Klarna group as part of their governing and controlling functions is crucial. Rules of procedure, which provide instructions on how to, among other things, comply with Swedish regulations, are very significant.

The board is the highest-ranking decision-making entity in Klarna's management and control structure. At the annual general meeting (AGM), shareholders elect the board members to serve one-year terms. The external framework does not mandate the existence of a nominating committee for Klarna. The board is composed of (1) the chairman, (2) the chief executive officer and (3) the board members. Klarna also maintains a remuneration committee and a audit, risk and compliance committee.

Risk Management at Klarna

A risk-aware culture is mandated by the Group's risk management governance model, which combines first line responsibility of risks with independent second line challenge and monitoring. Klarna's risk strategy concentrates on identifying, monitoring, and mitigating the material risks to which it is exposed.

Klarna uses a three-line system of defense, which is a standard in the financial services sector. First, The Board of Directors establishes Klarna's risk strategy and principles and approves policies. Second, The Audit, Compliance and Risk Committee assists the board in carrying out these tasks. Third, the risk reporting framework allows Klarna to receive timely risk information.

The board has specified how and when it will receive information on Klarna's risks. The recurrent risk reporting in Klarna is intended to give receivers accurate, up-to-date, thorough, and timely information that reflects the nature of various risk categories as well as market movements.

Financial Highlights

The return on equity was highest in 2017 and decreased to –53.1 per cent in 2021. A similar trend is noticed for return on asset figures. Such figures indicate that Klarna is struggling with their return in recent years. The debt to equity ratio is 5.7 in 2021 as compared to 7.7 in 2020. A high debt to equity ratio indicates high risk. Therefore, Klarna was able to reduce its risks in recent years.

Table 6: Key Ratios for Klarna

Ratios	2021	2020	2019	2018	2017
Return on equity (%)	-53.1	-28.0	-23.1	3.9	15.8
Return on asset (%)	-8.5	-2.7	-2.7	0.4	2.2
Debt to equity ratio	5.7	7.7	6.2	4.7	3.7

Source: Klarna (2022).

SUMMARY

The COVID-19 pandemic brought severe consequences for the global economy. Similar to all sectors, the payment industry has experienced a decline in its growth prospects. We have witnessed various measures to ensure the payment sector has a fast recovery amid the adverse impact of the pandemic. Payments play a vital role in the banking industry by facilitating transactions. EY reports that the payments sector contributes up to 30 per cent of the income of the global banking sector (Gancz, 2022). Banks could consider adopting a business model that integrates data-driven, automated and connected services.

The GSMA (2021) report indicates the following statistics for the mobile money market in 2020. There are 1.2 billion registered account holders of mobile money apps, a 13 per cent increase from 2019. The transaction volume has a 15 per cent increase in 2020 with a total value of 767 billion. Mobile payments advance the cashless economy agenda and improve financial inclusion. The increase of non-bank mobile payment operators is threatening the growth prospects of the banking sector. Customers are now able to mobilize their deposits instantly by using various mobile payment apps. The banking sector needs to invest in upgrading its technology; otherwise it will lose market share to the non-bank payment operators.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

UNIT 5

GREEN FINTECH

STUDY GOALS

On completion of this unit, you will be able to ...

- define green FinTech.
- explain the growing importance of sustainability.
- identify the role of the banking sector in advancing sustainable finance.
- determine the key factors in impact investing.

5. GREEN FINTECH

Introduction

According to Deloitte (2021), by the end of 2021, less than one-quarter of US corporations had set up an environmental, social and governance (ESG) council or working group. Many FinTech may be attracted to ESG as a top business objective which is centered on social and environmental advancement.

The FinTech sector is quickly expanding as stakeholders demand for better environmental and social performance rise. The arguments in favor of FinTech development are as powerful as they are diverse and complex. They include escalating demands and the power of stakeholders with an eye toward the environment, society and consumers in the industry. Gen Z and millennials advocate the growth of the global FinTech industry. In 2020:

- 95 per cent of millennials are interested in sustainable investment.
- 90 per cent of gen z consumers prefer products that care for the environment.
- 94 per cent of gen z consumers expect companies to address social and environmental issues.

It is important to clearly distinguish two terms most commonly used in literature: “sustainability” and “sustainable development.” Sustainability is the capacity to maintain or protect anything over an extended period of time, particularly natural resources. Sustainable development is a development strategy that satisfies existing needs without endangering the capacity of future generations to satisfy their own needs. For this reason, there are several differences between these two terms.

- Sustainability focuses primarily on maintaining the balance between basic human needs while maintaining the natural environmental condition.
- Sustainable development involves economic and social development in a way that is also sustainable over time.
- Sustainable development extends beyond environmental concerns and transcends to a much wider objective. It aims to solve the interconnected issues of social inclusion, environmental conservation, and economic prosperity.

5.1 FinTech and Sustainability

The most important drivers of integrating environmental, social and governance (ESG) agenda into corporate strategy include:

1. **Cost:** a formal, integrated ESG program may seem prohibitive for an emerging FinTech company. However, the cost to integrate FinTech solutions into the current business model could be cheaper due to the advancement of Internet of Things (IoT). For

startups, whose processes are still emerging, the cost of implementing a new FinTech framework and additional staff training for efficient use of such technology may be less costly than the added competitive advantage in the long-run.

2. **Increasing emphasis on the value of FinTech:** FinTech executives may believe they do not need to formally adopt an ESG strategy. The term “ESG” (environmental, social, and governance) strategy refers to a set of guidelines and procedures that give equal weight to ethical corporate governance, environmental issues, and social issues in commercial operations.

It is crucial for FinTech businesses to adopt a well-thought out ESG strategy since they greatly influence how the financial industry develops and how society and the larger economy function. A good ESG strategy enables FinTech companies to show their dedication to sustainability and ethical business conduct, which may enhance their reputation, attract and keep clients, and broaden their options for investment and growth. ESG consideration in decision-making can also assist in identifying and managing the financial possibilities and risks related to sustainability. But with rising concerns around greenwashing, it may no longer be enough to just have a sustainable business model. Stakeholders increasingly expect evidence that the ESG goals in a FinTech's business model are being met (Arner et al., 2020).

Greenwashing involves exaggerating or misrepresenting a product, service, or organization's environmental advantages in an effort to win over environmentally conscientious customers. For example, BP (British Petroleum) is one business that has been accused of “greenwashing.” BP changed its name to “Beyond Petroleum” in the 2000s and started an advertising campaign to highlight its investments in renewable energy. However, the company's overall emissions and environmental effect remained almost unchanged, and it continued to run predominantly on fossil fuels. The rebranding of BP, according to critics, was an effort to deceive the public and enhance its reputation without altering its business operations.

An ESG-focused business strategy alone may no longer be sufficient to demonstrate ESG leadership or accountability. Stakeholders demand more and more proof that a FinTech company is taking necessary steps to achieve its ESG aims. An efficient method of getting relevant ESG information to stakeholders is through disclosures using an integrating reporting mechanism.

The Growing Importance of Sustainability

The pandemic has not only cost millions of human lives around the world but also hurt the economic well-being of individuals and corporations. It has put pressure on the government to focus on economic recovery, and, thus, the focus on sustainable development has moved into the shadows of economic recovery. It is evident that the global progress of sustainable development goals (SDGs) is delayed due to the pandemic, and it is necessary to explore alternatives to ensure that the sustainability agenda maintains its pre-pandemic progress.

The COVID-19 pandemic has exposed and exacerbated internal and external inequalities. The world remains miserably off course in its meeting with Paris agreement on climate change. Biodiversity is declining, and so are terrestrial ecosystems; they are deteriorating at an astonishing rate. 1 million pieces of plastic worldwide are thrown away every year; 5 trillion single-use plastic bottles are thrown away. The table below provides a summary of the recent initiatives to mitigate UN SGDs.

Table 7: Recent Initiatives toward SDGs

SDG	Full form	Remark
1	Poverty eradication	The gender gap in poverty at work is closing globally.
2	Remove hunger	Moderate or severe food insecurity will be reduced by nearly 320 million from 2019
3	Improve healthy lives	The pandemic has shortened life expectancy, showing the importance of general health coverage and multi-sectoral coordination for health emergencies.
4	Equitable education	Differences in access to gender-inclusive education due to location and wealth are even greater.
5	Ensure gender equality	As of 1 January 2021, the proportion of women in the global parliaments was just 25.6 per cent, and in local councils 36.3 per cent. Only 23 countries hold at least 40 percent female representatives in the lower house or single house of parliament. Most have made such progress through the use of gender quotas.
6	Ensure a sustainable water supply	There has been a 70.2 per cent increase in safely managed drinking water supply, but another 2 billion people still did not have access to safe water by 2020. There will be 1.7 billion people without basic sanitation and 494 million people who practice open defecation.
7	Ensure sustainable energy	Three-quarters of the people in sub-Saharan Africa do not have access to sustainable energy according to the energy progress report (World Bank, 2022)
8	Promote sustainable economic growth	Global economic recovery is underway, led by China, with government support, and the United States. Real gross domestic product (GDP) per capita in 2019 is estimated to increase by 1.3 per cent worldwide, it decreased by 4.6 per cent in 2020. LDCs' (Least Developed Countries) real GDP growth is projected in 2021 and 2022 but is still significantly below the 2030 agenda for sustainable development target of 7 per cent.
9	Build resilient infrastructure	LDCs' share of global GDP declined from 16.6 per cent from 2019 to 2020 to 16.0 per cent. Production decreased due to the global financial crisis of 2007-2009. LDCs' MVA (manufacturing value added) was just $136 per capita in 2020, compared to $4,296 in Europe and North America.
10	Reduce inequality	Between 2010 and 2020, the refugee rate increased from 579 per 100,000 to 1,562. In the same period, the proportion of people fleeing Latin America and the Caribbean increased from 80 to 668 per 100,000. The number of refugees fleeing North Africa and West Asia more than doubled.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

SDG	Full form	Remark
11	Ensure inclusive settlement	Open public spaces, especially streets, are part of this transformation. The use of non-motorized transport will increase and reduce the risk of COVID-19. Land sharing on roads and vacant lots can be an uphill battle. But long-term changes and adjustments can reduce risk while promoting it.
12	Ensure sustainable consumption	All regions except Europe and North America have seen a significant increase in raw material consumption over the past two decades.
13	Combat climate change	Global CO2 emissions hit new highs in 2020, with global averages of more than 410 parts per million. Developed countries have seen the steepest declines, with an average drop of nearly 10 per cent, compared to 2019. As of December 2020, emissions recorded 2 per cent more than in the same period in 2019.
14	Maintain marine resources	Marine protected areas cover 7.74 per cent of global coastal waters and the oceans, an increase from 28 per cent in 2000 to 44 per cent in 2013. The 10 per cent target set for 2020 is still achievable, but some locations will be delayed. Protecting the KBA remains critical to ocean sustainability.

Source: United Nations (2021).

Banks and Sustainable Finance

The practice of incorporating environmental, social, and governance (ESG) factors into financial decision-making and the provision of financial products and services is known as sustainable finance. This strategy aims to strike a balance between financial gains and advantageous effects on society and the environment.

It entails creating financial tools and services to aid in sustainable development, incorporating ESG factors into portfolio management and investment research, and taking sustainability risks and opportunities into account when managing risk and allocating capital. Growing awareness of social and environmental challenges, as well as their possible financial effects on investments, has prompted a focus on sustainable finance.

Sustainable finance requires the integration of environmental, social and governance (ESG) principles in the business process (Gonzalez, 2021). Failures in corporate and banking governance have contributed significantly to past financial crises, such as the 2008 global financial crisis. ESG investors need to work beyond existing governance frameworks, which are incompatible with sustainability issues facing institutional investors.

There is an unprecedented dynamic behind the transition from fossil fuels to a low-carbon economy. Emerging economies do not have fiscal space to deploy the kind of fiscal support advanced economies can provide. This shows that the private sector must play an important role in promoting sustainable development.

Financial institutions need to focus on environmental risks in their traditional risk assessment process to ensure a holistic risk management perspective. Banks still need to improve the quality and reliability of such information. The major global standard-setters have started working together to form a consistent and global standard for sustainability

claims. As a result, the risk of asset contamination (refers to the presence of hazardous or toxic substances that can cause harm to the environment or human health in a property or asset) will not be fully understood or incorporated into the risks and pricing process (NGFS, 2020).

The need for financial tools, goods, and services that support sustainability goals is rising quickly. In order to achieve the sustainable development goals (SDGs) and the Paris agreement, the OECD predicts that by 2030, infrastructure investments of over USD 6.9 trillion annually are needed. In order to reduce greenhouse gas emissions by 55 per cent from 1990 levels by 2030, it is predicted that the EU would need to invest an additional EUR 350 billion in energy-related activities each year between 2021 and 2030 (European Commission, Directorate-General for Financial Stability, Financial Services and Capital Markets Union, 2021).

Banks are acknowledged as having a crucial role to play in closing the investment gap for the transition as one of the main sources of external financing for the European economy. In order to advance sustainable finance in the EU, the banking industry must play a key role. Banks can adopt several practices to assist in the shift towards a more sustainable economy:

- They can nsure their lending, investing, and product development procedures take sustainability into account.
- They can provide clients with sustainable finance solutions and services.
- They can invest in sustainable finance products themselves to aid in the growth of a sustainable finance market.

Banks may, for instance, provide green bonds and other financial tools to aid in the construction of low-carbon and climate-resilient infrastructure. Additionally, they can aid in sustainable development by prioritising financing for projects that are socially and environmentally responsible in their lending processes (European Banking Authority, 2019).

Prioritizing sustainable financing is crucial for the banking industry since it is consistent with their function as trusted intermediaries and suppliers of financial services. Additionally, it aids in reducing sustainability risks, enhancing the bank's standing, and satisfying growing client demand for sustainable financial options.

The European Commission provided poor nations with financing totaling EUR 2.6 billion in 2020, the bulk of which went toward programmes promoting climate adaption. Additionally, 20 per cent of the whole EU budget was earmarked for climate-related initiatives during the 2014–2020 budget period. Since then, this goal has been raised to 35 per cent for the neighborhood, development, and international cooperation instrument (NDICI) and 30 per cent for the years 2021–2027 (European Commission, Directorate-General for Financial Stability, Financial Services and Capital Markets Union, 2021).

The European Investment Bank, in addition to the European Commission, was instrumental in advancing sustainable finance in emerging markets. To support activities in fields like energy efficiency and renewable energy projects across Africa and other countries, the bank contributed EUR 2.7 billion in climate finance in 2020.

A comprehensive tool for fostering sustainable development all around the world is the European fund for sustainable development plus (EFSD+). It is a component of the external action guarantee and the investment framework for external action of the European Union. For the benefit of its partner nations, the EFSD+ provides guarantees, grants, technical help, and other resources. To stimulate investment in sectors including renewable energy, sustainable agriculture, and the digital economy, it will solicit financial support from the private sector. The EU is still dedicated to helping achieve the target of raising $100 billion annually by 2020 to boost developing economies. This objective has been extended until 2025 (European Commission, 2022).

The majority of the €2.6 billion in aid that the European Commission gave to poor nations in 2020 went toward climate adaption measures. Furthermore, for the years 2014 to 2020, 20 per cent of the EU budget was allocated to climate-related initiatives; for the years 2021 to 2027, this goal has been increased to 30 per cent. In 2020, developing economies received climate finance from the European Investment Bank totaling €2.7 billion. When it comes to climate finance, developed economies are advancing. In 2020, climate funding to poor economies will reach $83.3 billion, up from $58.6 billion in 2016.

Role of FinTech Companies in Sustainability

FinTech is financial innovation driven by new technologies. It can have a significant impact on the way financial markets and financial institutions provide services. In 2016, China put green finance on the G20 agenda, which is an important step in creating a global consensus on the need for green finance development. Ant Financial Services and JD Technology are two of the top green finance companies in China. FinTech can help develop standards, accounting, financial regulation and anti-money laundering audit services. Financial institutions can use FinTech for better cost and efficiency analysis and increased data authenticity. Key players in the ESG domain include:

- Current and prospective ESG FinTech firms
- Data companies providing ESG-related solutions
- Technology companies providing ESG services

Data should be an important part of the development of ecosystems around the world, given that the success of all possible verticals will depend on the ability to determine, analyze and compare data efficiently and accurately. The ESG FinTech taxonomy is briefly discussed below:

- Enablers include both green market infrastructure and data services.
- Product verticals include regtech, insurtech, lending and payment services.
- Financial services subcontractors include private markets, fund managers, banking institutions and insurance.
- Real economy activities include agriculture and food, energy, carbon markets and impact investing.

The FinTech industry has the potential to serve as a role model in implementing environmentally friendly and sustainable practices due to its use of big data, artificial intelligence, and real-time information. The implementation of such practices requires transparency

and collaboration between supply chain members, which reduces waste and increases cost-effectiveness for all participants (Chueca & Ferruz, 2021). The FinTech industry offers cutting-edge solutions that

- modernize financial procedures and payment systems,
- positively influence corporate behaviors, and
- strengthen brand reputation.

The banking and payment industries have undergone significant changes in recent decades, with the FinTech industry developing sophisticated, cost-effective, and sustainable banking and payment systems that reduce a business' carbon footprint. FinTech solutions have greatly changed the way in which people bank and conduct financial business. FinTech businesses can measure and verify the impact of sustainable financial products, making necessary adjustments to improve them (Arner, 2020). FinTech firms can take the following initiatives to promote the sustainability agenda:

- **Data collection and analysis:** They gather information about how sustainable financial products are used and performed in order to pinpoint areas that could be improved.
- **Surveys and customer feedback:** These are important tools for understanding how customers perceive the effects of sustainable financial products.
- **Using recognised ESG criteria:** This helps to assess the effects of sustainable financial products on the environment and society.
- **Verification by a third party:** They can work with independent third parties to assess the effects of sustainable financial products and make suggestions for development.
- **Partner with organisations that are relevant:** they collaborate with groups who are knowledgeable about ESG and sustainable finance to learn more and enhance the impact of sustainable financial solutions.

5.2 Use of Green FinTech in Impact Investing

What is the Impact of Investing?

Impact investment
Impact investment focuses primarily on sustainable agenda.

There is a diverse range of definitions available for **impact investment**. Global Impact Investing Network (2022) defines impact investment as investments made to produce a measurable positive social and environmental impact in addition to a financial return. According to Global Impact Investing Network (2022):

> Impact investments are investments made into companies, organizations, and funds with the intention to generate a measurable, beneficial social and environmental impact alongside a financial return.

This definition of impact investment indicates three attributes.

1. Internationality focuses on the creation of social and environmental outcomes.
2. Measurability focuses on the clarity of the process that can be used to measure the outcomes of the impact investment.
3. Financial return focuses on differentiating the philanthropic nature of impact investment.

Critical global concerns are being addressed by the growing impact investing business in fields like accessible basic services, microfinance, renewable energy, and sustainable agriculture. Impact investing seeks to produce both financial gains and favourable effects on society and the environment. By concentrating on finding solutions to urgent social and environmental challenges, it provides an alternative to conventional investments. These investments support initiatives and businesses engaged in sustainable agriculture, affordable housing, and renewable energy. Impact investing provides financial rewards to investors while directing capital toward beneficial change that advances the transition to a more sustainable future. Impact Management Project (2022) (IMP) adds another dimension to their impact investment definition. According to IMP, intervention is important to differentiate an investment from traditional and impact. IMP began in 2022 with the goal of creating and promoting best practises for managing impact investments. The project's objective is to give investors a consistent vocabulary, framework, and tools to help them manage their impact investments well.

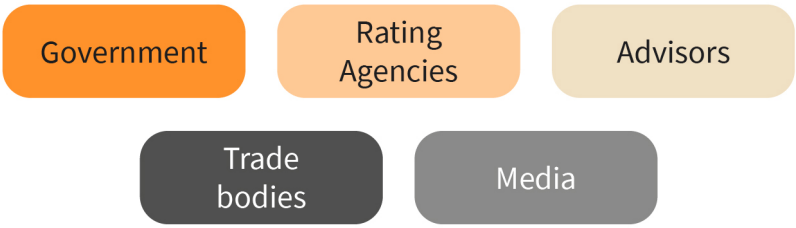
A collection of impact investment practitioner, investors, and researchers from different parts of the world are working together to create the IMP. The three main elements of the project are reporting, management, and measurement. It aims to offer advice on impact measurement and reporting, impact investment management, and the incorporation of impact concerns into investment processes.

Key Factors in the Impact of Investing

The key factors that advance impact investing can be divided into four categories:

1. **Asset and capital owners:** They provide capital for investment. Examples include pension funds and non-profit companies.
2. **Capital managers:** They are direct investors in projects. Examples include banks and insurance companies.
3. **Recipients of capital:** They are projects and real assets that investors choose to invest in from various alternatives. (Example: public and private enterprises)
4. **The ultimate beneficiary of the capital:** These are people, communities and the environment benefitting from the impact investments. Examples include underserved communities and the climate.

Figure 7: Additional Key Actors of Impact Investment



Source: Rashedul Hasan (2023).

The figure above indicates several additional key actors that play a role in the impact investing ecosystem.

- **Government:** It can support impact investing by creating favorable policies, such as tax incentives for investors, and by providing funding for projects.
- **Rating agencies:** They assess the social and environmental impact of investments and provide ratings to help investors make informed decisions.
- **Advisors:** They play a key role in connecting investors with impact investment opportunities and helping them navigate the complex landscape of impact investing.
- **Trade bodies:** They bring together stakeholders in the impact investing community to promote the growth and development of the field (example: Global Impact Investing Network).
- **Media:** They can play a crucial role by promoting the success stories and best practices of impact investments.

The table below outlines the differences between two types of investors: individual and institutional investors. Individual impact investors tend to focus on personal values and social or environmental impact, while institutional impact investors focus on achieving both financial returns and positive impact.

Table 8: Types of Impact Investors

No	Individual investor	No	Institutional investor
1	Individual investors	1	Development finance institutions
2	Fund managers	2	Diversified financial institutions
		3	Banks
		4	Private foundations
		5	NGOs
		6	Religious institutions
		7	Corporates

Source: Impact Management Project (2022).

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

Table 9: Global Examples of Impact Investment

Example	Investor	Investee
1	FMO	Clean Energy
2	The David and Lucile Packard Foundation	Ecotrust Forests I LLC (EF-I)
3	SNS Impact Investing	SNS Impact Investing
4	Gray Ghost DOEN Social Ventures Coöperatief U.A.	Beam Money Private Limited

Source: Impact Management Project (2022).

Investing to Make a Sustainable Impact

Sustainability cannot simply be ignored. Traditional financial standards are still in practice by many business schools and finance institutions. Transitioning the world's energy and transportation networks to low-carbon fuels will require a multi-generational effort. As investors, we now have the chance to invest in the future and reap substantial returns as these environmentally friendly enterprises and innovations serve a wide range of consumers. The framework for sustainable investing proposed by University of California (2020, p. 12) is listed below:

- Climate change
- Food and water security
- Inequality
- Ageing population
- Diversity
- Human rights
- Circular economy
- Ethics and governance

The sustainable investment portfolio consists of the following key players:

- **Professional and partners:** Over time, asset-specific manager implements selection and monitoring guidelines that will, among other steps, integrate ESG criteria into due diligence.
- **Peers and platforms:** They provide opportunities to develop a collaborative ecosystem.
- **Professors and scholars:** They allow stakeholder engagement.

Socially responsible investing involves many aspects, but there are strong overlaps between socially responsible investment principles (SRI) and those for sustainable development. SRI funds are also reducing their investments in emerging economies, mainly due to a lack of funding from the mainstream sector within Europe and the United States.

SRI funds choose investments based on environmental, social, and governance (ESG) factors with a possible influence on society and the environment in addition to generating financial returns. The traditional investing institutions, such banks and pension funds, are less interested in making investments in developing nations. Often, political or economic considerations make the traditional banking sector more cautious about their financial return which restricts their investment on SRI funds.

A fall in investment in emerging economies could follow from this drop in funding from the mainstream sector since SRI funds may have less money available to invest there. Additionally, emerging economies may have less defined ESG norms and laws than more developed markets, making it more difficult for SRI funds to evaluate and choose investments that meet their ESG criteria.

As FinTech organisations employ cloud technology to lower their carbon footprint in comparison to the less environmentally friendly legacy systems used by traditional financial institutions, sustainable technologies are also playing a significant part in the development of green FinTech. For instance, Tandem Bank has updated its platform and digital app to reflect its commitment to greener banking and is working to become the UK's first green digital bank.

Blockchain technology offers a secure and decentralised record of transactions that may be used to trace the origin of green investments. The technology is already being used by a number of FinTechs for supply chain transparency, and there is a lot of room for collaboration in this area. Some examples of green FinTech making impact investment are given below:

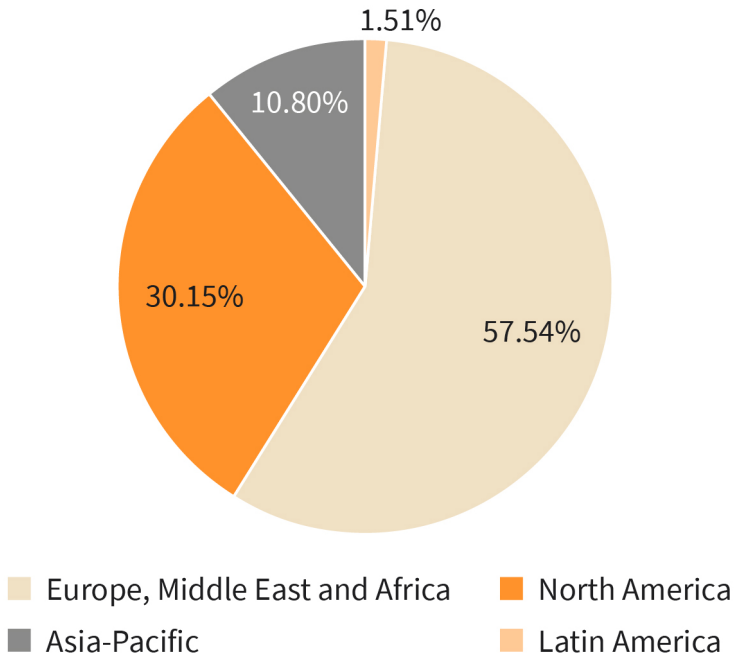
- **Aspiration (United States):** Aspiration is a green banking start-up with headquarters in Los Angeles that provides a range of financially viable and socially conscious options. Aspiration has a positive impact approach, which means it funds organisations working for social and environmental justice and plants more trees every day than there are in Central Park in New York. The business had received approximately $135 million in capital from investors as of 2021.
- **Clim8:** Clim8 Invest is a sustainable investment software that enables users to put their money into businesses and funds that are reshaping how people may access clean energy, clean water, sustainable food, and other resources. The software calculates the environmental impact of various investments using artificial intelligence and machine learning techniques. As of 2021, Clim8 Invest had secured over $2.5 million in seed capital.
- **Tandem Bank:** Tandem Bank is a digital bank with headquarters in the UK that aspires to be the first green digital bank in the nation. Tandem Bank uses cloud technology and collaborates with digital firms like Intive to lessen their carbon footprint. Tandem Bank has received more than $100 million in investment from investors as of 2021.
- **Everledger (United Kingdom):** Everledger is a provider of digital transparency that offers blockchain-backed product authentication for high-risk commodities like diamonds and works of art. Customers may track the legitimacy and history of their investments, as well as their environmental impact, using Everledger's blockchain technology. As of 2021, Everledger had secured more than $20 million in funding from investors.

- **Provenance (United Kingdom):** The supply chain transparency start-up Provenance tracks the ethical sourcing of items using blockchain technology. Blockchain technology was recently used in a pilot project by Provenance to monitor the ethical source of tuna in Indonesia. As of 2021, the startup had secured approximately $8 million in funding from investors.

5.3 Current Initiatives in Green FinTech

Europe has emerged as a leader in climate fintech. EMEA leads North America (120), Asia Pacific (43), and Latin America (6). Climate FinTech Report 2022 identifies over 400 climate start-ups around the world. Of these, 229 are based in Europe, the Middle East and Africa.

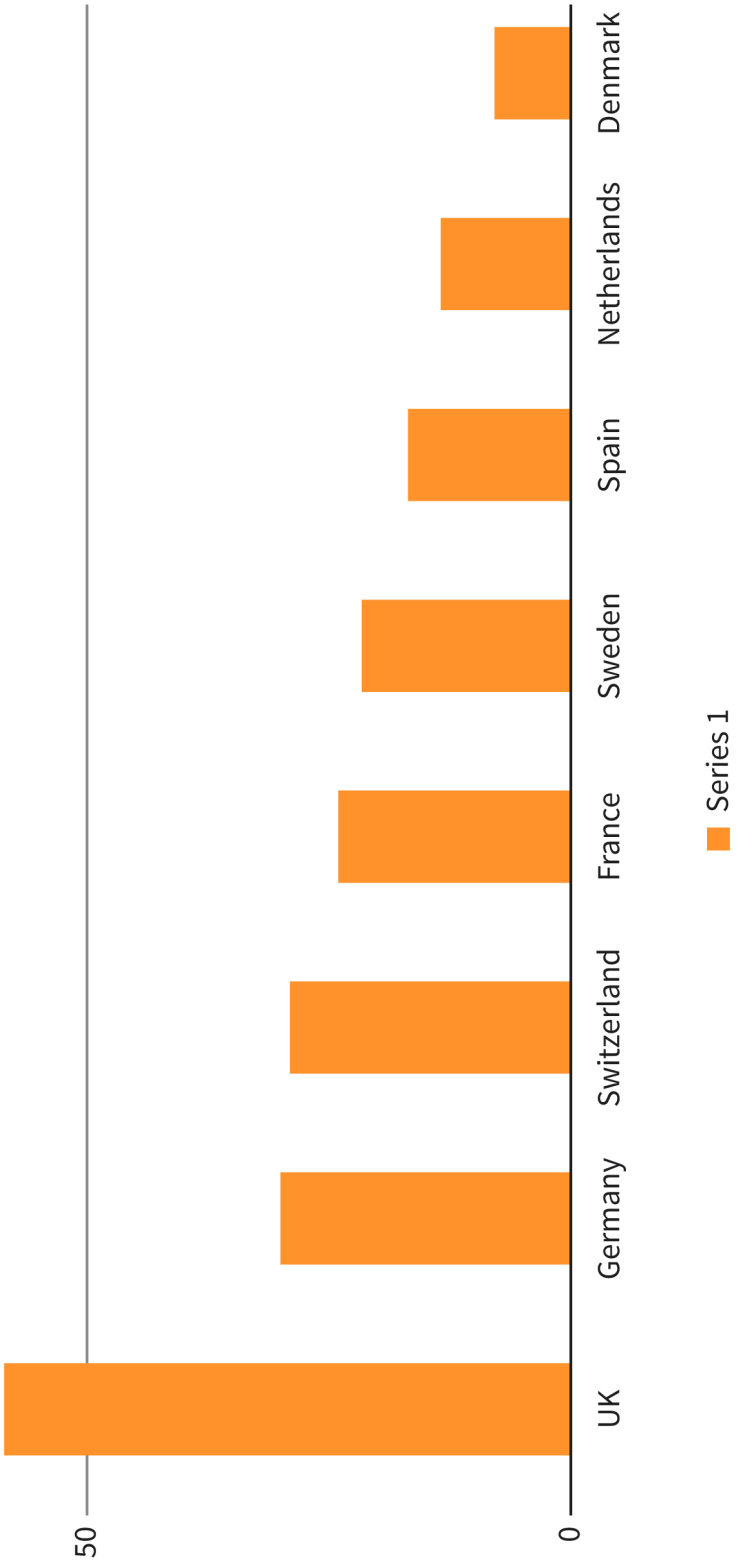
Figure 8: Green Fintech Firms by Region



Source: Fintechnews Switzerland (2022).

The figure below indicates the number of green FinTech firms across Europe. The UK has the highest number of green FinTech firms followed by Germany and Switzerland. Denmark, on the other hand, has the lowest number of green FinTech firms in Europe. According to the Climate FinTech Report (F10, 2022) the United States has the highest number of green FinTech firms in the world.

Figure 9: Total of Green FinTech Firms across Europe



Source: Fintechnews Switzerland (2022).

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

Although the US has the highest number of green FinTech, the Swiss green ecosystem is considered more complete. The Swiss green FinTech eco-system is comprised of six interconnected segments which include the following elements:

- **Digital Asset Solutions:** In this area, digital technology is used to offer ecologically and socially responsible investing solutions including impact investment portfolios and green bonds.
- **Digital Payment and Account Solutions:** This market category consists of FinTech firms that offer digital banking and payment services with an emphasis on boosting sustainable consumption and decreasing waste. Mobile banking applications that enable cashless transactions and reward users for environmentally beneficial actions are some examples.
- **Digital Investment Solutions:** This market category consists of FinTech firms that offer services and investment possibilities with an emphasis on environmental, social, and governance (ESG) factors. This can include robo-advisors that offer specialised investment portfolios based on ESG factors and crowdfunding platforms that let users support ethically and environmentally responsible companies.
- **Digital Risk Analysis and Insurance:** This market category consists of FinTech firms that employ technology to assess and reduce social and environmental risks when making investment decisions. This can involve using data analytics to evaluate a company's influence on local communities or machine learning algorithms to evaluate a company's carbon footprint.
- **ESG Data and Analytics:** In this section, technology is used to collect, examine, and display ESG data and insights. This can include ESG data suppliers that rate a company's sustainability or ESG data analytics platforms that give investors access to real-time ESG data.
- **Digital Deposit and Lending:** This market category consists of FinTech firms that employ technology to offer ethical depository and lending options. This may also apply to online savings.

The Swiss Green Fintech Network (2022) presents the latest taxonomy of green FinTech. The Swiss Green FinTech Network is a group of businesses and organisations working in the Swiss FinTech sector with a focus on green investing and sustainable finance. The network intends to link businesses, encourage teamwork, and support the expansion of green FinTech in Switzerland. It gives member organisations a forum to exchange best practises, viewpoints, and information about sustainable finance and green fintech. In order to promote the expansion of the green fintech industry in Switzerland, the network may also provide its members with research, networking opportunities, educational events, and other resources.

Table 10: Green Fintech Taxonomy

No	Area	Examples
1	Green digital payment and account solutions	Automated offsetting of green externalities.
2	Green digital investment solutions	Automated green investment advice
3	Digital ESG-data and analytics solutions	Digital green indexing

No	Area	Examples
4	Green digital crowdfunding and syndication platforms	Green donation crowdfunding
5	Green digital risk analysis and insure-tech	Smart contracts for green claims handling
6	Green digital deposit and lending solutions	Green digital mortgages
7	Green digital asset solutions	Green cryptocurrencies

Source: Swiss Green Fintech Network (2022).

5.4 Example

Treecard – The Green Super App in FinTech

Treecard is a Berlin-based company that provides a debit card that grows trees as customers spend. The startup's wooden debit card covers a customer's current bank account and funnels 80 per cent of transactions via it. According to reports, 85 per cent of people worldwide have changed their behaviour in the previous five years to become more sustainable.

The company has promised that no funds from accounts will ever be used to support the use of fossil fuels or deforestation. It also uses gamification to give users access to special offers and deals, such as free National Park passes.

Treecard, the company behind net zero and climate goals, has raised €22 million. Valar Ventures led a Series A fundraising round that brought in around €22m. Prior to the formal debut in 2023, Treecard will continue to develop the product and expand the team. Table 5 provides a summary of the financing initiatives of Treecard.

Table 11: Treecard financing initiatives

Announcement dates	Number of investors	Money raised (in million euros)
Nov 30, 2022	7	22
June 1, 2021	1	-
February 25, 2021	7	3.7
Oct 16, 2020	2	1

The table above indicates that Treecard was able to attract investor attention and raise the much needed finances to expand their sustainable operations in November 30, 2022. With the similar number of investors, the FinTech firm was able to raise only 3.7 million euros in February 25, 2021. More surprisingly, the firm was unable to raise any money during their Campaign in June 1, 2021. Some of the recent initiatives of the FinTech firms that attracted investor attention include:

- Plant trees as you spend
- Wooden card
- Earn planet-friendly rewards
- Fossil-fuel free account
- Monthly account service fee

During December 2021, the firm reported the following financial information (Pomanda, 2023):

- Turnover: 1.23 million (36 per cent increase from August 2021)
- Profit after tax: -1.02 million (44 per cent increase from August 2021)
- Total asset: 1.53 mission (16 per cent decrease from August 2021)
- Debt to equity ratio: 0.389 (as compared to 0.014 in August 2021)

Source: Crunchbase (2023).

SELMA's Impact Investment

SELMA is a sustainable finance initiative with a base in Switzerland that aims to combat climate change by promoting investment in low-carbon and climate-resilient solutions. The programme intends to facilitate the transition to a low-carbon, climate-resilient economy and connect financial systems with the objectives of the Paris Agreement.

Through a crowdfunding concept, SELMA functions by matching investors with social impact projects. Only projects that fit the rigid investment criteria of the platform are presented to investors after being sourced and screened by the SELMA team. Investment possibilities include everything from microfinance and renewable energy to programmes in education and healthcare.

SELMA is dedicated to openness, regularly updating investors on the status of each initiative, and making sure that their contributions are actually making a change. The platform also provides a variety of tools and resources, such as thorough project information, risk analyses, and performance data, to assist investors in making knowledgeable judgements.

SELMA focuses primarily on impact investing. The company was established with the goal of offering a solution to investors who wish to put their money in investments that are ethical, sustainable, and profitable. SELMA functions by matching institutional and individual investors with opportunities for impact investments that are consistent with their beliefs and objectives of impact investment. The organisation provides a variety of investment opportunities such as green bonds, environmentally friendly infrastructure, and renewable energy projects. The investment opportunities offered by SELMA are intended to have a good impact on society and the environment. The company utilises a cutting-edge technology and data analytics to monitor and assess the social and environmental impact of its investments.

In addition to helping to identify, create, and expand investment possibilities in clean energy, sustainable agriculture, and green infrastructure, SELMA offers a forum for the financial industry to work on sustainable finance solutions. In order to hasten the transition to a more resilient and sustainable financial system, the programme also gives investors access to research, data, and expert advice on sustainable finance options.

To keep its investors informed and up to speed on the status of their investments, SELMA communicates with them through a variety of ways. Regular updates, newsletters, reports, and web portals that offer performance metrics and real-time information might all fall under this category. Additionally, SELMA may conduct conferences or webinars for investors, offering chances for face-to-face interaction and communication. Depending on the particular investment as well as the needs and preferences of the investors, the frequency and format of these messages will change. The objective is to offer consistent, open-access information that will aid investors in comprehending the effects of their investments and the outcomes realised. SELMA has both individual and institutional investors. Institutional investors include:

- **TX Ventures:** This is a private investment company which focuses on making investments in start-ups that are working on technological solutions to pressing societal issues like healthcare, energy, and transportation. Companies that are addressing climate change and promoting sustainability are of particular interest to the company. To assist these businesses in expanding and scaling, it offers funding, knowledge, and assistance. Building enduring relationships with the businesses in its portfolio and assisting them in making a meaningful contribution to society are the goals of TX Ventures.
- **Sparrow Ventures:** This is a venture capital business that makes investments in early-stage startups with an emphasis on technology and sustainability. The company makes investments in businesses that are leading innovation and change in industries like sustainable agriculture, circular economy, clean energy, and environmental protection. In order to promote these businesses' expansion and scaling, Sparrow Ventures offers funding, mentoring, and support. In addition to generating financial returns for their investors, their objective is to have a good social and environmental impact.

SUMMARY

The finTech sector is expanding as stakeholder demands for better environmental and social performance rise. Less than one-quarter of US corporations had set up an ESG council or working group by the end of 2021, according to Deloitte (2021). The most important drivers of integrating environmental, social and governance (ESG) agenda into corporate strategy are cost and scepticism. The pandemic crisis is jeopardizing decades of progress, delaying the urgent shift to greener, more inclusive economies, and further derailment of the SDGs' progress. The world remains miserably off course in its meeting with Paris Agreement on climate change. Biodiversity is declining, and so are terrestrial ecosystems at an astonishing rate.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

Global Impact Investing Network (GIIN) defines impact investment as investments made to produce a measurable positive social and environmental impact. The impact investment market addresses the world's most pressing challenges in sectors such as sustainable agriculture, renewable energy, conservation, microfinance and affordable basic services. FMO, the Dutch development bank, and Clean Energy (CE), a special-purpose vehicle for wind farm financing, are funding Mongolia's first wind farm. This type of investment is known as an impact investment, which not only seeks a financial return but also aims to create a positive social and environmental impact.

UNIT 6

CYBER SECURITY, DATA PROTECTION AND REGULATION

STUDY GOALS

On completion of this unit, you will be able to ...

- define cyber security.
- discuss the current overview of data protection in Europe.
- explore regulatory changes related to data protection.
- analyze ethical considerations in FinTech.

6. CYBER SECURITY, DATA PROTECTION AND REGULATION

Introduction

Cybersecurity is an increasingly critical area of concern in the era of globalization. With the increasing reliance on technology and the internet, the lack of protection of personal and organizational data and information has raised several red flags. Cyberattacks, ranging from phishing attempts to ransomware attacks, can result in serious consequences, including financial losses, reputational damage, and disruption of critical systems. In recent years, both financial and non-financial sectors have become targets for cyber-attacks.

In addition to the direct financial consequences, cyberattacks could damage public trust and confidence in technology and the financial system. The global financial system is undergoing a rapid digital transformation, making it more vulnerable to attacks from daring criminals, states, and state-sponsored attackers. Low and lower-middle-income countries, which are undergoing a push toward financial inclusion, are also at risk of such attacks. Therefore, this chapter focuses on exploring various cybersecurity threats to financial institutions, emphasizes the needs and current developments in personal data protection and discusses the ethical considerations of financial fraud.

6.1 Cybersecurity Threats to Financial Institutions

The need to protect users on the internet is well recognized, and efforts to combat it are necessary. The privacy of individuals/organizations and their data requires attention. ETSI (European Telecommunications Standards Institute) is an independent, non-profit organization with more than a quarter of a century of experience. ETSI is the only ICT standards body officially recognized by the European Union (EU). This white paper provides an overview of all the work related to cybersecurity and outlines some of our goals and wishes for the coming years.

The majority of organizations are improving their cybersecurity measures. However, a few did not give cybersecurity the strategic focus it needed. Cybersecurity refers to the defense against illegal access of systems connected via internet, the type of systems could include hardware, software, and data. This can involve countermeasures against cyberattacks including network security and threat intelligence, as well as business continuity planning and disaster recovery. The National Institute of Standards and Technology (NIST) (n.d.) in the United States defines cybersecurity as “the practice of protecting networks,

devices, programs, and data from attack, damage, or unauthorized access." NIST provides widely recognized standards, guidelines, and best practices to help organizations enhance their cybersecurity posture.

Findings on the potential adverse effects of GDPR (General Data Protection Regulation) have been mixed. Organizations can benefit from further guidance on the right balance between data and security.

Cyber risk results from inadequate system infrastructure that increases user risk from various financial and non-financial threats. Cyber risks include both unintended incidents and intentional attacks. Estimates suggest around 40 per cent of cyber incidents are intentional rather than accidental. Four types of cyber risks are more common for financial institutions (Yeboah-Ofori & Islam 2019).

1. **Phishing:** Attackers are increasingly relying on targeted and customized malicious emails to compromise the end-user's device or get access to cloud services.
2. **DDoS attacks:** The financial sector is the target of the highest number of Distributed Denial-of-Service (DDoS) attacks. A DDoS attack occurs in several phases. First, the victim faces disruption in the internet connection. Next, a fake connection request breaches the server of the client which allows hackers to commit a diverse range of cyber attacks.
3. **Supply chain attacks:** Utilize the machine-to-machine communication network used in the supply chain. An internal supply chain network runs on trust which could have less emphasis on cyber security issues. Supply chain attacks are difficult to mitigate. Large multinational firms such as Microsoft and SolarWinds have faced such attacks in the past.
4. **Ransomware:** This is a type of malware that encrypts files over the network and demands ransom money. Hacktivism maybe industrial spies, "hacktivists", or state or state-backed actors. Leakage compromises confidentiality and results in financial and reputational losses.

The global financial system has been facing a growing threat of cyber attacks, which have the potential to disrupt financial stability, undermine public trust and confidence, and cause immense economic costs. The 2016 hack of the central bank of Bangladesh, in which $101 million was stolen, served as a wake-up call to the finance world that systemic cyber risks in the financial system had been severely underestimated. With the ongoing digital transformation of the financial system, accelerated by the COVID-19 pandemic, and the growing threat posed by malicious actors, cybersecurity has become more important than ever (Maurer & Nelson, 2021).

The global financial system is undergoing a rapid digital transformation as banks compete with technology companies and the demand for online financial services heightens. Meanwhile, central banks around the world are exploring digital currencies and modernizing payment systems. The increasing prevalence of digital financial services, however, also offers a target-rich environment for hackers. The pandemic has even supplied fresh targets for malicious actors, who pose a growing threat to financial stability and the integrity of the financial system. The financial sector has seen the second-largest share of COVID-19 related cyberattacks, behind only the health sector.

The malicious actors behind these attacks include not only daring criminals, but also states and state-sponsored attackers. North Korea, for example, has stolen $2 billion from at least 38 countries in the past five years. While cyberattacks in high-income countries tend to make headlines, less attention is paid to the growing number of attacks on soft targets in low and lower-middle-income countries, where the push toward financial inclusion has been most pronounced. The October 2020 hack of Uganda's largest mobile money networks, MTN and Airtel, is a prime example of the consequences of such attacks.

The integrity of financial data, such as records, algorithms, and transactions, is particularly at risk, and few technical solutions are currently available to protect against these types of attacks. The potential for these incidents to undermine trust and confidence more broadly is of great concern. Key voices, including Christine Lagarde, President of the European Central Bank, and the Financial Stability Board (FSB), have sounded the alarm and warned that a major cyber attack could trigger a serious financial crisis. The table below provides a list of high profile cyber fraud occurred in the past decade:

Table 12: High Profile Cyber Fraud 2013-2023

No	Type of cyber attack	Year	Affected Institution	Country	Impact of the cyber attach
1	Cyber heist	2016	Bangladesh Bank	Bangladesh	$101 million was still stolen.
2	Ransomware attack	2017	NA	Global	affected more than 200,000 computers in 150 countries, causing widespread disruption and demanding a ransom to unlock affected systems.
3	Data breach	2017	Equifax	United Kingdom	exposed the personal information of 143 million consumers, including social security numbers and birth dates.
4	Supply chain attack	2020	SolarWinds	United States	affected numerous government agencies and corporations, compromising sensitive data and networks through a supply chain attack on the widely-used SolarWinds software.
5	DDoS attack	2017	Deutsche Bank	Germany	temporarily disabled Deutsche Bank's online and mobile banking services, causing widespread disruption.

Source: Rashedul Hasan (2023).

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

6.2 Developments in Data Protection

The development of data protection across the globe has evolved in the past few decades. The rise of the internet and digital technologies have increased the need for improve privacy and protection of personal data.

Due to the growing amount of personal data that people, businesses, and governments are storing and sharing, it has become essential to develop efficient data protection regulations. Personal data has become a valuable commodity with the development of the internet and digital technologies, raising worries about privacy, security, and information misuse.

Individuals should have control over their personal information, and it should be processed in a transparent and responsible manner by businesses and government institutions. Individuals have the right to know the type of personal data being collected by various institutions. To prevent unauthorised access, theft, and other crimes, it also entails creating rules for the security and confidentiality of personal information. Lack of data protection laws can have serious, all-encompassing repercussions. Consequences include, among others:

- **Privacy violations:** People are susceptible to privacy violations including identity theft and unauthorised access to sensitive information when personal information is not sufficiently protected.
- **Economic losses:** Companies may face financial losses as a result of data breaches, which include expenditures for remediation, lost revenue, and potential legal action.
- **Damage to a company's reputation:** A lack of data privacy can result in bad press and reputational harm that is difficult and expensive to fix.
- **Loss of confidence:** When people have less faith in a company's ability to secure personal information, they may stop doing business with them and have less faith in the company as a whole.
- **Legal liabilities:** Failure to adequately protect personal information may subject organisations to legal liability, leading to penalties and court settlements.

Advantages of sound data protection regulation:

- **A greater sense of privacy and security for individuals:** Data protection laws make sure that personal information is gathered, handled, and stored securely, lowering the possibility of data breaches and unauthorised access to sensitive data.
- **Trust:** Trust in digital services may be increased thanks to a robust data security legislation, which can also boost users' faith in technology. This may improve the uptake and usage of digital services, spurring innovation and economic expansion.
- **Better business practises:** A well-designed data protection framework may encourage organisations and enterprises to handle their data responsibly, which will enhance data quality and foster more accountability and openness.
- **Better protection of human rights:** Data protection laws can aid in defending human rights, such as the freedom of speech, the right to privacy, and the protection of personal information.

- **Increased competitiveness:** By ensuring that all firms and organisations operate on an even playing field and refraining from discriminating tactics, data privacy legislation can assist to foster fair competition.

With regard to data protection in Europe, the original treaty of the European Community did not contain a reference to human rights or their protection. The main goals of the agreement were the development of a single market and the removal of trade restrictions among the signatory nations. The protection of human rights was not specifically included in the pact. At the time the treaty was written, the EU was primarily concerned with fostering economic integration and cooperation among its member states, and human rights were not seen as a top priority. The defence and advancement of human rights did not become a more codified component of the EU's goals and objectives until later treaties, such as the Maastricht Treaty in 1992.

A lawsuit was filed for alleged human rights violations in regions within the EU. The adoption of the Lisbon Convention makes the Treaty on the Functioning of the European Union (TFEU) (Petit & Neyrinck, 2010) a binding legal instrument and a milestone in the development of data protection law (Hijmans, 2010). Article 16 creates a new legal basis that gives the EU the power to legislate on data protection issues. This is an important development for considering EU data protection regulations, especially for sensitive data.

In 2016, after years of heated debate, the General Data Protection Regulation was adopted. The EU's Privacy Policy became fully applicable on May 25, 2018, when it was retired. The General Data Protection Regulation (GDPR) (Voigt & Von dem Bussche, 2017) provides harmonized data protection rules across the EU. According to EU law, the regulations apply directly to countries where they are not subject to the same data protection laws. The GDPR provides the following guidance to project customer data (Bendiek & Römer, 2018).

The Lawfulness, Fairness and Transparency of Processing Principles

The EU's General Data Protection Regulation (GDPR) aims to ensure that the processing of personal data is conducted lawfully and transparently, to protect the interests of individuals and the public at large. Data subjects have the right to be informed in writing whether their data is being processed and, if so, what kind of processing it is subjected to.

The Principle of Purpose Limitation

The purpose of the processing of personal data must be clear, specific and lawful. Processing personal data for no specific purpose, solely on the basis that it may be useful at some point in the future is not recommended. Processing data for additional purposes which is not compatible with the original one must have its legal basis. The General Data Protection Regulation (GDPR) rely on the concept of compatibility to consider whether further processing of personal data is compatible with its initial purposes, such as for archiving purposes or scientific or historical research. The data should not be handled in a way that the person it belongs to (the data subject) considers surprising, unacceptable, or unacceptable.

PREVIEW-PDF, erzeugt: 2024-06-12T09:45:58.541+02:00

The Data Minimization Principle

Article 5(1) of the modernized Convention No. 108 (Council of Europe, 2018) includes a proportionality requirement. This means that “[individual] data is reasonable and relevant, but involves disproportionate violations of fundamental rights and freedoms,” and should not be considered “excessive”, the convention says.

The Data Accuracy Principle

In the Rijkeboer case, the Court of Justice of the European Union (CJEU) (Galetta & De Hert, 2017) ruled that data subjects have a right to be able to check that their personal information is accurate and up to date.

The Storage Limitation Principle

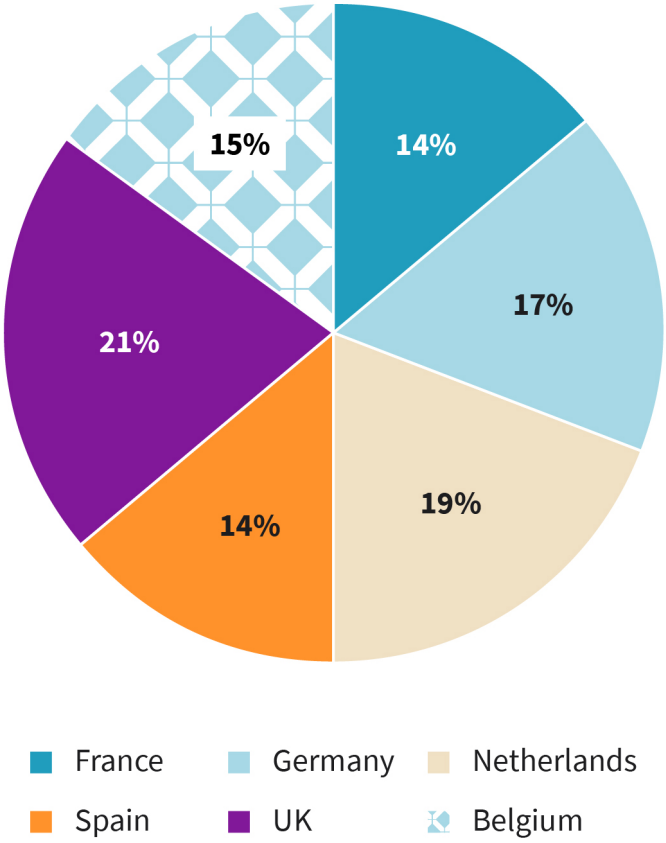
GDPR and modernized Convention 108 require personal data to be “retained in a form that allows identification” for no longer than is necessary for the purposes for which the data is used. For this purpose, “deadlines for the administrative deletion or periodic review” must be set.

The Data Security Principle

Personal data with encrypted or separated attributes is used in many contexts as a means of hiding an individual's identity. Pseudonymization can be an important factor in implementing privacy by design. The process of pseudonymization may compromise the effectiveness of data protection, according to the Council of Europe.

The figure below shows the GDPR awareness among European countries in 2022. The United Kingdom lead in terms of GDPR awareness followed by the Netherlands and Germany. France and Spain have the least awareness of GDPR.

Figure 10: GDPR Awareness in Europe



Source: Federation of European Data and Marketing (2022).

Regulatory Changes

Over the past few decades, data protection in Europe has made considerable changes. The Council of Europe's 1981 approval of Convention 108 (the first legally binding international instrument on data protection) was one of the significant turning points in the evolution of data protection in Europe. The Convention outlined fundamental principles for the protection of personal data, which includes:

- the need for data protection regulations,
- the demand that data be gathered for particular and legal purposes, and
- the requirement that data be kept secure and private.

The Data Protection Directive 95/46/EC was an attempt to develop a uniform data protection framework for countries in the EU. It was enacted in 1995 which requires all EU members to develop data protection laws. This is one of the early initiatives to develop a set of minimal requirements and protect the flow of personal data between EU members.

The General Data Protection Regulation (GDPR), which supersedes the 1995 Data Protection Directive, was adopted by the EU in May 2018. GDPR brough a number of significant improvements to data protection. This includes:

- greater penalties for non-compliance,
- the right of individuals to manage their personal data, and
- the requirement for businesses to designate data protection officers.

The GDPR has raised the bar for data protection regulations in Europe. The GDPR has influenced the development of data protection laws in other nations and played a significant role in raising public awareness of data protection and privacy rights. While the GDPR is applicable to all EU member states, it is crucial to recognise that different countries may implement and enforce it differently. For instance, some nations could have gone above and beyond what is outlined in the GDPR with their standards, while others might have somewhat different interpretations of key clauses.

The General Data Protection Regulation (GDPR) has not undergone any significant changes since it was first introduced on May 25, 2018. Through several EU legislative instruments, the rule has undergone a few modest clarifications and revisions.

The ePrivacy Regulation, which the European Commission proposed in January 2017, was one of the GDPR's most important modifications. The ePrivacy Regulation offers extra safeguards for the secrecy of electronic communications, such as emails and online chats, and is designed to work in tandem with the GDPR.

The European Data Protection Board (EDPB) has also released a number of guidelines to assist enterprises in comprehending and adhering to the GDPR. These recommendations offer clarity on numerous GDPR rules, such as the right to data portability, data protection impact assessments, and the role of data protection officers.

6.3 Ethics and FinTech

Ethics and FinTech

The Economist argues that digital content in everyday products such as washing machines, cars and financial products could erode consumer rights to their data. Financial services require many security and confidentiality considerations, making these issues very important for the sector. Some ethical considerations regarding FinTech services should be subject to public debate. For example, can FinTech become less ethical than a traditional bank? There are several views on this question. Those in favour place the argument that the automated decision-making process and improved data protection policies allow FinTech firms to embrace ethical considerations in their business model (Müller & Kerényi, 2019, p. 6). However, there are views that a clear definition of ethics in the digital world and a code of ethics for the operation could backfire the claim that “FinTech firms are more ethical than traditional financial institutions.”

According to Financial Accounting Standards Board (FASB) (2022), “Ethics refers to the moral principles and values that guide the behavior of individuals and organizations in financial reporting and decision making.” The definition of ethics does not differ significantly from the perspective of digital world. For example, Center for Digital Ethics and Policy, Loyola University Chicago (2022) define digital ethics as “the moral principles and values that guide the development and use of technology in a responsible and equitable manner.”

As such, it is crucial to explore the data ethics stakeholder ecosystem to get a better understanding of the ethical issues affecting fintech firms. The data ethics ecosystem for fintech firms comprises two types of stakeholders, i.e., internal and external.

- Internal stakeholders – include the board of the fintech firms, risk and compliance department and data scientists
- External stakeholders include – investors, the public, regulators, 3rd party service providers and other intermediaries.

Trust plays an important role in the growth of FinTech firms. Banks are relatively trustworthy compared to FinTech firms. Therefore, the key for FinTechs is to rebalance risk and build a data management framework to incorporate data ethics into an organization's operations. The following five areas could enhance trust in fintech firms.

1. **Respect human agency:** Financial institutions should not mislead or manipulate customers, except where the public interest is paramount. You should be able to tell or see when they are engaged in artificial intelligence or automated decisions, and it should be appropriate for you to have human control over these systems.
2. **Safeguarding equality and fairness:** This requires FinTech firms to detect potential negative impacts of discrimination that could occur through their current business practices.
3. **Deliver transparency:** Financial institutions must process data results within limits to ensure they are transparent and verifiability. Companies need to be able to explain their decisions to clients, auditors and regulators. Rigorous and extensive testing to ensure the algorithm works as it should and can form a basis of trust.
4. **Sponsor organization:** Financial institutions must adopt a governance framework based on the Financial Services Code of Conduct (FCoC), which aims to promote and ensure data ethics from the top down.
5. **Establishing accountability:** This is important as it allows better transparency across the supply chain of FinTech firms. FinTech firms need to emphasize developing accountability frameworks that govern their practices around ethical uses of customer data.

Financial Frauds

LendingClub

LendingClub, established in San Francisco, California, is one of the largest alternative lending platforms. Unsecured personal loans ranging from $1,000 to $35,000 were the main product. An investigation found that one of their customers had applied for a $22

million loan that did not meet the purchase criteria. LendingClub's problems can be seen as an opportunity for other fair-dealing companies to get some attention. The company's management should seek additional funding and reduce the number of loans granted to deal with the crisis. LendingClub executives admit they face serious budget problems if nothing changes.

The CEO of LendingClub (LC) resigned on Monday, May 2016 for improperly handling a loan. Peer-to-peer lending isn't regulated like a traditional bank. It's only a matter of time before they become much more regulated and loses some of their competitive advantages. This news should be extremely worrisome to current and potential users of LendingClub's platform. If the trust in the system starts to erode, the volume will follow along with it.

A fraud issue that the business experienced in 2016 caused a large drop in the value of its stock and the CEO's departure. The firm was accused of fabricating loan information to make customers look more creditworthy and boost their likelihood of getting financed, which was the crux of the controversy. Additionally, it was claimed that senior officials had engaged in insider trading and that the business had offered loans to investors that were outside LendingClub's own underwriting guidelines. Due to the incident, the business was the subject of several federal and state investigations as well as investor lawsuits. Additionally, LendingClub had to restate its results for multiple quarters, which resulted in a sharp decline in the value of its stock (Bloomberg, 2016).

The ethical issues can be summed up as follows:

- Misrepresentation of loan information
- Insider trading by senior executives which raise concerns about the integrity of the board.
- Violation of underwriting standards by selling loans to investors.
- Lack of transparency financial reporting and decision making at LendingClub.
- Neglect of corporate social responsibility which raises questions about the company's commitment to corporate social responsibility.

SoFi

A technology-driven personal finance firm called Social Finance Inc. (SoFi) offers a variety of financial services, such as refinancing student loans, personal loans, and investing services. The Securities and Exchange Commission began an investigation into financial crimes involving SoFi in 2021. (SEC). According to the SEC, SoFi misled investors regarding its business methods, risk management protocols, and compliance controls as well as the expansion of its loan portfolio. Additionally, the SEC said that SoFi misrepresented the outcomes of its internal loan underwriting review process and the likelihood of loan default. Following the inquiry, SoFi consented to pay a $1 million fine and to refrain from committing or causing any more offences.

SoFi inquiries about activities related to the trading of digital assets. SoFi completed its acquisition of Golden Pacific Bank, a state-licensed bank that will strengthen its digital banking operations. As part of the approval process for SoFi to acquire the bank, officials said FinTech cryptocurrency activities were not allowed.

The ethical issues include:

- **Deception:** SoFi deceived investors into believing that the company's loan portfolio was growing at a faster pace.
- **Misrepresentation:** SoFi failed to accurately disclose important information about its loan underwriting review process.
- **Responsibility to stakeholders:** SoFi violated their responsibility and potentially resulted in financial harm to its stakeholders.
- **Ethical leadership:** SoFi failed to prioritize the interests of stakeholders.

Revolut

UK-based super app Revolut has fallen victim to a cyber-attack that may have affected tens of thousands of customers. No card details, PINs or passwords were taken, but some individuals were vulnerable to fraud and phishing attacks. According to the Lithuanian Data Protection Agency, the team could include up to 50,150 customers worldwide.

Revolut was hit by a targeted cyberattack that gave unauthorized third parties access to the personal information of thousands of its customers. The FinTech company said no funds, card details, PINs or passwords were accessed or stolen. Lithuanian authorities said the hackers had stolen some of the card payment data, including customer names. A data breach occurred days after Revolut launched a new secure online checkout feature. Customers may be at increased risk of identity theft and fraud due to the breach.

A cyberattack was launched against the UK-based financial startup Revolut in July 2021. The company's systems were to be compromised, and client data was to be stolen. The business promptly identified the assault and took action to safeguard its systems, including temporarily turning off several functions. They also alerted the necessary authorities and the impacted clients about the assault. The firm said it has improved its security mechanisms and there were no reports of client monies being stolen during the hack. The quantity of data that was affected and the entire scope of the breach are not known to the general public.

The ethical issues include:

- **Privacy violation:** This is a violation of the right to privacy for the consumers of Revoult.
- **Responsibility for customer data:** The breach raises questions about the company's ability to protect customer data from cyber attacks.
- **Transparency and communication:** The company's communication and transparency during the incident will also impact its reputation and public trust.

Wealthfront

The SEC filed settlement proceedings against two Robo-advisors for misrepresenting investment products and posting misleading advertisements. Redwood City, Calif.-based Wealthfront Advisers LLC (formerly Wealthfront Inc.) improperly retweeted prohibited customer testimonials and paid bloggers for customer endorsements. New York City-based Hedgeable Inc. made several misleading claims about its investment performance. An SEC order against Wealthfront found that the advisor had violated the fraud prevention, publicity, compliance and other provisions of the Investment Advisers Act of 1940 (US Securities and Exchange Commission, n.d.). Hedgeable agreed to file the SEC order without confirming or denying the SEC's findings. The SEC's order reprimanded the SEC, ordered it to stop further violations, and fined it $80,000. The U.S. Securities and Exchange Commission announced that it settled with FinTech robo-advisors Wealthfront Advisors and Hedgeable. Wealthfront reportedly told clients it would look for stock trades that would trigger a wash sale — but about 31 per cent of account holders who signed up for the strategy had no impact on penalties (Irrera, 2018). When an investor sells an asset at a loss and immediately buys another investment that is substantially comparable, the transaction is known as a wash sale. The investor does this to create a tax loss that may be used to offset taxable profits. To stop investors from unduly exaggerating their tax losses in this manner, the wash sale regulations were developed.

The ethical issues include:

- **Misleading information:** Posting misleading information is a violation against transparency and reliability principle. It misleads potential customers and creates a false impression of the investment opportunities being offered.
- **Trust and reputation:** Misrepresentation information can severely damage the reputation of the firm.
- **Legal consequences:** Inaccurate information may violate advertising regulations and laws, which can result in legal penalties and other consequences for the robo-advisor.

Wirecard

Wirecard was a German FinTech firm listed on Frankfurt Stock Exchange and was part of the DAX index from September 1999 to August 2018. The company was founded in 1999, struggled in the Dotcom bubble and conducted a reverse IPO. A private firm can go public without going through a typical IPO by using a reverse IPO (Initial Public Offering). A “blank check company” or “Special Purpose Purchase Firm (SPAC)” is a commonly used in the merger or acquisition during a reverse IPO. Since 2007, the firm opened stores in countries such as New Zealand, Australia, South Africa, Turkey and China on the acquisition of the AllScore Payment service. Several board members and executives were arrested and CEO Jan Marsalek has been a fugitive since 2020. Wirecard has a debt of 3.2 billion euros and is missing €1.9 billion in revenue (Busvine & Uhlig, 2020).

Wirecard had overstated profits and fabricated sales to improve its financial performance. As a result of the fraud's exposure, hundreds of workers lost their employment, and the firm ultimately collapsed due to a huge loss of confidence. The Wirecard incident called into question the efficacy of financial sector auditing procedures as well as the accuracy

and dependability of financial reporting. EY, the company's auditors, received harsh criticism for their part in the incident since they failed to spot the fraud. Charges of fraud, market manipulation, and forgery have been brought against a number of Wirecard executives and workers (Carney & Smith, 2019).

The Wirecard incident emphasises the value of strict financial controls and the requirement for more accountability and transparency in the financial services sector. Additionally, it resulted in a demand for more stricter rules to safeguard investors and customers, as well as heightened monitoring of FinTech firms.

Creditors, including 15 banks that extended a credit line of €1.75 billion and investors who purchased €500 million bonds issued by Wirecard, are expected to suffer substantial losses. This is due to the discovery that approximately two-thirds of the company's sales and profits were fraudulent, making it difficult to repay the debt.

The disappearance of the Chief Operating Officer, Jan Marsalek, after the revelation of the Wirecard collapse, has made him the target of international pursuit. According to the Financial Times, Marsalek is also believed to have had political, military, and intelligence objectives, making him the focus of attention from three Western intelligence agencies (Ashfaq & Randall, 2020).

The Wirecard scandal has prompted the German financial watchdog, BaFin, and the Ministry of Finance to take measures to prevent a similar incident from occurring in the future. The Financial Reporting Enforcement Panel (FREP), a private sector organization that serves as Germany's accounting watchdog with 15 employees, will be replaced by BaFin. This will give BaFin the power to monitor and investigate the validity of financial reporting practices of listed companies (Ashfaq & Randall, 2020).

Auditor, EY, faced criminal charges and litigation on July 1, 2020, from a German law firm on behalf of bondholders, shareholders, and creditors for not fulfilling their professional audit responsibilities. The company had been the auditor of Wirecard for over 10 years.

In addition, the German government may face a class-action lawsuit on behalf of investors who suffered heavy financial losses due to a lack of monitoring of Wirecard. This comes after the arrest and re-arrest of CEO Markus Braun, the termination of contracts of three board members, the sale of loss-suffering global business units, and the layoff of over 50 per cent of Wirecard employees. Despite these challenges, the company continues to operate with the goal of minimizing losses for both investors and employees.

The ethical issues include:

- **Financial misrepresentation:** The Wirecard scam entailed significant financial misrepresentation of the corporation and breach of trust on the part of those responsible. For investors and creditors who depended on the veracity of the company's financial records, this unethical action led to huge financial losses.

- **Breach of trust:** A breach of trust and professional ethics was committed by the management and staff of Wirecard through their unethical actions, which included fabricating financial reports and hiding accounting inconsistencies. The company's shareholders, creditors and employees who relied on the company to act in their best interests, were harmed by this.
- **Compromising of the auditing company:** EY, the auditing company tasked with examining and confirming the correctness of Wirecard's financial reporting, also came under fire for its failure to identify and disclose the fraud.

SUMMARY

"Cyber risk" is an umbrella term for risks resulting from the failure or breach of IT systems. The EU's Privacy Policy became fully applicable on May 25, 2018, when it was retired. The General Data Protection Regulation (GDPR) provides harmonized data protection rules across the EU. According to EU law, the regulations apply directly to countries where they are not subject to the same data protection laws as the European Union.

FinTech companies in Australia have access to multiple layers of protection for their intellectual property (IP). The main forms of protection are shown below. Operators of cryptocurrency exchanges must hold an AFSL or Australian Market License if the crypto assets traded on the exchange are financial instruments. The People's Bank of China (PBOC) serves as the primary regulator of payment activities in China. Draft amendments to the China Commercial Banking Law provide a legal basis for electronic payments for digital currencies.