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In partial fulfillment of the requirements for the Master's degree in financial sciences and accounting.

SPECIALTY: CORPORATE FINANCE.

THEME:

FINTECHS: THE NEW FORMS OF BUSINESS FINANCING

Presented on 12/06/2025 by:

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I dedicate this modest work to

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TURINAWE NABOTH

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LIST OF ACRONYMS

2FA Two - Factor Authentication
ABC Arab Banking Corporation
ADA Agence de Développement de l'Artisanat
ADEPT Autonomous Decentralized Peer-to-Peer Telemetry
AGB Gulf Bank Algérie
AGI Artificial General Intelligence
AI Artificial Intelligence
AML Anti-Money Laundering
ANADE Agency for Entrepreneurship Support and Development
ANI Artificial Narrow Intelligencee
ANPT Agence Nationale de Promotion et de Développement des Parcs Technologiques
ANVREDET Agence Nationale de Valorisation des Résultats de la Recherche et du Développement Technologique
AON All-Or-Nothing
API Application Programming Interface
ASF Algerian Startup Fund
ASI Artificial Super Intelligence
ASICOM Algerian-Saudi Investment Company
ATM Automated Teller Machine
AWS Amazon Web Services
B2B Business-to-Business
B2C Business-to-Consumer
BaaS Banking as a Service

BADR Bank of Agriculture and Rural Development
BDL Banque de Développement Local
BEA Banque Extérieure d'Algérie
BigTech Big Technology
BIS Bank for International Settlements
BNA Banque Nationale d'Algérie
BNB Binance Coin
BNP Banque Nationale de Paris
BTC Bitcoin
CAGR Compound Annual Growth Rate
CDTA Centre de Développement des Technologies Avancées
CF Crowdfunding
CFP CrowdFunding Platform
CFPs CrowdFunding Platforms
CNEP Caisse Nationale d'Épargne et de Prévoyance
COSOB Commission for the Organization and Supervision of Stock Market Operations
COVID-19 Coronavirus Disease 2019
CPA Crédit Populaire Algérien
CRD Capital Requirements Directive
CRR Capital Requirements Regulation
DDoS Distributed Denial of Service
DeFi Decentralized Finance
DL Deep Learning
DOGE Dogecoin
DSRPAI Dartmouth Summer Research Project on Artificial Intelligence

DZD Dinar Algérien.
EC2 Elastic Compute Cloud
ECB European Central Bank
E-COMMERCE Electronic Commerce
ECSPR European Crowdfunding Service Providers Regulation
EMIR European Market Infrastructure Regulation
ETFs Exchange-Traded Funds
ETH Ethereum
EU European Union
FCA Financial Conduct Authority
FCE Fonds de Capital-Engagement
FDIC Federal Deposit Insurance Corporation
FINALEP Financière Algero-Europeenne de Participation
FinLab Finacial Laboratory
FinTech Financial Technologies
FIs Financial Institutions
GCM Global Cash Management
GDPR General Data Protection Regulation
GPUs Graphic Processing Units
HPC High Performance Computing
HSBC HongKong and Shanghai Banking Corporation
IaaS Infrastructure as a Service
IBM International Business Machines
ICOs Initial Coin Offerings
ID Identification Document
IFRS9 International Financial Reporting Standards 9

IMS Innovation Market Solutions
ING Internationale Nederlanden Groep
InsurTech Insurance Technology
IoT Internet of Things
IPO Initial Public Offering
IT information technology
JSON JavaScript Object Notation
KSI Keyless Signature Infrastructure
KYC Know Your Customer
LAN Local Area Network
LATAM Latin America
LDX Long Distance Xerography
LTL Less Than Truckload
M-Changa Mobile- Changa
MDL Mutual Distributed Ledger
MEA Middle East and Africa
MENA Middle East and NorthAfrica
MiCA Markets in Crypto-Assets
MiFiD Markets in Financial instruments Directive
ML Machine Learning
M-Pesa Mobile Pesa
MVP Minimum Viable Product
NASDAQ National Association of Securities Dealers Automated Quotations
NBS Nottingham Building Society
NFC Near Field Communication
NFTs Non-Fungible Tokens
NGOs Non-Governmental Organizations
NICT New Information and Communication Technologies
NIST National Institute of Standards and Technology

NYSE New York Stock Exchange
OTC Over-The-Counter
P2P Peer-to-Peer
PaaS Platform as a Service
PBC Public Benefit Corporation
PC Personal Computer
PDF Portable Document Format
PoS Proof of Stake
PoW Proof of Work
PSD2 Payment Service Directive 2
QR Quick Response
RBAC Role Based Access Control
RBI Reserve Bank of India
RDC Remote Deposit Capture
RegTech Regulatory Technology
RODO Rozporzadzenie o Ochronie Danych Osobowych
SaaS Software as a Service
SDG Sustainable Development Goals
SEC Securities and Exchange Commission
SGA Société Générale d'Assurance
SMEs Small to Medium-Sized Enterprises
SMS Short Message Service
SOEs State-Owned Enterprises
SoFi Social Finance

SOFINANCE Société Financière d'Investissement, de Participation et de placement
SOL Solano
STOs Security Token Offerings
STP Smart Transaction Protocol
SWIFT Society for Worldwide Interbank Financial Telecommunication
TD Toronto - Dominion
TPPs Third Party Payment Service
TRX TRON
U.S. United States
UAE United Arab Emirates
UAR Union of Insurance and Reinsurance Companies
UK United Kingdom
USA United States of America
USD United States Dollar
USDC United States Dollar Coin
USDT Tether United States Dollars
USDT United States Dollar Tether
VC Venture capital
VMs Virtual Machines
VPN Virtual Private Network
WAN Wide Area Network
WealthTech Wealth Technology
XML Extensible Markup Language

GENERAL INTRODUCTION

General introduction.

The entire world is currently being transformed by the rise of digital technology. We have entered the Fourth Industrial Revolution. Industry 4.0 represents a major shift, as digitalization reshapes the way goods are produced.[1] In this revolution, technology has experienced remarkable growth, building upon the achievements of the Third Industrial Revolution and enhancing them with data and modern innovations.

In this fourth era, technology is driving change across major industries and the financial sector is of no exception. With the rapid advancement of technology, fintech short for financial technology emereged in 2008 coinciding with the global crisis.[2] Following the subprime crisis, many bankers and traders left the worlds major financial centers to embark on entrepreneurial venture rethinking finance through technological innovation.

Their goal was to simplify finance making it more accessible while offering higher quality and lower cost services. This period saw the rise of numerous fintech startups along with the development of blockchain technology and cryptocurrencies among other innovations.

In the united states, the fintech has been booming in recent years and has recently begun expanding into Europe. Its rapid growth is largely driven by the democratization of mobile technologies which has created new opportunities in the financial sector.

FinTech companies aim to replace certain banking activities and even aspects of the banking profession itself. They offer services ssuch as financing solutions, deposit systems, and payment platforms. While they currently focus on niche markets, they are expanding to provide businesses and individuals with financial services comparable to those offered by traditional banks. Venture capital firms and ebven banks are investing in FinTech companies. Some banks choose to form partnerships believing that FinTech will halp address the challenges facing ana evolving financial industry.

The public has shown great interest in FinTech solutions as they eliminate the need for traditional banking intermediaries. Fintech companies provide accessible and affordable financial services to everyone.

[1] Schwab, Klaus. (2017). The fourth industrial revolution. Crown Business, p.12

[2] Arner, D. W., Barberis, J., & Buckley, R. P. (2016). The Evolution of FinTech: A New Post- Crisis Paradigm? Georgetown Journal of International Law, 47, p.1272.

From the outset, fintech startups have adopted a Big Data approach integrating technologies that allow them to collect, store, process and analyse vast amounts of data.[3]

The rapid advancement of Financial Technology has transformed the global financial landscape introducing innovative and more accessible financing solutions for business. Traditional financing methods such as bank loans and venture capital often come with stringent requirements and lengthy approval processes limiting access to capital for startups and small businesses. In contrast, fintech driven financing mpdels leverage digital platforms, blockchain technology, artificial intelligence, big data analytics to offer more efficient, flexible and inclusive funding options.

This evolution in financial services has given rise to new forms of financing including crowdfunding, peer to peer lending, decentralized finance (DeFi). Revenue based financing and alternative credit scoring. These innovations reduce dependency on conventional banking institutions, allowing businesses to secure capital through digital ecosystems that offer lower costs, faster processing times and greater transparency. Additionally, the rise of sustainable finance and green FinTech solutions reflects a growing demand for ethical and impact driven investment models. As businesses navigate an increasingly digital economy understanding the opportunities and challenges associated with FinTech based financing is essential.[4]

This study explores the key drivers behind the emergence of new financing models, their impact on business growth and the regulatory considerations that shape their adoption. By analyzing the role of technology in financial accessibility, this research aims to provide insights into how businesses can leverage FinTech innovations to optimize their financial strategies and drive long-term success.

The problem statement.

A central question lies at the heart of our research problem:

How have FinTechs transformed the traditional business financing methods?

It is important to highlight that this central question requires addressing other equally important sub questions, namely:

What are the advantages and risks associated with using these new forms of business financing?

[3] Gomber, Peter, Kauffman, R.J., Parker, C., & Weber, B.W. (2018). "On the FinTech Revolution: Interpreting Forces of Innovation, Disruption, and, Transformation in Financial Services". Journal of Management Information Systems, Vol. 35, no. 1, p.222.

[4] World Bank. The global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID -19. 2022. https://www.worldbank.org/en/publication/globalfindex.

How have FinTechs improved access to financial services?

Objective.

The objective of this research is to analyze new financing methods and their impact on banks, to gain a comprehensive perspective on the FinTech of the financial sector and access its level of integration with in the banking sector in Algeria.

Research methodology.

In order to answer the questions mentioned above and to attain our objectives, we followed a research methodology, which involves collecting data and information related to the subject of consulting books, e-books, articles, research papers, websites, and journals. This will help us to understand better how the new methods of business financing have changed the financial sector. Our research is supported by statistics, graphs, and tables.

Structure of work.

Our research methodology allows us to structure our work into three chapters.

The first chapter covers the theoretical framework of FinTechs, including its definition and evolution, principal technologies used, and the composition of the FinTech ecosystem.

The second chapter focuses on business financing methods including traditional business financing methods, different categories of FinTechs in business financing, advantages and risks of new financing methods through FinTechs.

The third chapter is dedicated to presenting the comparative study of FinTechs in the world including the impact of COVID 19 and unicorns on the development of FinTechs, the current state and perspective of FinTechs in the world and finally the state of FinTechs in Algeria.

CHAPTER ONE: THEORETICAL FRAMEWORK OF FINTECH.

Introduction.

Financial Technology (FinTech) has emerged as a transformative force in the global financial landscape, integrating technology with financial services to enhance efficiency, accessibility, and innovation. As financial institutions, businesses, and consumers increasingly adopt digital solutions, understanding the theoretical foundations of FinTech becomes essential for analyzing its impact, growth, and regulatory implication.

This chapter is divided into three sections: The first section presents the definition and evolution of FinTech, the second one presents the principal technologies used in fin tech and lastly, the FinTech ecosystem.

Section 1: Definition and Evolution of FinTech.

Under this section, we shall explore the definition of FinTech and its evolution, delving into how financial technology has emerged as a revolutionary force in the financial industry, integrating advanced digital solutions to enhance, automate, and innovate financial services across various sectors, from banking and payments to investments and insurance. While also, examining its historical development, from the early days of basic financial tools to the modern era of artificial intelligence, blockchain, and decentralized finance.

1 Definition of FinTech.

The etymology of FinTech derives from the combination of two English words: finance (financial services) and technology (information technology).[9]

English dictionary defines FinTech as “computer programs or other technology used to support or enable banking and financial services.” The phenomenon of FinTech has been discussed for several years in the context of innovation.

FinTech is an application of technology that supports the process of providing financial solutions. FinTech is not limited to specific sectors (e.g. the banking sector) or to a specific business model (e.g. peer-to-peer lending), but covers all financial services and products in the traditional sense.[10]

FinTech are IT solutions developed internally by large financial institutions (banks, insurance companies or investment funds) or delivered to these entities by external suppliers

[9] Gimpel,H., Rau, D and Röglinger, M. (2017). Understanding FinTech start-ups- , p. 246.
[10] Arner, D. W., Barberis, J., & Buckley, R. P. (2016). Op.cit., p.1274.

(both large and small enterprises).[11] The purpose of these solutions is to support financial institutions in the provision of basic services, but also to improve the product portfolio, develop a new business model, or improve the efficiency of processes. These solutions include API3 (Application Programming Interface), data platforms, alternative insurance systems, alternative systems for trading financial instruments, currency exchange platforms (currency exchange offices) and others.

FinTech is a company that is not regulated at all in the legal system or is only partially regulated. The task of FinTech entities is to provide innovative financial services through new technology. FinTech companies were established to provide modern financial services that go beyond the traditional scope.[12]

In view of the above definitions and its economic nature, the leading definition of FinTech is "a technological innovation that can help to increase market access, introduce a new product offer and reduce costs for customers."[13] Unlike traditional financial intermediaries, FinTech entities are not regulated.

2 The Evolution of FinTech.

The beginning of innovations that gave rise to the FinTech industry can be seen in the financial revolution, which took place in Europe at the end of the seventeenth century. It was a time of expansion of insurance, banking, capital companies, which significantly marked their role in the process of industrial revolution. FinTech is not a new phenomenon. Numerous publications attempt to describe and present it against the background of historical facts.

The evolution of FinTech can be classified into three eras:[14] FinTech 1.0, FinTech 2.0, FinTech 3.0. Each of these three eras is distinguished by a level of differentiation in the market leading to a change in consumer behavior towards money. But also the FinTech 3.5 era is additionally described.

2.1 FinTech 1.0 –Analogue industry (1866–1967).

In the 1860s, Giovanni Caselli invented a device known as a pantelegraphy, mainly used to verify signatures in bank transactions by sending and receiving transmissions via

[11] Deloitte, (2016).FinTech in CEE: Charting the course for innovation in financial services technology, p.7
[12] D. Varga, (2017). FinTech, the new era of financial services, p.22.
[13] Financial Stability Board. (2019). FinTech and market structure in financial services: Market developments and potential financial stability implications, p.10.
[14] Arner, D. W., Barberis, J., & Buckley, R. P. (2015). The Evolution of FinTech: A New Post-Crisis Paradigm. University of Hong Kong Faculty of Law Research Paper No. 2015/047, p.5.

telegraph cables.[15] Some, as the first step towards the FinTech revolution considered this invention. The Atlantic Telegraph Company laid transatlantic cables between Europe and America in 1866, paving way for an era of infrastructure creation and network links around the world.

The electronic payment system by Fedwire, originally established in 1918 by the Federal Reserve System in the United States was the first step towards the digitalization of money.

The publication of the book "the economic consequences of peace" in 1919 was also considered the first reflection on a future governed by FinTech.

After the Second World War, a fast technological progress was observed, especially in the field of communication and information technology. The first tools for breaking codes developed on computers provided by International Business Machines (IBM) that appeared in that time.

The 1950s were the time when new credit card providers debuted on the American banking services market (Diners Club in 1950 and American Express in 1958).[16]

The establishment of fax by Xerox Corporation under the name Long Distance Xerography (LDX) in 1964.

The creation of the Interbank Card Association, now MasterCard, in the United States in 1966 that supported the consumer revolution.

During 1967, the financial sector had adopted traditional analog technologies such as the telegraph, railroads, canals, and steamships, which underpinned financial interlinkages across borders allowing transmission of financial information, transactions and payments across the world.

The introduction of the first ATM (Automated Teller Machine) in the United Kingdom in 1967 by the financial holding Barclays marked the end of the FinTech 1.0 era.[17]

2.2 FinTech 2.0-Digitization (1967–2008).

This era remains undoubtly the most explicit period in terms of the combination between finance and technology. The transfer of financial services from analog to digital areas characterized era FinTech 2.0.

[15] Batiz-Lazo, B., & Wood, D. (2002). An Historical Appraisal of Information Technology in Commercial Banking. Electronic Markets, 12(3), P.192.
[16] Batiz-Lazo, B., & Del Angel, G. A. (2018). History of Payments and FinTech. In Handbook of Blockchain, Digital Finance, and Inclusion (Vol. 1). Academic Press, p.15.
[17] Batiz-Lazo, B., & Reid, R. J. (2011). The Development of Cash-Dispensing Technology in the UK. IEEE Annals of the History of Computing, 33(3), p.34.

The introduction of the ATM machine by Barclays in 1967 begun the era of FinTech 2.0. Just a year before, in 1966, telex had replaced the telegraph to transmit information around the world.

In 1968, the invention of the Inter-Computer Office (Automated Clearing House) in the United Kingdom, which was the basis of today's automated interbank settlement services in the area of payments.[18]

The launching of the electronic payment system by Fedwire, by the Federal Reserve System in the United States, in the early 1970s.

The biggest growth in FinTech came in 1971 with the creation of NASDAQ as the first electronic stock exchange.[19] This changed the way offerings were made and significantly modernized the initial public offering (IPO) process.

The establishment of the Society for Worldwide Interbank Financial Telecommunication (SWIFT) in 1973 recognizing the need to interconnect cross-border domestic payment systems.

The breakdown of the Bretton Woods exchange rate system in 1973 and a moment later the Herstatt crisis contributed to the creation of the Basel Committee on Banking Supervision at the end of 1974 under the auspices of the Bank for International Settlements (BIS).

In 1981, Michael Bloomberg founded Innovation Market Solutions (IMS).

As computerization and technology development had progressed, the securities area also saw a gradual phase out of paper-based trading in favor of electronic trading (trade plus) in 1982.

In 1983, the Nottingham Building Society (NBS) first introduced online banking for customers in the United Kingdom, and in the same year, mobile phones were first launched.

Throughout the entire FinTech 2.0 period, financial institutions increased the use of IT in their internal operations, gradually replacing most paper-based mechanisms.

In 1984, financial institutions became more and more willing to use Bloomberg terminals, which only proves that traditional financial services companies were the recipients of tools provided by FinTech.

[18] Modern Treasury. (n.d.). What is the Bankers' Automated Clearing System (BACS)? https://www.moderntreasury.com/learn/what-is-bacs

[19] NASDAQ. (2021, February 11). *NASDAQ:* 50years of market innovation. https://www.nasdaq.com/articles/nasdaq%3A-50-years-of-market-innovation-2021-02-11

In the late 1980s, financial services became largely a digital industry, based on electronic transactions between financial institutions, financial market participants and customers worldwide, for example in 1998, PAYPAL was launched, the pioneer of cashless payments to come. The advent of the Internet began another stage of growth.

The inception of the first internet banking protocols via world wide web (www) by wells Fargo in 1995 to create the first-ever internet banking experience for financial consumers.[20]

In 2001, eight banks in the United States had at least one million customers online.

By 2005, the first banks without physical branches (e.g. ING Direct, HSBC Direct, and Egg Banking) had appeared in the United Kingdom.[21] The bank's internal and external processes were completely digitized at the beginning of the twenty-first century. In addition, regulators increasingly used technology, especially in the area of stock exchanges, and computerized transaction systems and data logs became the most common source of information.

The 2008 crisis was a major turning point for the development of FinTechs and led to a fundamental change in the perspective of the FinTech sector and the need for innovation led to the real explosion revealed in the years to come. It is clear that, the 2008 crisis is mainly mentioned to talk about a recession. This recession shook the banking sector causing a lack of consumer confidence in financial institutions. While during this time, confidence in technologies exceeded that in banks.

2.3 FinTech 3.0 and 3.5 –the era of startups and BigTech (2008-present)

2.3.1 FinTech 3.0

The financial crisis of 2008 is seen as a turning point and at the same time the beginning of the FinTech 3.0 era.

After 2008, the market situation was encouraging the emergence of innovative entities that use financial and technological "know-how" in their activities. The basis for the dynamic development of technological innovations was the progress in technology, such as artificial intelligence (AI) and machine learning, databases (Big Data), distributed computing,

[20] Wells Fargo. (n.d.). First in online banking. https://history.wf.com/first-in-online-banking/
[21] Finextra. (2005, December 1). Prudential to buy out Egg. https://www.finextra.com/newsarticle/14598/prudential-to-buy-out-egg

cryptography and mobile Internet access, which initiated the emergence of new applications for various financial institutions.[22]

The most important reasons that made the dynamic development of the FinTech 3.0 era possible include the following:

- Social perception: New experiences and habits of consumers led FinTech companies to challenge traditional financial institutions. In a digital world, customers expect agility, flexibility, and continuous service improvement from financial service providers.[23]
- Regulatory control: The global financial crisis strengthened international confidence in the need for regulatory change. New regulations such as CRD IV/CRR, PSD2, MiFiD II, IFRS9, GDPR (RODO), and EMIR introduced complex obligations. This growing complexity encouraged traditional institutions to adopt FinTech solutions like AI, machine learning, and cloud computing to manage compliance more efficiently.[24]
- Economic conditions: In response to the 2007–2009 crisis, central banks lowered interest rates to historically low levels, with some even turning negative (e.g., Switzerland, Denmark, and Germany). As a result, traditional savings became less attractive, prompting investors to seek alternative financial solutions. These conditions contributed to the transformation of banking functions and accelerated financial innovation.[25]

Era FinTech 3.0 showed that only regulated financial institutions no longer provide financial services.

Three important milestones stand out in this phase:[26]

➢ Establishment and implementation of blockchain network in 2009, bases for bitcoin as the first cryptocurrency. Bitcoin was the first solution functioning in blockchain technology. According to the report of the World Economic Forum, blockchain technology has been gaining in importance since 2015.

➢ Implementation of mobile payments based on NFC (Near Field Communication) technology, which is changing the perception of consumers towards access to financial services. Thus, mobile devices are becoming the primary means of accessing the internet and financial

[22] E-Zigurat. (2022). Evolution of FinTech: The 5 Key Eras. Retrieved from https://www.e-zigurat.com/en/blog/evolution-of-FinTech/
[23] The Payments Association. (2019). FinTech: The history and future of financial technology. https://thepaymentsassociation.org/article/FinTech-the-history-and-future-of-financial-technology/
[24] EBI Europa. (2023). FinTech regulation and licensing principles, p.13
[25] Stripe. (2024). A guide to FinTech innovation. https://stripe.com/ae/resources/more/FinTech-innovation-where-financial-technology-is-today-and-where-its-heading
[26] Arner, Douglas W. et al. (2015) "The Evolution of FinTech: A New Post-Crisis Paradigm?" p.15

services among others promoting the rise of P2P payment systems. One of the first such systems was the Google Wallet payment system created in 2011. The western world has produced new developments since then. RegTech, digital lending, InsurTech, and many others are growing day by day.

- Development of biometric solutions based on face recognition. In 2017, BigTech Alibaba implemented Smile to pay solution, which allows users to pay with a smile to the camera.

This period is particularly represented by the rise of start-ups, with an unprecedented enthusiasm for innovation on the part of investors and consumers encouraging the creation of new financial products and services.

Faced with this craze, banks have decided to join the cause and new services have appeared such as "Banking as a service" platforms facilitating existing systems in order to be able to launch neo-banks.

From 2008-2013, investements in FinTech start-ups in venture capital increased fourfold. The growing number of new FinTech start-ups created following the 2008 crisis and their ability to integrate disruptive technologies and offer innovative services in niche segments attracted venture capital funds. Investors thus saw an opportunity to invest in the future unicorns (start-ups with a financial valuation of more than $1 billion) 0f financial sector.

2.3.2 FinTech 3.5 - Emerging markets.

The FinTech 3.5 era, which began in 2011, should be specified from the FinTech 3.0 era.[27] The FinTech 3.5 era is an intense development of innovation by most researchers as defined by J. A. Schumpeter in 1912.

The year 2014 to date have seen a non-linear rise in the two most populous countries in FinTech, namely China and India. Lacking large chains of complex banking infrastructure, both these countries have experienced rapid growth in the FinTech sector.

This, along with FinTech developments in Africa, is considered to be the growth driver from 2014-2018. This is led by SaaS developments such as financial software from Indian IT companies, M-pesa in Africa in 2005, payment banks in India and Alipay in china in 2004, and among others.[28]

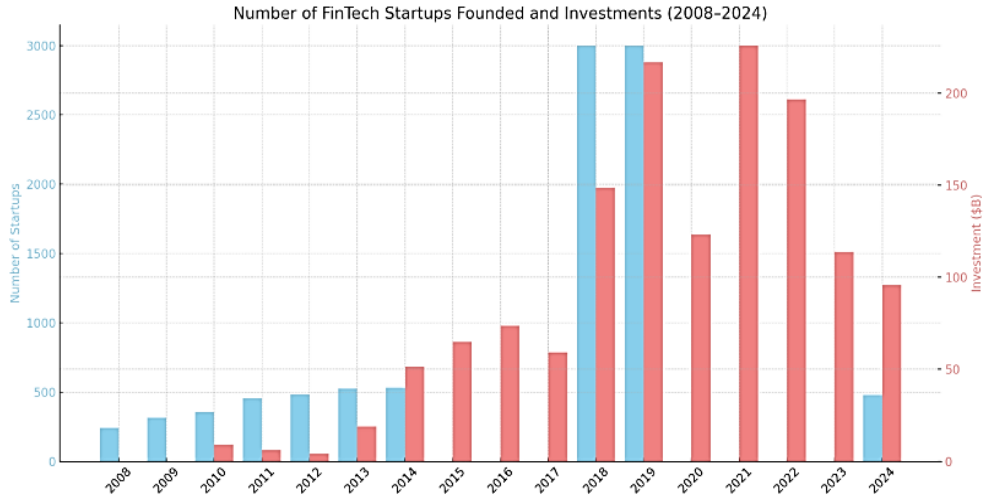
[27] Arner, D. W., Barberis, J., & Buckley, R. P. (2015). Op.cit. p.20.
[28] Ghosh, D. (2019). FinTech: The Rise of India and China in Global Financial Innovation. Springer, p.48.

In 2018, venture capital investments represented $40billion globally, a record increase of 120% compared to 2017. However, the number of deals only increased by 15%, which means that the size of the deals was much larger. Therefore, we can say that after 10 years of growth, innovations and significant funding, the FinTech start-up sector is starting to structure itself around major players who will have the means to challenge traditional players in their market. The maturity of the innovative projects brought by startups and the favorable external environment make these start-ups prosper within the financial sector.[29]

FinTech 3.0 and 3.5 eras are also an intensive growth in the number of FinTech companies.

The essence of the FinTech phenomenon in 2008–2017 is shown in Figure 1.

Figure 1. Number of FinTech companies established annually and investments in FinTech (in $B) in 2008–2017.



Source: Deloitte. (2017). FinTech by the numbers: Incumbents, startups, investors adapt to maturing ecosystem**,** p.13. KPMG International. 2025, February. Pulse of Fintech H2 2024, p. 5.

The graph illustrates the annual number of FinTech startups founded and global investment volumes in the sector from 2008 to 2024. It shows a steady increase in both metrics from 2008, with a significant surge in investment starting around 2014 and peaking in 2021 at approximately $225.8 billion. Startup formation also peaked around 2018–2019 with over 3,000 new companies founded globally each year. However, after 2021, both investment and startup

[29] PwC. (2019). FinTech and emerging markets: Opportunity and challenge. PwC Global FinTech Report, p.33.

creation declined sharply, with only 479 new FinTechs launched and $95.6 billion invested in 2024, the lowest levels since the early 2010s. This trend reflects the sector's maturation, investor caution, and a shift from rapid expansion to more measured growth.

Table 1 : Evolution of FinTech.

Era	FinTech 1.0	FinTech 2.0	FinTech 3.0	FinTech 3.5
Date	1866–1967	1967–2008	2008–today	
Geography	-Global -Developed markets	-Global -Developed markets	Developed markets/country	-Emerging markets -Developing markets
Key elements	Infrastructure Computer	Internet Banks	-Smartphone -Start-up -New participants in the financial services market -innovator	
Shift origin	-The Industrial Revolution -analogue	Digitization of processes	The financial crisis in 2008	Development of innovations

Source: Arner et al. (2015). Op.cit., p.1271

Section 2: Principal Technologies used in FinTech.

The rapid growth of FinTech startups and innovations has revolutionized the banking and financial sector. The constant development of information technology (IT) has made it possible to digitize and improve all elements of the financial sector value chain. Big Data, Artificial Intelligence (AI), and blockchain are disruptive technologies in FinTech and give new entrants the ability to disrupt the financial sector by creating new services, products, and business models.

Today, these technological innovations in the financial sector are widely disseminated, quickly integrated by consumers, and are helping startups thrive at the expense of traditional players. The main tools and technologies currently used in FinTech activities are:

1 CLOUD COMPUTING.

1.1 Definition of cloud computing.

Cloud computing refers to computing services over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale.[30]

Cloud computing is the central component of digital infrastructure and it emerges as one of the essential services for businesses and individuals. It evolves from the data center and is the main driving force for enterprise transformation.

Cloud computing is regarded as the third IT wave after PC and Internet transformation and has become essential support for developing the information industry. It has brought about fundamental changes in the way of life, consumption, and business, and triggers the entire industry's transformation. It's application also moves towards a more core and critical area, paying more attention to security, stability, and risk prevention and control.

Cloud computing infrastructure, composed of both hardware and software, includes HPC servers, data storage, databases, networking, software, analytics, and other new technologies such as AI and blockchain.

In the early 2000s, Amazon launched Elastic Compute Cloud.[31] The EC2 is a web service that provides scalable computing capacity in the Amazon Web Services (AWS) Cloud. It allows companies and individuals to launch virtual servers, configure the security and network settings, and manage their storage without investing in hardware upfront.

Additionally, Google's Google Docs services launched in 2006 allow users to create, share, edit, and comment on documents stored in the cloud.

In 2007, Netflix launched its video streaming service, using the cloud to stream movies and other video content into the homes and onto the computers of thousands (and eventually millions) of subscribers worldwide.

1.2 Advantages of cloud computing.

- Cloud computing allows many customers to share the same computing resources so that the cost of IT is reduced, and the development and deployment of applications are much faster. There is no need to procure expensive computer systems to install the operating system and application software, which also reduces all the associated maintenance costs.[32]

[30] Armbrust, M., Fox, A., Griffith, R., et al. (2010). A View of Cloud Computing. Communications of the ACM, 53(4). https://doi.org/10.1145/1721654.1721672.
[31] Amazon Web Services. (n.d.). What is Amazon EC2? https://aws.amazon.com/ec2/
[32] World Bank Group. (2020). The Role of Digital and Cloud Technologies in the FinTech Ecosystem. https://www.worldbank.org

- The cloud environment has better cyber-security. Leading cloud providers offer robust security features and compliance support tailored for financial services.[33]
- Cloud service providers are increasingly offering new technologies such as AI, blockchain, and many others so that even a company that does not have expertise in the area can develop applications together with the cloud service provider.

1.3 Types of cloud (cloud computing models).

The NIST defines four cloud deployment models. The four main cloud-computing models differ based on the geographical location of the cloud infrastructure and the entity responsible for administering access and maintaining the infrastructure.[34]

✓ Public cloud: It is where the services and infrastructure are housed at an external service provider (i.e., the cloud provider's premises). The service provider is responsible for managing and maintaining the infrastructure, and the cloud services are available to the public on a subscription basis.[35] Connections to public cloud providers are usually made through the Internet.

Examples of public clouds are Amazon Web Services (AWS), Google Cloud, IBM Cloud, Microsoft Azure, and Oracle Cloud.

✓ Private cloud: It is dedicated for a single customer only. Its infrastructure is on-premises.

A private cloud is similar to a public cloud except that the services and infrastructure are housed and located internally to the company or organization using the cloud. The organization is responsible for the management, administration, and software/client application installed on the end user's system.

A private cloud is usually accessed through a Local Area Network (LAN) or a Wide Area Network (WAN). Occasionally where users are remote, the access is provided using a Virtual Private Network (VPN).

A private cloud offers better privacy compared to a public cloud. An example of a private cloud is VMware.[36]

[33] World Bank Group. (2020). Op.cit. https://www.worldbank.org
[34] Mell, P., & Grance, T. (2011). The NIST Definition of Cloud Computing (NIST Special Publication 800-145). National Institute of Standards and Technology. https://doi.org/10.6028/NIST.SP.800-145
[35] Buyya, R., Vecchiola, C., & Selvi, S. T. (2013). Mastering Cloud Computing: Foundations and Applications Programming. Morgan Kaufmann, p.33.
[36] VMware. (2023). What is a Private Cloud? P.12.

✓ Hybrid cloud: It is the combination of public cloud and private cloud. The user of a hybrid cloud has an on-premises private cloud; yet it can redirect the excess demand to a public cloud.

Sensitive data could be hosted on a private cloud, while non-sensitive data could be hosted on the public cloud.[37] A hybrid cloud is generally more complex but allows more flexibility in fulfilling an organization's objectives.

✓ Community cloud: Community cloud is usually commissioned for exclusive use by a community of users, such as organizations sharing a common purpose, mission, security requirements, or policy. The cloud infrastructure may be located on or off-premise.

A community cloud offers privacy to the organizations, and it is jointly maintained and administered by a group of organizations.

1.4 Characteristics of cloud computing.

- On-demand self-service: The client of a cloud supplier should obtain computing capabilities or resources such as processing capacity and network storage capacity on an on-demand basis. This process does not require the client to go through human interaction with the service provider.
- Broad network access: The cloud capabilities should be accessible over the network through standard mechanisms or protocols used by heterogeneous thin or thick client platforms such as mobile phones, tablets, laptops, and workstations.
- Resource pooling: Resources such as processing capacity, storage, memory, network bandwidth, and VMs serve multiple consumers. The assignment of these resources is dynamic and depends on the consumer's demand. The consumer would have no control or knowledge of the exact location of their assigned resources. However, he/she may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).
- Rapid elasticity: The cloud capabilities can be scaled in and out by provisioning and releasing them elastically based on demand.[38] This process can be made more efficient via automation. The quick responses to requests for resources appear to the consumer as access to infinite resources. Elasticity provides the flexibility to provide these resources on demand.
- Measured service: a cloud system should closely monitor the service usage and the health of services, automatically control, and optimize resources via metering capability.

[37] IBM. (2023). Public vs Private vs Hybrid Cloud: What's the Difference? P.15.
[38] Buyya, R., Vecchiola, C., & Selvi, S. T. (2013*).* Op.cit., p.18.

Resource usage can be monitored, controlled, reported, and billed accordingly. This provides transparency for both the cloud provider and consumer.

1.5 Service Models of cloud computing.

The NIST (National Institute of Standards and Technology) defines three main cloud service models. Service models define how businesses or individuals may use cloud services. This may range from pure data storage to the development of software and the usage of the cloud as a computing platform.

According to NIST: "The term 'as a [cloud] Service' is a suffix describing a computing capability that supports all five essential characteristics of cloud computing. The term 'as a service (aaS)' implies that SaaS, PaaS, and IaaS are delivered by way of "software."

- Software as a Service (SaaS): In a SaaS environment, the cloud service provider controls everything about the application being deployed. This limits the amount of customization that the client can request. Most SaaS providers offer their services in the form of a web-based application. They allow organizations to use the latest software at all times without incurring additional costs with a flexible subscription model.[39]

Prime examples of SaaS providers are outlook.com, Google Drive, Dropbox, and Cisco WebEx.

- Infrastructure as a Service (IaaS): IaaS provides clients with services including computing power, storage, networking, and operating systems. The clients use IaaS to deploy and run arbitrary software and applications.

The service provider is solely responsible for maintaining the physical hardware, storage, and networking infrastructure; it does not need to act as an operating system administrator, giving more control and security to the clients.[40]

The clients are responsible for maintaining the operating system and all the applications installed on the operating system.

Prime examples of IaaS providers are Amazon Web Services, Alibaba Cloud, and Rackspace.

- Platform as a Service (PaaS): PaaS allows clients to use programming languages, libraries, services, and tools supported by the provider. In PaaS, clients use the platform to provide for computing needs without building their infrastructure.

[39] Armbrust, M., Fox, A., Griffith, R., et al. (2010).op.cit., p.50.
[40] Zhang, Q., Cheng, L., & Boutaba, R. (2010). Cloud computing: state-of-the-art and research challenges. Journal of Internet Services and Applications, 1(1), p.7.

The service provider has no control over what application or service the client develops.

Generally, the client is responsible for everything beyond the operating system and development platform. In contrast, the service provider is responsible for maintaining and ensuring that the operating system is patched and up-to-date.

Examples of PaaS providers are Windows Azure, Apache Stratos, and OpenShift.

1.6 Uses of Cloud Computing in FinTech.

This subsection discusses several possible ways that FIs (financial institutions) or FinTech firms may leverage cloud computing to enhance their business efficiency and generate additional revenue. The cloud model enables companies to outsource the administration of technology infrastructure to cloud service providers and access computing resources in a flexible, efficient, and secure manner.

With cloud maturity becoming the hallmark of the world's best performing banks,[41] the financial service industry has observed steady cloud adoption, which has only been accelerated further by the Covid-19 pandemic.

There are several ways in which companies (FinTech entrants) utilize cloud technology to expedite the process of innovation in financial services.

- Data management: The benefits of cloud computing are most pronounced in data management systems because traditional data infrastructures in FIs are not only expensive to purchase, set up, and maintain, but they are also unable to scale to meet the variable and increasing volume of data. Cloud technology enables FinTech companies to aggregate, store, and manage large quantities of data securely, without capacity constraints and the need for significant investment in infrastructure. With efficient data management on the cloud, businesses can harness innovative, data-centric approaches to improve existing products and services.

In 2020, Capital One became the first US bank to shift all of its operations into the public cloud by exiting its physical data centers. The movement away from infrastructure management has enabled the bank to manage data at a larger scale to take advantage of machine learning capabilities and deliver customer-centric innovation.[42]

[41] Accenture. (2020). Cloud maturity: The key to unlocking digital transformation in financial services., p.5
[42] Amazon Web Services. (2020). Capital One on AWS. Amazon Solutions, Case Studies. https://aws.amazon.com/solutions/case-studies/capital-one/

- Operational costs: Cloud services enable FinTech organizations to reap considerable cost savings in developing and operating independent infrastructure for their data management needs. Migrating to the cloud allows companies to incur smaller, ongoing operational costs instead of significant up-front capital expenditure, channeled into more uses that are productive.

Further, cloud providers offer a utility-based model in which companies can scale up computing resources when required and scale down when demand subsides. As companies only pay for resources they utilize, cloud computing eliminates the need for costly over-provisioning.[43]

This dynamic cloud pricing captures considerable cost efficiencies and facilitates granular spending control.

- Scalability and agility: The ability to access a shared pool of configurable computing resources can increase a financial institution's ability to innovate by enhancing agility, efficiency, and productivity.[44] For instance, it provides FinTech companies with the flexibility to scale without the need for costly upgrades to on premise technology infrastructure.

Cloud migration also enables shorter development cycles for new products, supporting an agile and efficient response to customers' needs. FinTech companies can test new scenarios and alternative configurations without a lengthy purchasing and provisioning alongside minimal upfront cost.

- Automated services: Cloud technology enhances the capabilities of FinTech companies by allowing them to address the performance complexities of services such as AI, machine learning, and data analytic techniques. Companies can then reap the benefits of these services while keeping infrastructure costs low.

TD Securities, a leading provider of advisory and capital markets products, utilized massive computing power to price complex derivative products with its in-house software. The multitude of sophisticated data analysis, cloud software offered by major cloud providers can also provide FinTech companies with a real-time view of their portfolios, assisting risk monitoring and management

- Business continuity: Ensuring business continuity during unprecedented times requires reliable and resilient infrastructure. Major cloud providers have invested significant

[43]Blazheski, F. (2016). Banking Analysis: Cloud Banking or Banking in the Clouds? U.S.EconomicWatch. https://www.bbvaresearch.com/

[44] Saluja, G., & Sepple, K. (2018). Cloud Scalability and Agility in FinTech. Journal of Financial Innovation, 21(2), p.32.

funds to meet the highest security standards and necessary regulations. They possess a demonstrable track record of performance within the financial services industry. Therefore, the adoption of cloud technology is highly reliable for businesses. It provides sophisticated systems for data storage that offer a much greater level of resilience to businesses, ensuring data security in the event of disasters.

Most companies experience improved disaster recovery times after migration to the cloud. S&P Global Ratings, the world's leading provider of independent credit ratings, experienced improvements of over 50% in its disaster recovery time and is confident that the resiliency of Amazon Web Services would allow the company to avoid SEC penalties during application downtime.[45]

- Artificial intelligence; Cloud can support the massive data storage capacity, scalable computing power, and embedded graphic processing units (GPUs) to handle the large data stores and algorithms that AI systems need to work on an ongoing basis. Coupled with its flexibility, it is deemed to be the most viable place for complex AI-driven business processes that drive rapid innovation.[46]

Public cloud providers have a variety of AI-based tooling to enhance the offering of FinTech Companies. For instance, Alibaba Cloud offers an AI Service solution that allows companies to build various types of multi-language customer service chatbots to enable text, voice, and image interactions.[47]

- Customer centricity; Customer centrism is imperative to survival in the increasingly competitive, digitally transformed FinTech industry. By enhancing efficiency and personalization, the cloud can assist FinTech organizations in meeting the needs of their customers efficiently.

In addition, personalized and predictive selling of products is a formidable advantage for FinTech companies by improving customer acquisition, satisfaction, and retention. The cloud offers better data-driven preparation for more predictable and optimal customization results by allowing real-time information updates. This maximizes the return on investment of the companies' decision strategies and enhances the customer experience.

The UK's Starling Bank has managed to turn large amounts of data into real-time actionable insights that have improved customer interactions at scale, using BiqQuery from

[45] Amazon Web Services. (2020). Op.cit., p.4.
[46] Finextra. (2020). Natural Language Processing is the Next Step to Automation. Finextra Research. https://www.finextra.com/newsarticle/35053/natural- language-processing-is-the-next-step-to-automation
[47] Alibaba Cloud. (n.d.). Artificial Intelligence Service for Conversational Chatbots. Alibaba Cloud Solutions. https://www.alibabacloud.com/solutions/ai-chatbots

Google Cloud[48]. For instance, merchant identification and real-time notifications with Google Maps APIs have enabled the bank to offer personalized and convenient solutions for its customers, such as budget tracking and fraud detection.

- Environmental efficiencies; through cloud migration, FinTech companies can also reduce the energy consumption and carbon footprint that comes with setting up physical infrastructure. With more, efficient utilization of computing power and less idle time, companies can reap significant environmental efficiencies.

2 BLOCKCHAIN.

Blockchain is also known as the Mutual Distributed Ledger (MDL). It is a structured database.

MDL categorizes data into three types: identity data, transaction data, and content data. Using Identity MDL, Transaction MDL, and Content MDL, one can create all kinds of applications that were not possible with the conventional database.

Blockchain is such a solution, which provides a secure, immutable, distributed way of handling data. In addition, the blockchain database is distributed. Any change in one of the copies will make it distinctly different from the other copies.

2.1 Definition of blockchain

Blockchain is a technology that allows information to be stored and transmitted in a transparent, secure manner and without a central control body. It looks like a large database that contains the history of all the exchanges made between its users since its creation.

Blockchain is a P2P (peer-to-peer) infrastructure for real-time crypto transactions and certification. It complements the existing internet infrastructure that allows information to be published and is the basis for various applications in the payments network.[49]

Blockchain technology simplifies the management of trusted information, making it easier for entities/persons to access and use critical public-sector data while maintaining the security of this information.

Blockchain technology uses blocks of data. Once these blocks form a chain, they are linked so that any change will escalate throughout the blockchain and therefore become more

[48] Google Cloud. (n.d.). Starling Bank on Google Cloud. Google Cloud Customer Stories, p. 1.
[49] Wright, A., & De Filippi, P. (2015). Decentralized Blockchain Technology and the Rise of Lex Cryptographia. Harvard Public Law Working Paper No. 16-28, p. 14.

secure. Verification and management using automation and shared protocols protect the data from unauthorized access.[50]

Initially an open-source solution, the blockchain is not a software, but a development framework, its computer code is available, in the form of modules, on databases accessible via the internet, developed within the framework of communities.

The blockchain can be used in three ways:[51]

- For the transfer of assets (currency, securities, shares, etc.).
- For better traceability of assets and products.
- For the automatic execution of contracts, ("smart contracts").

2.2 Elements of blockchain.

- Blocks: These groupings of information or transactions are distinguished from each other by the addition of an identifier code called "Hash". For example, Estonia is rolling out a platform called Keyless Signature Infrastructure (KSI) to safeguard all public-sector data. KSI creates hashes of the original data. The hashes are stored in a blockchain and distributed across a network of government computers. Whenever an underlying file changes, a new hash value appends to the chain. An unauthorized data change will produce a hash not acceptable by the blockchain.[52]

- Nodes: These are the computers connected to the blockchain network. Each computer contains a copy of the database, which is downloaded when connected to the network, and contains all exchanges between users.[53]

- Miners: These are people whose role is to verify the transactions and operations of network users.

2.3 Types of blockchain

- Public blockchain: It is a ledger open to everyone. This blockchain is characterized by its total openness. There is therefore no central registry, nor a trusted third party.

[50] Mougayar, W. (2016). The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology. Wiley, p. 97.
[51] De Filippi, P., & Wright, A. (2018). Blockchain and the Law: The Rule of Code. Harvard University Press, p.59.
[52] Mougayar, W. (2016).op.cit., p. 97.
[53] Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction. Princeton University Press, p. 21.

- Private blockchain: It is where write access granted by a centralized organization (such as a central bank), but read permissions may be either public or restricted (private).
- Hybrid blockchain: Here, the consensus process is controlled by a pre-selected set of nodes (participants). Access to this blockchain can be public or restricted to participants through a co-optation process. These blockchains can be considered "partially decentralized."

2.4 Functioning of blockchain.

The blockchain process is quite simple conceptually but from a practical point of view, it becomes much more complex. The steps of the process can be simplified into 7 steps:

- Initiation of a transaction: An exchange of data in the form of digital assets is initiated between two parties for example.
- The transaction is submitted to the blockchain network
- Miners select certain transactions: this is a filtering process so as not to end up with duplicates
- Collecting transactions in a block: These transactions are assembled in a block. In order to be able to propose a block, miners must solve a mathematical problem that requires a lot of computational capacity, through the use of proof of work, in order to be able to collect a reward.
- Block identification: the proposed block is identified using a hash as consecutive to the previous block allowing the block to be protected from any subsequent modification.
- Adding the block to the blockchain: The mined block is added to the blockchain. Nodes help protect against corruption by preventing transactions from being added or removed from the ledger.
- Confirmation of the transaction.

2.5 The application of blockchain technology in finance.

Blockchain technology is revolutionizing multiple sectors, particularly finance. Thanks to its security, transparence and decentralization features, it offers significant improvements in several key areas.

❖ International payments: For the past forty years, traditional international payments have relied heavily on SWIFT's secure financial messaging system, which is an intermediary for banks in this market. With the arrival of the blockchain, cross-border payments have become faster and cheaper than with traditional systems.

The most important FinTech company in this market is the American company Ripple, which provides its customers with a platform based on blockchain technology called "Ripple Net,"[54]

❖ Digital customer identification systems: Security is a very important aspect for an online bank and transactions such as payments must be secure and validated. For every financial institution, it is therefore crucial to verify the identity of the user before giving them access to their online accounts.

Blockchain technology can simplify this control by giving users the choice to choose how they identify themselves and whom they agree to share their identity with. Once they have registered their identity on the blockchain, they do not have to repeat this registration and can safely reuse the identity verification for other operations.

An example is the FinTech Cambridge blockchain that provides strong digital identities globally and meets increasingly stringent data privacy obligations.[55]

❖ Trade finance: In the trade finance sector, i.e. financial activities related to trade and international trade, blockchain can streamline the entire business process by getting rid of paperwork and bureaucracy.[56] Thanks to "Smart contracts", smart contracts that make it possible to automate tasks that today generally have to be carried out manually.

❖ Investments in the stock markets: The FinTech Robinhood is a company that operates in the market for investments in stocks, stock funds, options, and cryptocurrencies without fees. Customers can from a mobile app place their investments and buy or sell cryptocurrencies like Bitcoin, Litecoin, Ethereum, making financial markets more accessible to retail investors.

❖ Audits: The various sources of information for an auditor, namely, account reconciliations, audit balances, entry log, sub-ledger extracts, and supporting spreadsheet files are available in both electronic and paper formats. This involves an auditor investing a lot of time to perform an audit. Thanks to the blockchain, auditing is simplified, and records are made directly in the ledger, so the storage and updating of data is optimized. Auditors have the ability to access all data in real-time. In this way, the blockchain reduces the time and cost of audits.[57]

[54] Ripple. (2020). RippleNet: The global payments network. https://ripple.com/ripplenet/
[55] Cambridge Blockchain. (2020). Building digital identity solutions. https://www.cambridgeblockchain.com
[56] Cai, Y. (2018). Blockchain technology in trade finance: Transforming the way we conduct business. Journal of Financial Technology, 12(3), p.45.
[57] Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Op.cit, p.50.

2.6 Advantages of blockchain.

- Blockchain technology, ideal for digital transactions, has the potential to implement STP and to transform the global financial network.
- The technology accelerates the velocity of money, thus improving the efficiency in the economy.
- It also provides a path for legacy banking systems to interoperate, greatly improving efficiency.
- The use of distributed ledgers has the potential to disrupt the payment industry in the near future.
- Major credit card companies, such as VISA, MasterCard, American Express, and major banks and financial service firms are all embracing blockchain technology due to a potential reduction in costs and improved product offerings.
- In processing transactions, blockchain and AI enable trust and speed up transactions. Loan applicants grant consent for access to personal records stored on the blockchain. Approval or disapproval can be obtained using trusted data and automated processes in seconds instead of days.
- Blockchain-based smart contracts and distributed apps open up a wide frontier for transaction applications, in addition to the immutable digital identity, which provides a chain of custody and proof of asset ownership.
- Decentralized Web3, hybrid cloud, and distributed ledger technologies facilitate e-commerce payments and transactions, furthering crypto asset purchases through digital currencies and deploying crowdsourced and triangulated data source analysis, behavioral biometrics, and intuitive, immersive, and real-time authentication processes.

2.7 Factors that favor blockchain technology.

- The maturity of Internet technology itself.
- The advances in computer science.
- The spread of cheap computing power.
- The high speed.
- High bandwidth communication.
- E-commerce and trade globalization.

3 ARTIFICIAL INTELLIGENCE (AI).

The mention of artificial intelligence (AI) evokes images of science fiction.

3.1 Definition of artificial intelligence.

Artificial intelligence is defined as "a process of imitating human intelligence that relies on the creation and application of algorithms executed in a dynamic computing environment. Its goal is to enable computers to think and act like human beings."[59]

AI is also "the construction of computer programs that perform tasks that are currently more satisfactorily performed by humans because they require high-level mental processes such as; perceptual learning, memory organization and critical reasoning."[60]

It represents a set of theories and techniques implemented to create machines capable of simulating human intelligence. In this regard, this technology aims to provide better data analysis and exploitation capacity.

3.2 History of Artificial Intelligence.

AI is not a new technological system, as computer scientists believe that mathematician Alan Turing developed the first form of AI after World War II in the 1950s. In his book Computing Machinery and Intelligence, Alan Turing discusses the question of machine intelligence.[61] He then discusses the "Turing Test," in which a participant interacts blindly with another human, and then with a computer designed to provide intelligent responses. If the subject cannot identify the difference, the computer has passed the test and is "intelligent."

AI is the simulation of human intellect by creating and applying algorithms in a dynamic computing environment. The goal is to teach computers to think and behave like humans. This requires the use of computer systems, data management systems, and sophisticated AI algorithms (code). To get as close as possible to human behavior, artificial intelligence requires large amounts of data and computing power.

AI "seeks to make computers do the sorts of things that minds can do."[62] The origins of Artificial Intelligence are often traced back to the middle of the 20th century with reference to the three laws of Robotics or the Imitation Game and Digital Computers.[63]

Certainly, the invention of the analog computer by an American Navy in 1938 and later a digital computer by Konrad Zuse in 1939 were also important steps in the history of

[59] Netapp. (2019). Artificial intelligence in the digital age. Netapp Technologies, p. 12.
[60] Boden, M. A. (2018). AI: Its nature and future. Oxford University Press, p. 58.
[61] Turing, A. (1950). Computing machinery and intelligence. Mind, 59(236), p.10
[62] Boden, M. A. (2018). Op.cit. p. 58
[63]Turing, A. (1950). Idem, p.10

artificial intelligence.[64] The first intelligence use of the term "Artificial Intelligence" is attributed to the title of a workshop organized by Marvin Minsky and John McCarthy ((DSRPAI") at Dartmouth College in 1956.[65]

The technology came into the public eye in 1997 when IBM's Deep Blue chess program beat chess grandmaster Garry Kasparov. Although the terms AI, machine learning and deep learning are sometimes used interchangeably, they are not the same.

3.3 Classification of AI.

Depending on its capability, AI is also classified as: Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), and Artificial Super Intelligence (ASI).

- ANI refers to the AI, which can perform only very specific tasks, such as playing chess, or voice and facial recognition.
- AGI is almost human-like, and the intelligence of ASI will be superior to that of humans.
- ASI; Singularity is the point at which ASI becomes a reality. That is the point of no return because AI will be able to continue to evolve on its own without human input. When singularity is achieved, AI may do things beyond the comprehension of the human race.

3.4 Functioning of AI.

- An AI machine and Big Data create AI. The AI machine consists of hardware, memory, and algorithms. The hardware is the computer. Today, the neural computer rather than the traditional computer power more and more the AI. Neural computers imitate the functionality of the human brain. An algorithm is the deep-learning or machine-learning software. Most of the hardware today resides in the data center or in the cloud.
- Data are collected from everywhere.
- They are sent to the AI machines through the Internet.

3.5 Main tasks performed by AI.

- Learning. In the learning phase, the AI system receives data and learns what that data is and how it should behave. The result of this learning is stored in its memory.

[64]Bibel, J. (2014). The evolution of artificial intelligence: From analog to digital. MIT Press, p. 23.
[65] Haenlein, M., & Kaplan, A. M. (2019). Artificial intelligence: Opportunities and challenges. Journal of Business Research, 98, p. 45.

- Execution, the AI system is fed with data and it then processes that data to produce an appropriate response
- Artificial intelligence promises to augment human intelligence and to help humans to accelerate innovations.
- Large companies in the digital economy, such as Amazon, Google, IBM, Alibaba, are all offering AI algorithms in their cloud computing services so their customers can build AI-based applications.
- AI is also used in the financial industry to detect and flag activity in banking and finance such as unusual debit card usage and large account deposits.[66]
- As machines become more intelligent, they can perform more humanlike tasks, such as; strategic games, self-driving cars, medical diagnoses, facial recognition, and many more.

3.6 Elements of AI machines.

- Hardware; is the computer system that mimics a human neuron network[68].
- Software; is the machine learning algorithm, also known as deep learning, including search, mathematical optimization, methods based on statistics and probability, etc.
- Big Data; Big Data is fed into the AI machine to train it. In facial recognition, AI learns to recognize people by examining millions of faces.[70]

3.7 Forms of artificial intelligence.

3.7.1 Machine learning:

It is a branch of data science in the discipline of computer science. ML relies on algorithms to analyze large amounts of data to issue a result or understand a behavior.[71]

In essence, the machine learning algorithm performs error detection/ correction; optimization repeats the process until the optimized accuracy has been met. The final output is the decision

[66] Mikalef, P., Krogstie, J., & Pappas, I. O. (2019). Exploring the implications of big data analytics for financial institutions. Financial Innovation, 5(3), 154-169, p. 156
[68] Haenlein, M., & Kaplan, A. M. (2019). Op.cit., p. 60
[70] Mikalef, P., Krogstie, J., & Pappas, I. O. (2019). Op.cit., p. 158
[71] Bibel, J. (2014). Op.cit., p. 87

3.7.1.1 Advantages of ML.

- Machine learning-based FinTech enable bank credit rating and lending across digital financial markets, enhancing sustainable finance, credit rating trustworthiness, and financial conditions, performance, and inclusion.[72]
- Machine learning algorithms can precisely predict organizational financial performance, optimizing informed decision-making as regards financial services.

3.7.2 Deep learning:

Deep learning is more advanced machine learning in that it automates the learning process, enabling the use of larger data sets.

DL is a more advanced form of AI, based on algorithms and a neural network, which will make the system more free in its evolution. Deep learning learns faster, scales faster, and is more efficient when analyzing large volumes of data.

3.8 Applications of AI in the financial sector.

Currently, AI is already widely used. AI enables banks to become more competitive in related industries like real estate.

- E-commerce; AI is used in e-commerce to deliver a personalized shopping experience. The recommendations are based on the shopper's purchasing history, background, and experience. A visual search also allows a customer to buy something similar to the image of their search item.
- AI-powered assistance; AI assistants, as the chatbot can replace humans in the initial dealings with customers. A chatbot uses natural language processing, which can hear, understand, and talk to customers. More often, when you dial a service phone number, a chatbot answers the phone. It directs you to different parties depending on your answer.
- Fraud prevention; AI can detect unusual spending patterns and alert the customers. It can also detect fake reviews.
- Speech recognition; AI uses natural language processing to convert human speech into a written format. Many mobile devices incorporate speech recognition into their systems to conduct a voice search. Speech recognition is also used in language translation.
- Computer vision and facial recognition; computer vision can decipher digital images and videos and use the information to take action. Facial recognition is the most-used application of computer vision. There are many other applications of computer vision; for

[72] Ahelegbey, D., Giudici, P., & Pediroda, V. (2023). A network-based FinTech inclusion platform. Socio-Economic Planning Sciences, 87(B). https://doi.org/10.1016/j.seps.2023.101555

example, in social media, computer vision can tag photos and recognize people, places, and objects.

- Surveillance; AI's facial recognition capability enables surveillance or ID functions. There are airports using such technology to board passengers without the need to check travel documents for example the doors open only to recognized faces.[73]
- Recommendation engines; on the online shopping site, recommendations often pop up based on your purchase history. This is also done using AI algorithms that analyze consumer behavior and preferences.
- Automated stock and commodity trading; many stockbrokers offering AI-assisted portfolio management based on your goal, risk tolerance, and financial situation, such a program designs an ideal portfolio for you to optimize the results. There are also AI-driven high-frequency trading platforms making trades per technical analysis and/ or fundamental financial data of the company or market, without human intervention.
- Robotics; AI-powered robots are used in warehouses and factories to move and manage inventories and goods, or in dangerous environments to replace human workers. Robot advisors are financial advisors who provide automated financial investment services according to a personalized algorithm.[74] These robo-advisors are increasingly being used by portfolio management companies because they provide a convenient way for people to invest and manage their portfolios.
- Process optimization; AI analyzes data from a factory and optimizes processes. It can reduce waste, improve product quality, and avoid breakdown.
- Human resource; it can help to sieve through candidate applications to find their suitability for a certain job. It can profile a candidate based on their resumes.

4 BIG DATA.

Big Data uses parallel database management systems to handle huge volumes of unstructured data. There are many programming languages for parallel data processing, such as XML, JSON, and Avro.[75]

Using Big Data, one can effectively integrate predictive analytics and data mining into the full analytics lifecycle. Businesses can use Big Data to accurately predict outcomes and

[73] Tissot, F. (2020). AI in surveillance systems. *International Security Review, 28*(2), p.32
[74] Nalo. (2021). Robo-advisors in portfolio management. *Financial Technology Journal, 18*(4), p.78.
[75] Johnson, T., & Smith, R. (2021). Big Data technologies: Programming languages and frameworks. Journal of Big Data and AI, 10(4), p.45.

apply analytics to optimize their action steps. Big Data is the petroleum of the digital economy.[76]

On a higher level, the database management platform for Big Data is often referred to as the Data Lake**.** The Data Lake can combine and synthesize all types of data from multiple sources. These data can be structured (the traditional relational database) or unstructured, such as texts, images, audio, videos, PDF, and binary data.

The Data Lake distributes data across multiple servers to be stored. It also catalogs information describing each dataset. Such information allows developers to gain understanding and confidence of the data and develop applications. The Data Lake platform can ingest data rapidly and transform it, tracking and documenting datasets.

A data lake allows an organization to shift its focus from centralized control to a shared model, to respond to the changing dynamics of information management. This enables quick segregation of the data into the data lake, thereby reducing the overhead time.[77]

Big Data always works in conjunction with AI. Many Big Data functions overlap with functions of AI.

4.1 Definition.

These are so large data that traditional information management and processing tools cannot support. Big data is opposed to "traditional data". So-called traditional data corresponds to information that is processed centrally and that is not very varied in its project and of a limited volume.

Big data is based on decentralized databases and is extremely varied, as can be seen in particular information related to social networks as well as information concerning the purchasing and lifestyle habits of individuals.

The particularity of Big Data lies in the fact that it is not or only slightly structured (it is estimated that 80% of the data on the Internet is unstructured), that is to say that it cannot be processed by basic data processing software (e.g. Excel).

Big Data technology was first used by web giants such as Facebook, Google or Yahoo, leveraging it to enhance user experiences, improve targeted advertising, and optimize large-scale digital operations.

The concept of "Big Data" appeared in the early 2000s, when Google was obliged to ensure not only the storage and access to very large quantities of data, but also the extraction

[76] Brown, A. (2020). The role of Big Data in modern economies. Journal of Digital Economy, 12(2), p.15.
[77] Brown, A. (2020). Idem, p.19.

and analysis of this data via a computer tool that the company developed itself ("MapReduce" which later evolved into "Apache Hadoop"). The term "Big Data" only became widespread in the 2010s.[78]

4.2 Characteristics of big data.

- Volume**:** A large amount of data to collect.
- Velocity: Fast access to data, often in real-time, particularly in the financial sector.
- Variety: A large diversity in the nature and source of the data.
- Veracity**:** High velocity in data creation, collection, and sharing.[79]
- Value: the usefulness of the data in generating insights or driving decision.

4.3 The application of big data in the financial sector.

The need for "Big Data Analytics" is widespread. It ranges from analyzing the creditworthiness of loan applicants to wealth management, fraud detection, and optimizing customer acquisition and retention, along with improving customer experiences.[80]

Big Data is an innovation that is revolutionizing the banking sector throughout its value chain. Upstream, Big Data technology helps strengthen customer knowledge and satisfaction (for example, customization of products and services offered by using data sources to which the customer will have access). Downstream, Big Data allows for the identification in real time of any behavior deemed abnormal in order to avoid any fraudulent use of bank cards or transfers.[81]

4.4 Uses of Big Data.

- Product development: Thanks to Big Data analysis, companies like Netflix uses predictive models and informs you of new programs that you may like. Other companies leverage additional resources such as social medial insights, in-store sales data, focus groups, surveys, and testing to determine the best approach when launching a new product and to better target their audience[82].

[78] Beer, D. (2016). The emergence of Big Data: A historical perspective. Journal of Data Science, 29(1), p.112.
[79] Brown, A. (2020). Op.cit., p.18.
[80] Johnson, T. (2021). Data-driven financial analysis and Big Data. International Journal of Financial Technology, 16(3), p.75.
[81] Smith, R., & Jones, T. (2019). Big Data and personalized product development: The Netflix case. Journal of Business Innovation, *25*(2), p.34.
[82] Smith, R., & Jones, T. (2019). Idem, p.35.

- Comparative analysis: it can make a comparison with the routes of other products: When a company understands how its customers behave and can observe them in real time, it can compare with the journeys of other similar products and know where its strengths are compared to its competitors.[83]
- Customer experience: The market is so vast that it is difficult for a product to be considered unique. Big data allows you to collect data from social networks, web visits, call logs, and other sources, to improve the interaction experience and maximize the value provided.[84]

5 CRYPTOCURRENCY.

Businesses and consumers are no longer necessarily using cash to pay for their purchases, favoring the emergence of contactless payments. With a simple gesture on a smartphone, consumers can pay for items at digital checkouts. Now, a new payment system is emerging; cryptocurrencies.[85]

5.1 Definition of Cryptocurrency.

Cryptocurrencies are digital or virtual currencies that are encrypted (secured) using cryptography. Cryptography refers to the use of encryption techniques to secure and verify the transfer of transactions.[86]

A cryptocurrency can be defined as a digital currency supported by a decentralized network of users using cryptographic techniques to settle peer-to-peer transactions without the need for a financial institution[87].

In a report published in 2012 and updated in 2015, the European Central Bank (ECB) defines virtual currencies, also called digital currencies, as "unregulated digital currencies accepted within a specific virtual community."[88]

Unlike electronic currencies, they are not issued by a financial institution in exchange for funds and their circulation is not regulated by a Central Bank.[89]

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[83] Smith, R., & Jones, T. (2019). Idem, p.139.
[84] Adams, J., & Williams, T. (2020). Big Data and Customer Experience: Personalization and Comparative Analysis. Journal of Marketing & Data Science, 19 (4), p.154.
[85] Miller, A. (2022). Cryptocurrency and Digital Payments in the Global Economy. FinTech Review, 11 (1), p.201.
[86] Taylor, D. (2021). Cryptography and the Security of Cryptocurrency Transactions. International Journal of Cryptography, 8 (3), p.88.
[87] Kumar, P., & Patel, R. (2020). Cryptocurrencies and the Evolution of Digital Payments. Digital Economics Review, 27 (2), p.118.
[88] European Central Bank. (2015). Virtual currencies: A new form of payment. Frankfurt: ECB, p.42
[89] Biais, P. (2018). Cryptocurrencies and the decentralization of money. Paris: Éditions Finance & Technologie, p.110.

5.2 Classification of cryptocurrency.

- Closed virtual currencies: These are used in video games or virtual universes. They have no connection with the real economy.[90]
- Open virtual currencies: They can be classified into two subgroups:
  - Unidirectional; they can be purchased directly with legal tender at a set exchange rate, but cannot be converted back into legal tender.[91]
  - Bidirectional; can be converted into legal tender. They have both a buying price and a selling price. This is the case for certain cryptocurrencies, the best known of which include: Bitcoin (BTC), Ethereum (ETH), Tether (USDT), Ripple (XRP), Binance Coin (BNB) and Iota.[92]

5.3 The emergence of cryptocurrencies.

Several factors are believed to be at the root of the emergence of cryptocurrencies. These include the increasing use of New Information and Communication Technologies (NICT) and the expression of a vision of decentralization of money.

The recent development of NICT has favored the rise of new dematerialized payment methods. The creation of cryptocurrencies is one of the innovations made with the help of computer equipment and the internet, in particular, as part of the dynamic of dematerialization of online payment methods.

The emergence of cryptocurrencies results from the expression of a vision of society based on the decentralization of money. This concept is defended by the neoliberal ideology of the Austrian school,[93] going in the direction of "the denationalization of money". This concept refers to "the abolition of the state monopoly on money" to make way for "competition between private issuers of money".

This vision of society is supported by the "cypherpunks" community. This is a libertarian movement born in the late 1980s in the United States, which promotes the values of freedom of expression, freedom of exchange and anonymity and which uses cryptography as a means to abolish the model of society based on a system of centralized power.

Cryptocurrency advocates support the approach of decentralizing money, through technological innovations that do not require the presence of a central power to manage the issuance of money, its circulation and the preservation of its value.

[90] Biais, P. (2018). Idem, P.114.
[91] Hayek, F. A. (1976). The Denationalization of Money: The Argument Refined. London: Institute of Economic Affairs, p.155
[92] Biais, P. (2018). Idem, *p*.117.
[93] Hayek, F. A. (1976). Op.cit., p.162.

5.4 Characteristics of Cryptocurrencies.

Cryptocurrencies can be distinguished based on some basic properties of a currency in the classical sense, namely:[94]

- The issuer (central bank or private actors).
- The form (physical or electronic).
- The transaction settlement mechanism (centralized or decentralized).

It appears that cryptocurrencies are issued by private issuers in an electronic (digital) form and transactions are settled via a decentralized mechanism. However, the criteria relating to the issuer and the form do not really distinguish cryptocurrencies from conventional currencies, as conventional currencies are also issued in digital form by central banks (e.g., banks' reserves in the central bank account).

The difference between cryptocurrencies and conventional currencies is the settlement of digital transactions between peers (peer-to-peer) without any intervention from a financial intermediary or a central authority. These transactions are decentralized and operate through blockchains.[95]

5.5 Types of cryptocurrencies.

The most commonly used types of cryptocurrencies is as follows

5.5.1 Bitcoin:

This term comes from the fusion of two English words: bit (unit of binary measurement) and coin (coin). This cryptocurrency attracted public attention in October 2008, when an individual (or a mysterious group of people) answering to the pseudonym of Satoshi Nakamoto, published a White Paper of about ten pages describing the functionalities of the Bitcoin blockchain network.[96] The document in question describes Bitcoin as a theoretical open-source digital resource.

The development of Bitcoin was driven by the desire to bypass the traditional financial system, considered responsible for the financial crash of 2007 and the resulting economic crisis (due to excessive debt, excessive financialization, speculation and instability). This discredit then resulted in the desire to design an alternative system for exchanging value using an

[94] Hayek, F. A. (1976). Idem, p.165
[95] Biais, P. (2018). op.cit., P.117.
[96] Nakamoto, S. (2009). Bitcoin: A Peer-to-Peer Electronic Cash System, p.1.

instrument over which banks would have no control.[97] The idea of decentralized digital currency then began to attract the attention of the public and monetary authorities.

5.5.2 Les Altcoins:

Alternative cryptocurrency coins are also called altcoins or simply "coins." They are often used interchangeably.

Altcoins simply refer to the coin that is an alternative to Bitcoin[98]. The majority of altcoins are a variant (fork) of Bitcoin, built using Bitcoin's original open-source code protocol that modifies the underlying codes, allowing for the design of an entirely new coin with a different set of features.

Of course, each of them brings its own set of innovations, for example, faster transaction processing times or an integrated currency exchange service. A central concept of modifying the open-source code to create new coins is called "hardforks."

Namecoin, Peercoin, Litecoin, Dogecoin, and Auroracoin are examples of altcoins that are variants of Bitcoin's code.[99] There are other altcoins that are not derived from Bitcoin's open-source protocol. Instead, they have created their own blockchain and protocol supporting their original currency.

All altcoins have in common the fact that they each have their own independent blockchain, where transactions relating to their native coins have taken place.

5.5.3 Stablecoins:

Stablecoins present themselves as a response to the volatility of "classic" cryptocurrencies (Bitcoin and Altcoins). Their value is pegged either to another asset, such as; to another cryptocurrency, or to a financial asset, or to traditional currencies such as the Dollar or the Euro.[100]

They therefore attempt to combine the advantages of digital currencies (decentralization and independence from monetary authorities) with the price stability of traditional currencies.[101]

These "stable" cryptocurrencies have experienced explosive growth in recent years. By early 2020, the total value of all stablecoins exceeded $5 billion. Tether (USDT), which appeared in 2014, is the first and most popular of these. Its value is theoretically pegged to the dollar according to the following relationship: 1 USDT = 1 dollar.[102]

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[97] Nakamoto, S. (2009). Idem, p.1.
[98] Biais, P. (2018). Idem, *p.140.*
[99] Biais, P. (2018). op.cit., *p.142.*
[100] Tether. (2020). *Tether Whitepaper*, p.2.
[101] Biais, P. (2018).Idem, p.*150*
[102] Tether. (2020). Idem, *p.4.*

6 EDGE COMPUTING.

In recent years, edge computing has attracted substantial attention because its proximity to the source of data can reduce the overheads of data transmission. This allows faster response time and better bandwidth availability.[103]

It is complementary to cloud computing. In many situations, edge computing is even preferred when there is a need for low latency and quick actuation, as in privacy concerns over the transfer of sensitive data or massive amounts of data to the remote cloud. A reduction in the transmission of data to external locations also means fewer open connections and fewer opportunities for cyber-attacks. Google's cloud service provides tools with an integrated software and hardware stack for implementing machine learning, both in its cloud computing and its edge computing. This provides Google's cloud/edge solution advantage of leveraging data directly at the edge.

7 INTERNET ON THINGS (IOT) (DEVICES AND SENSORS).

The Internet of Things (IoT) are the frontline components of the digital economy. IoT is a breakthrough technology derived from the Internet.[104]

They collect data and transmit to a data center object equipped with IoT, and sensors can sense their environment, collect data, communicate with other objects and people, and perform tasks as instructed, all through the Internet.

The data that are collected constitute a part of Big Data. Big Data, in turn, trains AI through machine learning. AI can instruct an object to perform a function through IoT. The IoT activates the entire world of lifeless objects.

IoT promises to bring us into the fourth industrial revolution, following the invention of the steam engine, electricity, and the computer.[105] IoT integrates people and objects to form a gigantic network. Messages and data are sent and received not only between people, but also between people and objects, and between objects and objects. IoT is widely adopted in a variety of industries and consumer markets.

The blockchain adds security to the IoT data and allows not only information transfer, but also valuable assets to be sent over networks. This makes it possible for two objects to transact with each other without human intervention.

[103] Smith, J. (2020). Introduction to Edge Computing: Applications and Challenges. London: FutureTech Publications, p.112.
[104] Smith, A. (2020). The future of IoT in global networks. Journal of Digital Economy, 15(3), p.115.
[105] Kumar, S. (2021). The Industrial Revolution of IoT. Journal of Emerging Technologies, 14(1), p.32.

Today, the number of IoT devices installed worldwide exceeds the population of the entire world. By the end of 2025, there will be about 75 billion IoT-connected devices worldwide, according to a recent forecast.[106]

For example, Samsung's smart refrigerator has sensors and IoT. It can tell you exactly what food you have in the refrigerator, without you having to open it. You can check it using Samsung's app, in your phone. When you are at the supermarket wondering whether you have eggs at home, just open the app.

7.1 Advantages of IoT.

- It can infer, see, hear, and measure any environmental parameters (temperature, humidity, chemical composition, etc.) through multiple types of attached sensors and actuators.[107]
- It collects the data as desired and shares the data with the outside world. Through two-way communication, it can receive external instruction to perform functions requested by an external source.
- The exchange of data between an object with IoT and the remote server allows the object to be monitored and controlled.[108] It makes the management of a remote system possible. This results in increased system efficiency and improved cost monitoring.
- Through IoT, objects can also be activated to perform certain tasks by human command, a preprogrammed instruction set, or even by artificial intelligence.
- With industrial devices and applications, IoT (or Industrial IoT), each machine or device runs the full range of productivity improvements from predictive maintenance of the equipment to the customized configuration of products in the production line.
- The combination of IoT and blockchain allows any type of transaction to occur between two IoT-enabled objects. The industry can create a tamper-proof history of the products, from their component supply chain to their field operation, in complex value networks with many stakeholders. The possibilities include, tracking devices in container ships, and many others.
- The combination of blockchain and IoT creates tremendous potential in industrial use. For example, Samsung and IBM are creating decentralized networks of IoT devices using blockchain. IBM's Watson IoT platform enables IoT devices to send data to blockchain ledgers.

[106] Gartner, R. (2021). IoT market forecast: The rise of connected devices. International Data Corporation, 24(3), p.45.
[107] Kumar,S.(2021).Op.cit., p.34.
[108] Wilson, P., & Lee, J. (2020). IoT systems and their market applications. Journal of Internet Technology, 22(4), p.80.

The platform is called ADEPT (Autonomous Decentralized Peer-to-Peer Telemetry). ADEPT records the transactions carried out by the IoT devices without the need for central control and management. It utilizes hybrid PoW / PoS to secure transactions.

Table 2 : The impact of each technology on FinTech.

Technology	Impact on FinTech
Crowdfunding	- Provides alternative funding sources for startups and individuals - Encourages financial inclusion - Reduces reliance on traditional banking systems
Big Data	- Enhances customer insights and personalization - Improves fraud detection and risk management - Enables data-driven decision-making
Blockchain	- Ensures transparency and immutability of transactions - Reduces fraud and transaction costs - Enables smart contracts and DeFi innovations
Artificial Intelligence (AI)	- Automates financial services (e.g., robo-advisors, chatbots) - Improves credit scoring accuracy - Detects fraud and enhances cybersecurity
Cryptocurrency	- Facilitates decentralized financial transactions - Introduces new investment opportunities - Challenges traditional banking systems
Edge Computing	- Reduces latency and improves speed of financial services - Enhances security with local data processing - Enables real-time fraud detection
Internet of Things (IoT)	- Supports usage-based financial products (e.g., insurance) - Enables real-time data collection for risk assessment - Enhances automation of payments

Section 3: The FinTech Ecosystem.

Under this section, we shall explore how FinTech is revolutionizing the way individuals and businesses access and manage financial services by leveraging technologies such as cloud computing, block chain, artificial intelligence and edge computing. FinTech is driving innovation in payments, banking, lending and investments.

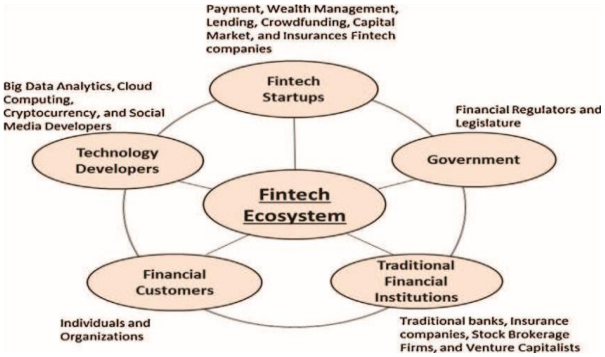
The ecosystem is comprised of startups, regulatory bodies, consumers and traditional financial institutions all working together in creation of a faster, more efficient and accessible financial solutions. Understanding how it works on the global economy is essential for businesses and individuals who want to stay ahead in the digital financial era.

1 The composition of the ecosystem.

The FinTech ecosystem is the complex network of interaction between FinTech startups, technology developers, financial customers, government and traditional financial institutions with a common interest in the FinTech startups ecosystem. To understand the competitive and collaborative dynamics in FinTech innovation, we must first analyze the ecosystem. A stable symbiotic FinTech ecosystem is instrumental in the growth of the FinTech industry.[109]

These elements symbiotically contribute to the innovation, stimulate economy, facilitate collaboration and competition in the financial industry, and ultimately benefit consumers in the financial industry.

Figure 2. The five elements of the FinTech ecosystem.



Source: Lee, I., & Shin, Y. J. (2018). FinTech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, 61(1), p.38.

1.1 FinTech startups (e.g., payment, wealth management, lending, crowdfunding, capital market, and insurance FinTech companies):

At the center of ecosystem are FinTech startups. These companies are mostly entrepreneurial and have driven major innovations in the areas of payment, wealth management, lending, crowdfunding, capital market, and insurances by incurring lower operating costs, targeting more niche markets, and providing more personalized services than traditional financial firms.

They are driving the phenomenon of unbundling financial services, which has been highly disruptive for banks.[110] The ability to unbundle services is one of the major drivers of

[109] Zavolokina, L., Dolata, M., & Schwabe, G. (2016). FinTech – What is in a Name? Thirty Seventh International Conference on Information Systems (ICIS 2016), p.12.
[110]Walchek, C. (2015, May 29). The unbundling of finance. TechCrunch, p.3.

growth in the FinTech sector, as traditional financial institutions are disadvantaged in this situation.

Consumers, rather than relying on a single financial institution for their needs, are beginning to pick and choose services they would like from a variety of FinTech companies. A consumer may manage his/her loan via SoFi, while using PayPal to manage payments, Rocket Mortgage for his/her mortgage, and Robinhood for stock management.[111] Venture capitalists and private equities are conducive to the creation of FinTech startups and the level of investments increased significantly over time as well.

1.2 Technology developers (e.g., big data analytics, cloud computing, cryptocurrency, and social media developers):

Technology developers provide digital platforms for social media, big data analytics, cloud computing, artificial intelligence, smart phones, and mobile services.

Technology developers create a favorable environment for FinTech startups to launch innovative services rapidly.

Big data analytics can be used to provide unique personalized services to customers and cloud computing may be used for cash-strapped FinTech startups to deploy web-based services at a fraction of the cost of in-house infrastructure development.[112]

Algorithmic trading strategies can be used as the basis for robo-advisor wealth management services at much lower fees than traditional wealth management services.

Social media facilitates the growth of communities in the crowdfunding and person-to-person lending services. The ubiquity of mobile devices supplants the advantages of physical distribution.

Mobile network operators are also providing low-cost infrastructure for FinTech companies' service development, such as mobile payment and mobile banking. In turn, the FinTech industry is generating revenue for these technology developers.[113]

1.3 Government (e.g. financial regulators and legislature):

Governments have been providing a favorable regulatory environment for FinTech since the 2008 financial crisis.[114]

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[111] Nicoletti, B. (2017). *The Future of FinTech: Integrating Finance and Technology in Financial Services*. Palgrave Macmillan, p.49.

[112] Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2017). On the FinTech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. Journal of Management Information Systems, 35(1), p.230.

[113] Lee, I., & Shin, Y. J. (2018). FinTech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, 61(1), p.41.

[114]Holland FinTech. (2015). Understanding the FinTech Ecosystem. Holland FinTech, p.4.

Depending on the national economic development plans and economic policies, different governments provide different levels of regulation (e.g., licensing of financial services, relaxation of capital requirements, tax incentives) for FinTech startups to stimulate FinTech innovation and facilitate global financial competitiveness.[115]

However, while certain regulations are favorable to FinTech startups, they still need to understand how regulations may affect their service provisions. For example, LendUp, a payday loan FinTech company, was fined $3.63 million for violations of consumer financial protection laws, including the Truth in Lending Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act.

1.4 Financial customers (e.g., individuals and organizations):

Financial customers are the source of revenue generation for FinTech companies. While large organizations are important sources of revenue, the predominant revenue source for FinTech companies are individual customers and small and medium-sized enterprises (SMEs).

A survey found that the use of FinTech services is greatest among younger, wealthier customers.[116] Early FinTech adopters tend to be tech-savvy, younger, urban, and higher-income individuals.

Currently, millennials (people between the age of 18 and 34) constitute a significant portion of FinTech consumption in most countries. The future demographic is favorable to FinTech companies in that in the next few decades, the tech-savvy millennials will account for the largest part of the population and drive the growth of FinTech services.

1.5 Traditional financial institutions (e.g., traditional banks, insurance companies, stock brokerage firms, and venture capitalists):

Traditional financial institutions are also a major driving force in the FinTech ecosystem. After realizing the disruptive power of FinTech and dwindling window of opportunities to blunt FinTech's impact on the market, traditional financial institutions have been reevaluating their existing business models and developing strategies to embrace FinTech innovation.

Traditional financial institutions have competitive advantages in economies of scale and financial resources over FinTech startups. However, traditional financial institutions tend to focus on bundled services, providing one-stop comprehensive financial products and services to consumers rather than unbundled specialized products and services.

[115] Arner, D. W., Barberis, J., & Buckley, R. P. (2015). Op.cit., p.7
[116] Holland FinTech. (2015). Op.Cit., p.6.

While traditional financial institutions initially treated these fast-growing FinTech companies as threats, they have shifted their focus to collaborating with FinTech startups with various funding provisions. In exchange for providing funding, they are able to draw on the insights of these startup companies in order to stay on the forefront of the technology.[117]

2 Functioning of FinTech.

FinTech works by integrating advanced technologies like Artificial Intelligence (AI), blockchain, bigdata, cloud computing into the traditional financial systems to enhance efficiency, security, and accessibility. It encompasses innovations such as digital payments, robo-advisors, and peer-to-peer lending, transforming how individuals and businesses manage money. More than $50 billion has been invested in almost 2,500 companies since 2010, as these FinTechs redefine the ways in which people store, save, borrow, invest, move, spend and protect money.[118]

2.1 Characteristics of FinTech.

The characteristics of FinTech as follows.[119]

- Customer-centric, offering simple, easy-to-use products and services designed to meet specific consumer needs.
- Legacy-free, without the burden of outdated IT systems that have evolved slowly Sovereign decades, regulatory responsibilities, or historical products.
- Asset-light, with a minimal fixed asset structure.
- Scalable, able to adapt their offerings to customer needs with low capital requirements,
- Simple, with clear and targeted offerings.
- Innovative, in terms of both products and communication channels.
- Compliancy-light, facing fewer regulatory constraints.

2.2 FinTech business models.

FinTech works through six business models implemented by the ever-growing number of FinTech startups: payment, wealth management, crowdfunding, lending, capital market, and insurance services.

[117] Yang, X. (2015). The rise of FinTech: Impact on traditional finance. Journal of Financial Technology, 10(3), p.45.
[118] Accenture. (2016a). FinTech 2016*:* A new era of financial services innovation*,* p. 23.
[119] EY. (2016). Global FinTech Adoption Index 2016, p.12.

2.2.1 Payment business model.

Payments are relatively simple compared to other financial products and services. FinTech companies focusing on payments are able to acquire customers rapidly at lower costs, and are one of the fastest moving in terms of innovation and adoption of new payment capabilities.[120]

Payments are one of the most used retail financial services on a day-to-day basis, as well as one of the least regulated financial services. Moreover, FinTech uses the Application Programming Interface (API) for verification purposes.

The two markets of payment FinTechs are; consumer and retail payment, wholesale and corporate payment.

Consumer and retail payment FinTechs include mobile wallets, peer-to-peer (P2P) mobile payments, foreign exchange and remittances, real-time payments, and digital currency solutions.[121] These services improve the experience for customers who look for a streamlined payments experience in terms of speed, convenience, and multi-channel accessibility.

Examples are: Mobile payment services; they can be conveniently and securely used on mobile devices. Approaches to mobile payments include: charging to a phone bill, near field communication (NFC) (such as; Google Wallet, Apple Pay, and Samsung Pay), barcode or QR code, a credit card on mobile websites, a mobile phone card reader, and direct mobile payment without using credit card companies.[122] P2P payment services; users are able to reimburse each other with apps such as PayPal and Venmo for free.

2.2.2 *Wealth management business model:*

One of the more popular wealth management FinTech business models is automated wealth managers (robo-advisors) that provide financial advice for a fraction of the price of a real-life adviser. These robo-advisors use algorithms to suggest a mix of assets to invest in based on a customer's investment preferences and characteristics.[123]

This business model benefits from changing demographics and consumer behavior that favor automated and passive investment strategies, a simple and transparent fee structure, and attractive unit economics that allow low or no investment minimums.[124] Wealth management FinTechs include Betterment, Wealthfront, Motif, and Folio**.**

[120] Accenture. (2016). Growing payments to new heights: The value propositions that pay, p.2.
[121] BNY Mellon. (2015). Payment Systems in a New Era: The Future of Payments, p. 18.
[122] Li, X. (2016). Mobile Payment and Technology Adoption: A Study on Consumer Trends. Journal of Financial Innovation, 12(4), p.33.
[123] Ask the Algorithm. (2015). Robo-Advisors and the Future of Wealth Management. Journal of Financial Planning, 21(3), p.12.
[124] Holland FinTech. (2015). The Rise of Robo-Advisors in Wealth Management. Holland FinTech Report, p.8.

2.2.3 *Crowdfunding* business model*:*

Crowdfunding FinTechs empower networks of people to control the creation of new products, media, and ideas and are raising funds for charity or venture capital[125].

Crowdfunding involves three parties: The project initiator or entrepreneur who needs funding; the contributors who may be interested in supporting the cause or project; and the moderating organization that facilitates the engagement between the contributors and the initiator.

2.2.4 Lending business model:

P2P consumer lending and P2P business lending is another big trend in FinTech. P2P lending FinTechs allow individuals and businesses to lend and borrow between each other. With their efficient structure, P2P lending FinTechs are able to offer low interest rates and an improved lending process for lenders and borrowers.

A subtle but significant distinction from a bank is that these FinTechs are technically not involved in the lending themselves, as they are simply matching lenders with borrowers, and collecting fees off of users.[127]

P2P lending and crowdfunding are different in purpose. While the primary purpose of crowdfunding is funding for projects, the primary purpose of P2P lending is debt consolidation and credit card refinancing.[128] Lending FinTechs include Lending Club, Prosper, SoFi, Zopa, and RateSetter.

2.2.5 Capital market business model**:**

New FinTech business models take hold across a full spectrum of capital market areas such as investment, foreign exchange, trading, risk management, and research.

One area of promising capital market FinTech is trading**.** Trading FinTechs allow investors and traders to connect with each other to discuss and share knowledge, place orders to buy and sell commodities and stocks, and monitor risks in real time.[129]

Another area of capital market FinTech business models is foreign currency transactions. Foreign currency transactions have been a service dominated by financial institutions. FinTechs lower barriers and costs for individuals and SMEs engaging in foreign currency transactions all around the world. Users are able to see live pricing and send/receive

[125] International Trade Administration. (n.d.). Crowdfunding: The Future of Finance. U.S. Department of Commerce, p.5.
[127] Williams-Grut, O. (2016). The Impact of Peer-to-Peer Lending on the Financial Services Industry. Financial Services Journal, 4(3), p.19.
[128] Zhu, D., Dholakia, U. M., Chen, Y., & Algesheimer, R. (2012). The Role of Peer-to-Peer Lending in Debt Consolidation. Journal of Consumer Research, 39(1), p.115.
[129] KPMG. (2016). FinTech: Disruption or Transformation of the Capital Markets? KPMG Report, p.12.

funds in various currencies securely in real time, all via their mobile device. FinTechs offering this service are able to do so at a much lower cost, via payment methods that are much more familiar to individual clients or businesses.[130] Capital market FinTechs include Robinhood, eToro, Magna, Estimize, and Xoom.

2.2.6 *Insurance services business model:*

In insurance FinTech business models, FinTechs work to enable a more direct relationship between the insurer and the customer. They use data analytics to calculate and match risk. And as the pool of potential customers broadens, customers are offered products to meet their needs (e.g., car, life, healthcare, or causality insurance).

The insurance FinTech business model seems to be the most well embraced by traditional insurance providers. The technology allows insurers to expand their data collection to non-traditional sources to supplement their traditional models, improving their risk analysis.[131] Insurance services FinTechs that are disrupting the insurance industry include; Censio, CoverFox, The Zebra, Sureify Labs, and Ladder.

Conclusion of chapter 1.

The theoretical framework of FinTechs provides a structured understanding of how technology driven innovation is reshaping the financial services industry. Grounded in theories from finance, information systems, innovation diffusion and regulatory economics, this framework highlights the dynamic interaction between emerging technologies, market demands and institutional structures. It helps explain how FinTechs challenge traditional financial models through enhanced accessibility, efficiency and personalization. Ultimately, a robust theoretical foundation is essential for analyzing the growth, risks and societal impact of FinTechs guiding both academic inquiry and practical implementation in this rapidly evolving sector.

[130] KPMG. (2016). Op.cit.p.14.
[131] PricewaterhouseCoopers. (2017). InsurTech: Disrupting the Insurance Sector with Technology. PwC Insurance Review, p.24.

CHAPTER TWO: BUSINESS FINANCING METHODS.

Introduction

Business financing refers to the process of obtaining funds or capital to support business operations, expansion, or specific projects. This can be achieved through a variety of sources, including equity financing (selling ownership stakes), debt financing (borrowing money), or alternative methods like grants and crowdfunding. This chapter is divided into three sections: the first section talks about traditional business financing methods, the second section defines the different categories of FinTechs in business financing and the third one discusses the advantages and risks of new methods of business financing.

Comparison between the different methods of business financing.

Table 3: New business financing methods vs Traditional business financing methods

Aspect	**Traditional financing methods**	**New (FinTech-Driven) financing methods**
Source of Funds	Banks, credit unions, government programs.	Online platforms, peer-to-peer (P2P) lending, crowdfunding, crypto-based funds.
Accessibility	Often limited by strict credit checks and collateral requirements.	More accessible to startups, SMEs, and individuals with limited credit history
Speed of Funding	Slower process (days to weeks).	Fast approval and disbursement (sometimes within hours or days)
Application Process	Paper-heavy, requires physical presence and manual verification.	Fully digital, automated KYC and verification.
Eligibility Requirements	High (e.g., good credit score, business history, financial statements).	Flexible, sometimes based on alternative data like social proof or transactions.
Cost of Capital	May be lower for well-qualified applicants.	Can be higher due to increased risk, but flexible repayment options exist
Investor Participation	Limited to banks and institutional investors.	Open to the public (e.g., equity crowdfunding allows retail investors)
Innovation Support	Less adaptive to early-stage or high-risk ventures.	Supports innovation and risk-taking (esp. for tech startups, social ventures)
Regulatory Oversight	Highly regulated by national financial authorities.	Still evolving; some platforms operate in regulatory gray areas.
Examples	Business loans, bank overdrafts, government grants.	Equity crowdfunding, P2P lending, ICOs, revenue-based financing.

Section 1: Traditional business financing methods.

Traditional business financing includes both debt options such as loans, leases and corporate bonds and equity financing. Whereas debt financing offers structured repayment terms and potential tax benefits, it also involves fixed obligations. Equity financing on the other hand allows businesses to raise capital without incurring debt but often requires giving up partial ownership and control

1 Debt financing.

Debt financing is a method by which businesses raise capital through borrowing, typically via loans, bonds, or credit lines, with a promise to repay the principal along with interest over a set period.

1.1 Long-term debt.

1.1.1 Long term-loans.

Long-term loans are negotiated between the borrowing company and a financial institution, such as bank or credit union. The issue costs tend to be relatively low since the borrowing company deals with only one lender and there is room for much more flexibility in the conditions of the loan than is usually possible with an issue of loan stock[132].

1.1.2 Corporate bonds.

Companies can borrow by issuing securities with a fixed interest rate payable on the nominal or face value of the securities (known as coupon rate) and a pre-stated redemption date.[133]

Corporate bonds can be issued in several ways, including direct issues to the public. Companies can use the services of issuing houses and ask them to place the issue with its clients, often institutional ones, this is mostly the case in the companies which are quoted on the stock exchange.

Unquoted companies can sell their bonds directly to their shareholders or other investors. In this case, it is not allowed to trade such bonds publicly.[134]

[132] Brealey, R. A., Myers, S. C., & Allen, F. (2017). Principles of Corporate Finance (12th ed., McGraw-Hill Education), p.421.
[133] Ross, S. A., Westerfield, R. W., & Jaffe, J. F. (2013). Corporate Finance (10th ed., McGraw-Hill Education), p.484.
[134] Emery, D. R., Finnerty, J. D., & Stowe, J. D. (2004). Corporate Financial Management (4th ed., Pearson Education), p.315.

1.1.2.1 Factors for the business to consider on bond financing.

- Issue costs. Issue costs tend to be relatively low
- Servicing costs. Since bonds are a relatively low-risk investment to investors, expected returns tend to be low compared with those typically sought by equity holders.
- Obligation to pay interest. The bond issuers have the obligation to pay interest according to the terms agreed at the time of issuing. Failure to do so is considered as default and allows any of the bondholders to initiate the respective legal procedures.
- Obligation to redeem bonds. Irrespective of whether bonds are issued as redeemable or not, the company can always buy its own bonds in the open market (provided they are quoted). Thus, bonds offer a level of flexibility, which is not provided with shares. If bonds are issued as redeemable, the company is under a contractual
- Tax deductibility of bond interest. Interest paid to bondholders is deductible from profit for corporation tax purposes.
- Control and freedom of action. The bondholders do not get a control in terms of voting rights, but there may be some restrictions[135].

1.2 Medium term debts.

The acquisition of assets particularly expensive capital equipment is a major commitment for many businesses. Rather than pay for the asset at once, it can often make sense for companies to look for ways of spreading the cost of acquiring an asset over the time, to coincide with the timing of the generated revenue.[136] The most common sources of medium- to long-term finance for investment in capital assets are hire purchase and leasing.

- Hire purchase. With a hire purchase agreement, after all the payments have been made, the business customer becomes the owner of the equipment. This ownership transfers either automatically or on payment of an option to purchase fee. For tax purposes, from the beginning of the agreement the business customer is treated as the owner of the equipment and therefore can deduct related depreciations and amortisations from profit. Depreciations and amortisations can be a significant tax incentive for businesses to invest in new plant and

[135] Ross, S. A., Westerfield, R. W., & Jaffe, J. F. (2013). Op.Cit., p.495.
[136] OECD. (2019). Public Funding and Financing Models for Startups and *SMEs*. OECD Reports on Innovation and Growth, p.22

machinery or to upgrade information systems[138]. Under a hire purchase agreement, the business customer is normally responsible for maintenance of the equipment.

- Leasing. The fundamental characteristic of a lease is that ownership never passes to the company, which uses the assets leased. Instead, the leasing company accounts for assets depreciation and passes some of the benefit on to the business customer, by way of reduced rental charges[139].

The business customer can generally deduct the full cost of lease payments from taxable income, as an operating expense.

Types of leasing arrangement:

• Financial lease. The financial lease or 'full payout lease' is close to the hire purchase alternative. The leasing company recovers the full cost of the equipment, plus charges, over the period of the lease.

When the lease period ends, the leasing company will usually agree to a secondary lease period at significantly reduced payments. Alternatively, if the business wishes to stop using the equipment, it may be sold second-hand to an unrelated third party. The business arranges the sale on behalf of the leasing company and obtains the bulk of the sale proceeds.[140]

• Operating (or service) lease. This type of leasing is common for equipment where there is a well-established second-hand market (e.g., cars and construction equipment). Assets financed under operating leases are not shown as assets on the balance sheet. Instead, the entire operating lease cost is treated as a cost in the profit and loss account.[141]

1.2.1 Factors to consider in respect of medium term loans.

- Certainty. One important advantage is that a hire purchase or leasing agreement is a medium- to long-term funding facility, which cannot be withdrawn, provided the business makes the payments as they fall due. Thus, the uncertainty that may be associated with alternative funding facilities such as overdrafts, which are repayable on demand, is removed.[142]
- Budgeting. The regular nature of the hire purchase or lease payments (which are also usually of fixed amounts as well) helps a business to forecast cash flow. The business is

[138] Moyer, R. C., McGuigan, J. R., & Kretlow, W. J. (2014). Contemporary Financial Management, 13th ed., Cengage Learning, p.482.
[139] Ross, S. A., Westerfield, R. W., & Jaffe, J. F. (2013). Op.Cit., p.506.
[140]European Commission. (2014). State Aid Rules and Public Funding for Businesses. European Union Official Reports, p.48
[141] OECD. (2019). Op.Cit., p.28
[142] European Investment Bank. (2020). Financing Growth: The Role of Public Funding in Supporting Innovation. EIB Report, p.41.

able to compare the payments with the expected revenue and profits generated by the use of the asset.

❖ Fixed rate finance**.** In most cases the payments are fixed throughout the hire purchase or lease agreement, so a business will know at the beginning of the agreement what their repayments will be. This can be beneficial in times of low, stable, or rising interest rates but may appear expensive if interest rates are falling.

❖ The effect of security. Under both hire purchase and leasing, the finance company retains legal ownership of the assets, at least until the end of the agreement. This normally gives the finance company better security than lenders of other types of loan or overdraft facilities. The finance company may therefore be able to offer better terms.

❖ Maximum finance. Hire purchase and leasing could provide finance for the entire cost of the assets. However, there maybe a need to put down a deposit for hire purchase or to make one or more payments in advance under lease.

❖ Tax advantages**.** Hire purchase and leasing give the business the choice of how to take advantage of depreciation and amortization. If the business is profitable, it can account its own depreciation and amortization through hire purchase or outright purchase. If it is not in a tax paying position, then an operational lease could be more beneficial to the business.[143]

2 Equity financing.

Equity financing is the process of raising capital by selling shares of ownership in a company to investors, such as venture capitalists, angel investors, or through public stock offerings.

There are three main means of raising equity finance:

- Retaining profits rather than paying them out as dividends.
- Issuing new shares to existing shareholders.
- Issuing new shares to new shareholders (which could be professional investors such as business angels, venture or equity capital or the public).

2.1 Retained earnings.

Retained earnings are an important source of finance. Profits lead to a net increase in funds, and retaining these, or part of them, rather than paying them out as dividends, is in effect a way of rising finance[144].

[143] Brealey, R. A., Myers, S. C., & Allen, F. (2017). Principles of Corporate Finance, 12th ed., McGraw-Hill Education, p.436.
[144] Atrill, P., & McLaney, E. (2022). Accounting and Finance for Non-Specialists 12th ed., p.233.

2.1.1 Factors to consider in respect of raising finance by retention of profits.

a) Dividend policy. The dividend policy has an impact not only on the finance available to the company but also on the shareholder wealth. Retaining one proportion of the profit rather than another proportion has an effect on the after-dividend price of the share, that is, on the net wealth of the shareholders. Note that the conversion of retained earnings into shares leaves the uses of funds (assets) totally unaffected. The equity figure also does not change; the contribution of the ordinary shareholders is not altered by the bonus issue[145].

b) Costs**.** The issue costs, which are applicable in case of other means of raising additional equity, are not applicable to retained earnings. Therefore, at first sight, retained earnings might seem to be a source that costs nothing to service

c) Uncertainty. When the need for finance has been assessed, there is no guarantee that sufficiently large profits will be achieved to meet the requirements. On the other hand, when the funds have been generated from profits, their existence is certain and their retention becomes a matter of owners' decision.

d) Control. Retaining profits does not change the voting strength of any individual shareholder.

2.2 Rights issue**s**.

Rights issues are offers to existing ordinary shareholders to take up additional shares for cash, at a price usually significantly below the current market price of already existing prices[147]. A rights issue is, therefore, a way of raising new cash from shareholders. This is an important source of new equity funding for publicly quoted companies.

In the UK, right issues have represented the most important method of raising new equity, after retained profits. This method has not been very popular among quoted companies in Central and Eastern Europe though, mostly due to limitations of existing stock markets[148].

Shareholders can, and often do, waive these rights, by selling them to others. Shareholders can also vote to rescind their pre-emption rights. The existence of pre-emption rights is sometimes seen as a restriction on the ability of the company's managers to take advantage of some other source of equity finance.

[145] Damodaran, A. (2015). Applied Corporate Finance 4th ed., Wiley, p.278.
[147] Berk, J., & DeMarzo, P. 2019. Corporate Finance, 5th ed., 4 Pearson, p.523.
[148] Megginson, W. L., Smart, S. B., & Graham, J. R. (2020). Corporate Finance, 5th ed., Cengage Learning, p.491.

2.2.1 Factors to consider in respect of raising finance by rights issues.

a) Costs. Rights issues are a relatively cheap way of raising equity finance since the costs of preparing a brochure, underwriting commission or press advertising involved in a new issue of shares are largely avoided.

b) Pricing**.** Shareholders who either sell or take up their rights are left in more or less the same position as regards wealth irrespective of the issue price. The price at which the new shares are issued is generally much less than the prevailing market price for the shares. The price discount also acts as a safeguard should the market price of the company's shares fall before the issue is completed[150].

c) Certainty. It is rare in practice for a rights issue to fail. This is an important factor since many of the issue costs are committed in advance and would be lost if the issue failed.

d) Control. Unless large numbers of existing shareholders sell, their rights to new shareholders there should be little impact in terms of control of the business by existing shareholders.

2.3 Equity finance from risk capital.

2.3.1 Funding gaps.

Business owners often report that company finance at a certain development stage can be very difficult to obtain even from traditional sources such as banks and venture capitalists. Entrepreneurs need a relatively low price financing at certain time and place.

There have been identified two funding gaps, which occur during two stages of innovation process and which are due to capital market inefficiency and information gap.

[150] Ross, S. A., Westerfield, R. W., Jaffe, J., & Jordan, B. D. (2022). Fundamentals of Corporate Finance, 12th ed., McGraw-Hill Education, p.317.

Table 4: Funding gaps.

Stage	Pre-seed	Seed/start-up	Initial growth	Expansion
Source	Founders	Business angels		Venture funds
Demand for Funding (in LTL	~10.000	10.000-1M		1 M-10 M

Source: adapted from Sohl, J. E. (2003). The Early-Stage Equity Market in the United States. The Journal of Private Equity, p.9.

2.3.2 Business angels financing.

Business angels are wealthy, entrepreneurial individuals who provide capital in return for a proportion of the company equity. They take a high personal risk in the expectation of owning part of a growing and successful business. Since business angels invest their own funds, they are sometimes called informal venture capital.

2.3.2.1 Factors to consider in respect of raising finance from business angels.

Businesses are unlikely to be suitable for investment by a business angel unless certain conditions are fulfilled.

- Sector and characteristics of a company: Business angels specialize and invest in companies where they can make the best use of their professional experience and networks.[154] Therefore, a business angel who invests in IT companies would rarely go for investment in retail, for example.
- Development stage: The business should be new; usually, business angels invest in the seed or start-up stage of the company development, although some angels specialize in the expansion stage as well.
- Amount: The business needs to raise a limited amount (typically between ten thousand to half a million Euros). One business angel would have a portfolio of two to five ventures.

[154] Mason, C., & Harrison, R. (2004). *Business Angels: A Guide to the Early-Stage Investment Landscape*. Oxford University Press, p.20.

- Transfer of equity: Current shareholders should be willing to sell a part of shareholding in return for financing[155].

However, there are several strong arguments why business angels (or venture capital) investment is beneficial to business owners:

✓ Raising finance in the form of equity (shares) strengthens the company's balance sheet. Banks (or other lenders) may then be willing to provide additional debt finance

✓ Personal relationship: The owners and managers of the business should be willing to develop a personal relationship with a business angel. Typically, business angels want hands-on involvement in the management of their investment, without necessarily exercising day-to-day control.[156]

2.3.3 Venture capital.

Venture capital (VC) is a form of "risk capital", in other words, capital that is invested in a business, where there is a substantial element of risk relating to the future creation of profits and cash flows. Venture capital is invested as shares (equity) rather than as a loan and the investor requires a higher "rate of return" to compensate him for his risk.

The main sources of venture capital are venture capital firms. Venture capital provides long-term, committed share capital, to help unquoted companies grow and succeed. In other words, venture capital is also called "business of raising businesses[157]".

Venture capital is invested in exchange for an equity stake in the business. As a shareholder, the venture capitalist's return is dependent on the growth and profitability of the business. This return is generally earned when the venture capitalist "exits" by selling its shareholding when the business is sold to another owner[158].

Venture capital firms raise their funds for investment from external sources, mainly institutional investors, such as banks, insurance companies, pension funds and individual investors[159].

[155] Mason, C., & Harrison, R. (2004). Op,Cit., p.25.
[156] Landström, H. (2007). Entrepreneurship and the Business Angel Market. International Studies in Entrepreneurship, p.59.
[157] Gompers, P., & Lerner, J. (2001). The Money of Invention: How Venture Capital Creates New Wealth. Harvard Business School Press, p.10.
[158] Landström, H. (2017). Handbook of Research on Venture Capital. Edward Elgar Publishing, p.142.
[159] Bygrave, W. D., & Zacharakis, A. (2011). The Portable MBA in Entrepreneurship, 3rd ed., Wiley, p.57.

2.3.3.1 Factors to consider in respect of raising finance from venture capital.

It should be pointed out that the attributes that both venture capital firms and business angels look for in potential investments are often very similar.

- High growth potential**.** Venture capitalists prefer to invest in entrepreneurial businesses. This does not necessarily mean small or new businesses. Rather, it is more about the investment's aspirations and potential for growth, rather than by current size.
- Investment span. Venture capital firms usually look to retain their investment for between three and seven years (in exceptional cases, longer). The term of the investment is often linked to the growth profile of the business.
- Business sector and company characteristics. Venture capital firms' investment preferences may be affected by the source of their funds. Venture capital firms, just as business angels can be specialised and invest either in a specific geographical area, in a specific business sector and so on.
- Investment process**.** The investment process, from reviewing the business plan to actually investing in a proposition, can take a venture capitalist anything from one month to one year but typically it takes between 3 and 6 months. The key stage of the investment process is the initial evaluation of a business plan. Most approaches to venture capitalists are rejected at this stage.
- Exit**.** As in the case of business angels investment, the return to the investor is realised by exiting (selling the shares, the value of which were increased).

2.4 Going public: raising equity finance through equity market.

Issues of new shares to the public account do not account of a very large proportion of total equity fund-raising (for example, in UK it would be less or around 10% of new equity finance over recent years).[161]

While not significant in the overall context of equity financing, when new issues do occur, they are often large in terms of the amount raised. New issues are usually used at the time a business first obtains a listing on the Stock Exchange. This process is called an initial public offering (IPO) or a flotation.

[161] Brealey, R. A., Myers, S. C., & Allen, F. (2017). Principles of Corporate Finance, 12th ed., McGraw-Hill Education, p.424.

2.4.1 Reasons why a company may decide to go public.

The following are reasons why a company may decide to go public and seek a stock market listing:

- ✓ Maximization of value. By starting trade on the market, the company seeks to minimize its costs of capital or maximize its value.
- ✓ Access to a wider pool of finance. A stock market listing widens the number of potential investors. It may also improve the company's credit rating, making debt finance easier and cheaper to obtain. Moreover, this is needed when there is a good opportunity for acquisition of another company.
- ✓ Improved marketability of shares. Shares that are traded on the stock market can be bought and sold in relatively small quantities at any time. Existing investors can easily realize a part of their holding.
- ✓ Transfer of capital to other uses. Founder owners may wish to liquidate the major part of their holding either for personal reasons or for investment in other new business opportunities.
- ✓ Enhancement of company image. Quoted companies are commonly believed to be more financially stable. A stock exchange listing may improve the image of the company with its customers and suppliers, allowing it to gain additional business and to improve its buying power.
- ✓ Facilitation of growth by acquisition. A listed company is in a better position to make a paper offer for a target company than an unlisted one.[162]

2.4.2 Ways of making public issues.

Technically, there are two ways of making public issues:

- ✓ Offer for sale. The issuing business can sell the shares to an issuing house. The issuing house thEN sells the shares to the public. Usually, there is no restriction on the amount of capital raised by this method. Placing is a variation of offer for sale.
- ✓ Offer by prospectus. The issuing business sells the shares direct to the public. Such companies are usually advised by banks or other intermediaries.[163]

[162] Ritter, J. R., & Welch, I. (2002). "A Review of IPO Activity, Pricing, and Performance." *The Journal of Finance*, p.1795.
[163] Moyer, R. C., McGuigan, J. R., & Kretlow, W. J. (2014). Op.Cit., p.289

2.4.3 Public funds as a source of external funding.

In general, EU regulation does not allow for state aid to private businesses, so that the competition is not distorted. For this reason, only a limited range of sectors and activities can benefit from public funding. The exceptions are based on:

- Regional dimension (state aid is allowed in less developed regions);
- Company's dimensions – until certain limits, the state aid is allowed for small and medium-sized enterprises;
- De Minimis rule, the idea of which is that small amounts of aid (currently till 200 000 € during the period of three years for one company) do not distort competition;
- Certain types of activities, for which government want to create incentives to develop (e.g., research and development, innovation creation, etc.)

2.4.3.1 Ways how the state can support business companies.

State support to business companies can come in many different forms. There are two main groups of support:

✓ Direct support, which addresses the issue of provision of actual cash. The forms of direct support can be the following:

- Grants;
- State guarantees in order to get bank loans;
- Compensations of interests paid for bank loans;
- Co-investment along with risk capital, etc.

✓ Indirect support comes in the form of business support services to companies. For example, certain grant agencies will provide assistance in finding investors, to help in generating new export leads or introducing experts to accelerate the development of new product ideas and strategies.

Section 2: New forms of business financing (FinTechs).

New forms of business financing have emerged to address the limitations of traditional funding methods. These innovative approaches provide alternative options for businesses to access capital, drive growth and achieve their goals. These include crowdfunding and neo-banking.

1 Crowdfunding.

Introduction.

Michael Sullivan was the first to use the word crowdfunding in fundavlog.6 in 2006 when launching his incubator dedicated to video blogs. Its website included a crowdfunding feature, alongside other more traditional features such as, project and event presentations in the United States of America. It has become a good alternative to easily raise capital, especially in the early stages of a startup.

From 2009 onwards, most crowdfunding websites appeared in the market for promoting their products, ideas, creativities and innovation in the market until today. From there on, the crowdfunding concept grew and spread widely across the world among the businesspersons, NGOs, companies and private individuals.[164] For instance, Kickstarter and Indiegogo are the two largest sustainability crowdfunding platforms in the world.

Crowdfunding has become one of the modern financing modes that facilitate the initiation of a project, along with funds from business angels or 'love money', from friends and family. Most startup companies or growing businesses often use crowdfunding as a way of accessing alternative funds.

Modern crowdfunding is driven by two structuring elements:

– Web 2.0 technologies and the impact of social networks. Twitter, Facebook, and LinkedIn are, among others, key communication levers in successful crowdfunding fundraising. In addition, online payment techniques like PayPal allow for fund transfers across the world with minimal regulatory constraints.

– A desire for involvement and altruism from stakeholders wishing to participate in this entrepreneurial, societal, and even human adventure.

1.1 Definitions of crowdfunding.

The concept of crowdfunding originates from the broader concept of crowdsourcing, which uses the crowd to obtain ideas, feedback, and solutions to develop business activities. The English word "crowdfunding" is composed of "crowd," which means the crowd, and "funding," which means financing. It is also called collaborative financing, socio-financing, financing 2.0, or literally financing by the crowd.

[164] Liang X, Hu X, Jiang J. (2019). Research on the effects of information description on crowdfunding success within a sustainable the perspective of information communication. School of Economics and Management, p.36.

The term "crowdfunding" refers to an open invitation to the public to raise funds for a specific project, through Crowdfunding platforms via websites that allow interaction between fundraisers and the public, so that pledges can be made and collected."[165]

Crowdfunding refers to "An open call, essentially through the Internet, for the provision of financial resources either in the form of donations or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes."[166]

Crowdfunding can be defined as the procedure allowing a project leader (a private individual, a for- profit or not- for- profit organization, etc.) to use the services of a funding platform (generic or specialized) to propose a project to a community (open or targeted) of contributors, possibly in exchange for previously defined compensations.[167]

Crowdfunding refers to the "efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the Internet, without standard financial intermediaries."[168]

Crowdfunding is "an umbrella term describing the use of small amounts of money, obtained from a large number of individuals or organizations, to fund a project, a business or personal loan, and other needs through an online web-based platform."[169]

Crowdfunding is a relatively new method of raising capital from a variety of networks, expanding the donor base to fund ideas and projects.

1.2 Objectives and differences between crowdfunding and traditional funding.

1.2.1 Objectives of crowdfunding.

The objective is to raise funds for investment using the Internet and social networks (Twitter, Facebook, LinkedIn and other specialized blogs). Since a "crowd" of investors is solicited, the term crowdfunding has been used to describe this new source of financing which, like microcredit, is presented as an alternative financing system compared to traditional financing methods.[170]

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[165] European Commission.(2023).crowdfunding, p.1

[166] Schwienbacher, A. and Larralde, B. (2010). Crowdfunding of small entrepreneurial ventures. In D. Cumming (ed.), Handbook of Entrepreneurial Finance. Oxford: Oxford University Press, p.2.

[167] Onnée, S. and Renault, S. (2013). Le financement participatif: atouts, risques et conditions de succès. Gestion Revue Internationale de Gestion, 38(3), p.56.

[168] Mollick, E. (2014). .Op.Cit., p.2.

[169] Worner, E.K. (2014) Crowd-funding: An Infant Industry Growing Fast. Staff Working Paper of the IOSCO Research Department, p.21

[170] Bruton G, Khavul S, Siegel D, Wright M (2015) New financial alternatives in seeding entrepreneurship: microfinance, crowdfunding, and peer-to-peer innovations. Entrep Theory Pract 39(1), p.10.

The objectives of Crowdfunding are multiple, but the main idea is to help, bring out, facilitate and support people in need to see their ideas, projects or small businesses realized and grow, with much more flexibility in procedural matters compared to the conditions required by traditional financing.

1.2.2 Differences between crowdfunding and traditional funding.

Below are the aspects that differentiate crowdfunding from traditional funding.

Table 5 : The differences between crowdfunding and traditional funding.

Aspect	Crowdfunding	Traditional funding
Source of funds	Public (many individuals, often online)	Banks, investors, venture capitalists, government grants
Access	Open to almost anyone with an internet connection	Often requires credit checks, business plans, guarantees
Process	Campaign-based, online platforms	Formal applications, reviews, negotiations
Speed	Can be fast if campaign goes viral	Usually slower due to paperwork and due diligence
Repayment/Return	Depends on model: donation, reward, equity, loan	Typically involves interest payments or equity exchange
Risk distribution	Spread among many backers	Concentrated among few funders or institutions
Engagement	High supporters often become early users or promoters	Low limited to financial transaction
Marketing exposure	High campaigns double as promotional tools	Low mostly behind-the-scenes funding

Source: https://keydifferences.com/difference-between-crowdfunding-and-traditional-fundraising.html

1.3 Characteristics and success of crowdfunding.

1.3.1 Characteristics of crowdfunding.

The following elements can be considered as characteristics of crowdfunding:

- Crowdfunding offers companies that have just started their activities attractive financing conditions.

- Anyone who wants to finance a project has free access to it. That is to say, the funder has to do is simply log in to a Crowdfunding platform to see the different projects in progress without paying any fees (access rights).

- The funder has the right and the choice to put his money into one project among many others.

- As long as the project is ongoing, there is always transparency on the information concerning the allocation of funds.

- The campaign always has a duration of between 20 and 90 days maximum, hence the rapid access to funding.

1.3.2 The success of crowdfunding.

Three factors explain the recent success of crowdfunding[171].

– The scarcity of financial resources dedicated to investment projects in the earliest phases of the business life cycle (seed capital or start-up capital, which corresponds to the so-called pre-seed, seed and start-up phases). This results in an equity gap or financing gap, which results from the preference for traditional investors to prioritize financing projects in less risky, established companies.[172]

– The evolution of Web 2.0. Connecting potential contributors (or crowders) and project leaders is facilitated by relatively low costs. In addition, Web 2.0 technologies allow the mobilization of adapted, fast and inexpensive communication tools. Thus, for the project leader, the participation of his social network allows him to transform his social capital into financial capital.[173]

– The success of crowdsourcing. Participatory financing is a form of crowdsourcing.[174] This can be defined as the use of the crowd to obtain solutions to develop the company's

[171] Agrawal, A., Catalini, C. and Goldfarb, A. (2010). Entrepreneurial finance and the flat- world hypothesis: evidence from crowd-f unding entrepreneurs in the arts. Working paper no. 10- 08, September, p.5.
[172] Pierrakis, Y., &Collins, L. (2012).Crowdfunding In: How the UK's equity gap was closed by the rise of crowdfunding. London: Nesta, p.7.
[173] Lebraty, J.F. and Lobre, K. (2013). Crowdsourcing, One Step Beyond. London: Wiley, p.15.
[174] Rothler, D. and Wenzlaf, K. (2011). Crowdfunding Schemes in Europe. EENC Re-port, p.18.

activities, ideas, feedback on proposals, etc. Crowdsourcing is as an "outsourcing of the essential tasks of manufacturing and selling products intended for the general public in the form of an internet call and with the intention of encouraging individuals to make a voluntary contribution to the company's production process.[175]

1.4 The functioning of crowdfunding.

1.4.1 Crowdfunding Stakeholders.

Crowdfunding is made up of three main stakeholders: entrepreneurs, investors, and finally, the platforms that act as intermediaries.

- Entrepreneurs/Startups: As funding continues to become increasingly difficult, entrepreneurs have to resort to other financing methods. Crowdfunding is one of them.

However, financing needs are not the only reasons that motivate entrepreneurs to use crowdfunding. Furthermore, crowdfunding is considered a very effective way to make an idea or project known to a very wide and sometimes even international audience.

This is mainly done through social and verbal networks, too effective but inexpensive methods. Entrepreneurs are also motivated to satisfy a certain desire for approval, both for themselves and for their project. The interest generated in a project increases the self-confidence of entrepreneurs. Furthermore, the number of investors and the amount of funds raised can help determine whether a project has potential.

- Platforms/Intermediaries: Crowdfunding platforms have seen steady growth worldwide. Platforms facilitate transactions between entrepreneurs and investors through their knowledge, know-how, and past experience.

The motivation behind platforms goes far beyond monetary incentives. Platforms charge commissions on the total amount raised and sometimes on reaching the funding goal.

They can be seen as catalysts for innovation, providing the means and systems that enable crowdfunding. First, a platform must be as flexible as possible. It is not its role to control the funding process, but rather to play a supporting role. In addition, they must facilitate the circulation of ideas and solutions, for example by promoting communication between project creators and investors.

[175] Kleeman, F., VoB, G.G., &Rieder, K. (2008).Un(der)paid innovators: The commercial utilization of consumer work through crowdsourcing. Science, Technology &Innovation studies.4 (1), p.7

❖ Investors: First, it is interesting to note that there are several types of investors in Crowdfunding projects and that they can have very different motivations. There is no typical crowdfunder. Investors are part of all professional socio-economic categories.

The idea behind crowdfunding is based on the fact that some people want to support projects they enjoy and are close to, emotionally, familiarly, communally, or geographically. Some people want to support projects with which they share the same values or local projects that can contribute to job creation.

Others are more interested in the rewards they will receive in exchange for their contribution. Some people want to be part of a community with people who share common values. For them, it is about maintaining their social identity.

1.4.2 The process of crowdfunding:

Modern crowdfunding is a mechanism for providing funding to projects by appealing to as many stakeholders as possible, via social networks. Three concepts are essential to crowdfunding: open call, crowd involvement and the importance of social networks. A crowdfunding process is broken down into five stages:

- the submission of the project and selection by the platform;
- the acceptance of the project on the platform;
- a communication phase based on exchanges between members of the crowd and the project leader, with possible financial participation;
- the sending of the funds collected by the platform to the project leader;
- After the project has been completed and depending on the results obtained, the project leader pays the members of the crowd, according to terms generally set when the project is accepted on the platform.

1.4.3 The stages of a crowdfunding operation.

Crowdfunding platforms differ according to their professions, but they respond to the same constitutive principles. The following are the stages of crowd funding operations:

- Preparing the financing project: The project leader must present their project in the most attractive way, and the information provided must answer the following questions:
  - Why this project?

- What is its relevance?
- What is the project leader's skill?
- How much to raise?
- What is the return on investment?

Successful crowdfunding requires the project leader to master communication techniques in order to present their project in the most attractive way, according to Internet standards. A multi-channel communication strategy must be defined before the project is integrated into the platform. Three axes are highlighted:

✓ The pace of communication. A crowdfunding fundraising campaign has a duration that varies from 45 days to 60 days for the vast majority of platforms.

✓ Communication targets. Three targets are strategic in a crowdfunding operation. It is important to capture these targets in order to succeed in the financing operation. The three strategic targets are, potential contributors**,** Investors, Communication relays (These are individuals or organizations that can help to disseminate the project to a wide audience (bloggers, influencers, journalists, etc.). Their role is to relay information to reach a larger number of people)

✓ Communication relays. In the communication strategy, project leaders must consider the use of several media: email campaigns, press releases, Twitter, videos on YouTube, etc.

- Submission of the file on the platform: The project leader must choose a platform that serves as an intermediary between the investor and the contributors and as a crowdfunding advisor. Thus, the platform studies the pitch that was sent to it and accepts or rejects it.
- Project election**:** Once the project is accepted by the platform, it is put online with all its content: project presentation text, videos, photos, and the fundraising campaign can begin.
- Financing the operation: The campaign begins and is limited in time, the platform operates by the all-or-nothing method (AON) or by the mode (tier) i.e. payment regardless of the amounts collected.

- All-or-nothing (AON) method: If the financial goal is not reached, the funds are returned to the contributors. This is seen as a way of protecting funders and encourages projects to set realistic funding targets that match the amount of money they need in order to realize their project’s aim.

- Tiered method: Funds are collected in tiers and paid to the project leader even if the total goal is not reached, but this remains at the discretion of the platform.

- Payment of funds: The payment system releases the funds and pays them to the project leader after deducting transaction fees and platform fees.

- Post-fundraising activity: the platform monitors the progress of the project through regular reporting and after its completion; the investor remunerates the contributors according to the terms set when the project was accepted on the platform.

1.5 Types of crowdfunding:[176]

In the modern era of technology, undoubtedly, different crowdfunding models play a pivotal role to promote entrepreneurial activities and economic development programs all over the globe. Crowdfunding acts as an interactive forum for bringing all enthusiastic investors together to fulfil their common goals. In addition, the online investment habits of people have increased phenomenally as modern technology grows at a greater speed.

Crowdfunding platforms can be highly differentiated, in particular depending on the nature of the contribution and the expected return.[177]

1.5.1 Equity-based Crowdfunding.

Equity crowdfunding consists of selling a stake in a business to a number of investors in return for investment. Equity crowdfunding is a unique way to raise capital for the startups without taking on new debt.

The existence of equity funding is well established, with private equity, venture capital and business angel investing long playing a role in developing companies.

The main difference between equity crowdfunding and these traditional models is that, rather than establishing a one-to-one relationship, it is offered to a wide range of potential investors, some of whom may also be current or future customers. Equity crowdfunding does this by matching companies with would-be angels via an internet-based platform.

Equity crowdfunding is also called regulation crowdfunding because it is regulated by the federal government.

Examples for an equity-based CFP are; UK-based Crowdcube; by investing in the fund, a funder obtains equity in the portfolio. Here, the fund manager tries to play a similar

[176] https://www.crowdfunding.com/types-of-crowdfunding/
[177] Bessière, V. and Stéphany, É. (2014). Le Crowdfunding – Fondements et Pratiques. Brussels: De Boeck, p.12.

function as the manager of a venture capital fund; Smart Angels; a French equity-based CFP created in 2009.[178]

1.5.1.1 Characteristics of Equity-based crowdfunding.

- It requires good expertise to value a venture correctly.
- The fees payable for raising equity finance on the crowdfunding platform are legal or administrative fees related to the issue and additional legal and advisory fees may incur
- Many people can invest.
- The business should be investment-ready, thus a business plan and financial forecasts must be produced.
- Limited due diligence is usually carried out by the platform and the investor may have the option to ask for more information even if it comes at additional costs to you.
- There are serious legal aspects, such as disclosure and legal documents, annual general meetings with shareholders, processing corporate rights, annual reports and decision procedures.
- Shareholders have voting rights on key matters of running the business, issuing new shares, etc. Investors may claim damages to compensate money loss incurred, for instance as a result of breach of contract.

1.5.2 Reward-based crowdfunding.

It is a type of crowdfunding where the creators of a new product, service, or business solicit a large number of people to contribute to their "campaign" in exchange for something in return.

Here, small-scale funders are not primarily interested in financial return. Individuals donate to a project or business with expectations of receiving in return a non-financial reward, such as goods or services, at a later stage in exchange of their contribution that the campaign was created to fund, and/or may also include promotional items like branded t-shirts, bumper stickers, bobble heads, and more.

[178] https://www.smartangels.fr/

In cases where the rewards are focused around the product or service that the campaign was created to fund, reward-based crowdfunding serves as a platform for the creators to pre-sell your product, service, or creative work.

This form of crowdfunding allows companies to launch with orders already on the books and cash flow secured (a major issue for new business) and gathers an audience before a product launch. Fundraisers can also think of turning funders into ambassadors of the product. They promote the product, e.g., by posting to Facebook friends. In addition, as ambassadors, may receive additional rewards.

On reward-based CFPs, funders mainly play the role of "prosumers. This applies especially for artistic ventures.

The crowdfunding platform allows fundraisers to attract a group of funders who essentially pre-purchase the product. This reduces the risk of losses from the viewpoint of the fundraiser. The uncertainty from the viewpoint of the funder is whether the output will satisfy his or her tastes.

Reward-based CFPs cannot be measured in monetary terms. On reward-based CFPs, funders receive tangible, but non- financial benefits for their contributions.[179]

Examples of reward-based CFPs are: Kickstarter: It is the most prominent reward-based CFP since its launch in 2009. KissKissbankbank: It covers all genres of projects. This platform is at the same time reward- and donation-based.

1.5.2.1 Characteristics of Reward-based crowdfunding.

- Funds given don't have to be repaid
- Orders are secured before the launch of a new product
- You are obliged to deliver on your promises on schedule.
- It is a popular option for startups and entrepreneurs as it provides a way to fund the launch of new companies or products.
- It is particularly suitable for products and services that are innovative, or garner high levels of consumer attention. Complicated concepts or products are less suitable for rewards crowdfunding.

[179] Kuppuswamy, V., and Bayus, B. L. (2013). Crowdfunding Creative Ideas: the Dynamics of Projects Backers in Kickstarter. Mimeo, p.15.

1.5.3 Donation-based crowdfunding.

It is a way to source money for a project by asking a large number of contributors to donate individually a small amount without any expectation of return. Individuals donate small amounts to meet the larger funding aim of a specific charitable project while receiving no financial or material return.

The role of donation-based CFPs is to support humanitarian and artistic projects. Funders on donation-based CFPs can be seen as philanthropists.

Donation campaigns are often 1-3 months in length. Sometimes referred to as rewards crowdfunding, the tokens for donations may include pre-sales of an item to be produced with the funds raised. This sort of crowdfunding is predicated on donations, funders do not obtain any ownership or rights to the project nor do they become creditors to the project.

Donation-based CFPs do not include personal benefits, even though it is sometimes difficult to draw an exact dividing line between the two because, e.g., the mentioning of the funder can already be seen as a reward. Similar to reward-based CFPs, the success of a donation-based CFP depends on the quality of the matching between the tastes of the funders and the characteristics of the campaign.

Fundraisers do not offer monetary returns or in-kind payments apart from recognition within a community. This is similar to traditional campaigns by charities and NGOs, which also ask for contribution to a cause.[180] Fundraisers are groups or individuals in search of funding.

Examples for a donation-based CFP are: GoFundme; funds can be raised for a particular project or to help in times of difficulty, and it makes it possible to raise money for charities (a different pricing rule applies in this case). GoFundme makes suggestions based on category, geographic proximity and funding by Facebook friends of the potential funder; MyLocalProject, it is a French CFP created in 2013 as a donation-based platform and covers projects on education, environment and health mostly in developing countries; United Donations, also a French donation-based CFP.

1.5.4 Peer-to-Peer (P2P) lending.

P2P lending or marketplace lending is a type of crowdfunding that refers to “peer-to peer” or “person-to-person” in which companies or individuals seek funding in the form of a loan agreement. The users can be lenders and borrowers without any intermediation.

[180] Saxton, G. D., & Wang, L. (2014). The determinants of private donations to provide public goods: An online study of Facebook Causes. Nonprofit and Voluntary Sector Quarterly, 43(2), p.18.

Businesses search for potential investors who are ready to provide huge amount of investment in exchange for high returns. The crowd lends money to a company with the understanding that it will be repaid with interest. It is very similar to traditional borrowing from a bank, except that you borrow from lots of investors.

On lending-based CFPs, funders are offered a certain interest rate on successful projects if the project pays out. Fundraisers on lending-based CFPs offer interest payments in return for a loan. These platforms aggregate various data sources and employs cutting-edge analysis for credit decisions.

Different from a traditional bank, the CFP does not screen between different projects. Rather, it lets funders to decide for themselves if a particular project should be funded.

Examples for a lending-based CFP are; The US-based Prosper.com; this lending-based CFP assigns a credit grade for each campaign based on the fundraisers characteristics and the performance of all successful campaigns. Thus, it can be seen as a credit-rating agency for the borrowers active on Prosper,[181] Spear; it is a French lending-based CFP launched in 2011,[182] Babyloan; it is also a French lending-based CFP created in 2008.

1.5.4.1 Characteristics lending based crowdfunding.

- Greater flexibility with interest rates: If your campaign is popular, investors may compete with each other to lend money to your business and offer better interest rates to secure the deal.
- Loan sizes can vary greatly. The minimum loan size is very small, which encourages a wide range of lenders to participate.
- The loan is repaid through direct debits to the platform, which distributes your repayments out to the lenders.
- Disclosure requirements are are made public to all crowdlenders.
- Loans are legally required to be repaid.

1.6 Advantages and risks of Crowdfunding.[183]

1.6.1 Advantages.

- Crowdfunding creates the organization or support individuals to access finance that banks or other lenders are not prepared to offer or only offer at a high cost. Owing to which

[181] www.prosper.com/invest/peer-to-peer-lending/
[182] www.spear.fr.
[183] https://www.litmusbranding.com/blog/what-is-crowdfunding-how-startups-can-benefit-from-it/

such arrangement is the best alternatives source of finance that benefit the wider economy or a local economy.[184]

- P2P lending helps smooth consumption and income fluctuations, and can provide SMEs funds for business expansion, production, and other activities.[186] These entrepreneurs, with the help of modern technologies, create numerous astonishing business ideas and display them online to attract various investors.
- Crowdfunding platforms act as intermediaries between individual and institutional investors, and other public sectors that focus on small and medium-sized enterprises.[187]
- Crowdfunding does not require any collateral as it is the process of generating funds from a large group of people rather than traditional methods of loans where collateral is required.
- The process of crowdfunding for startup act as tool for marketing the product through campaign and helps in creating customer base and improve relation with investors. The most important aspect of financing through crowdfunding should be considered as the process of formulating a community of people who support the product and would provide valuable feedback on the product and spread awareness about the campaign.
- Crowdfunding provides equal access to capital and reduces friction in the process of investment as well as able to enhance better communication between entrepreneurs and the crowd (investors).[188] In addition, it promises accountability, transparency, market information and efficiency too.
- Jason Best stated in his article, "Entrepreneurship without Boundaries" that the crowdfunding platforms like reward and lending offer the investors a higher rate of returns than those available financial products.

1.6.2 Risks of crowdfunding.

There are also risks associated with crowdfunding.

- Once an idea has been posted on a crowdfunding platform, the whole world can see it. The idea may be copied and implemented by other entrepreneurs. Therefore, the project

[184]Julie S. Hui, M. D. (2011). Understanding the Role of Community in Crowdfunding Work. Segal Design Institute, p.3.
[186] Kristof, De Buysere. O. & Gajda. (2012). A Framework for European Crowdfunding, p.18.
[187] Julie S. Hui, M. D. (2011). op.cit. p.3
[188] Financial Conduct Authority. Financial Conduct Authority; 2021. https://www.fca.org.uk/consumers/crowdfunding

initiators must use legal methods and instruments to protect their concepts and ideas (patents, trademark and copyright).

- The mismanagement of the intellectual property of ideas submitted by the crowd. Most crowdfunding websites permit members of the public to comment on projects, and in many cases, these comments include recommendations that are later incorporated into the project."

- The possibility of troublesome information asymmetries between the project initiator, the crowdfunding platform and the backers. This is one of the potential weaknesses of crowdfunding platforms specifically, and multisided platforms in general.[189] Too much information can increase the complexity of understanding crowdfunding projects, which cause aversion of backers and reduce the rate of crowdfunding success[190].

2 Neo-banking.

Introduction.

The history of neo-banking began in Europe. The UK, U.S, and European nations have now built a global platform of neo banking, with around 100 neo-banks.[191] Some of the first players emerged in the United Kingdom in 1989 and Germany. In India, Niyo Solutions is one of the first companies to emerge in this sector.

Neo-banks began employing new technology and adapting to changing customer demands and expectations during the last 20 years, particularly after the 2008 global financial crisis, and these are resolved based on electronic clearing. Neo-banking has become a major trend in the banking industry. It is because of the way it redefines the banking sector and displays how advanced the future of banking can be.

The term neo-bank (virtual, digital, Internet banking) has been actively used since 2017. Neo-banking, an important secular trend in financial services, is reliant on generation Z (this refers all individuals born between approximately 1997 and 2012 which grew up with the wide spread of technology adoption, internet and social media) where building trust in this cohort is needed to drive the digital banking transition.

In the era of global economic digitization, banks utilize modern financial technology to offer new methods of connecting with consumers and finer unique goods and services

[189] Hagiu, A. and Wright, J. (2015). Multi- sided platforms. International Journal of Industrial Organization, forthcoming, p.3.
[190] Liang X, Hu X, Jiang J. (2019) .Op.Cit., p.2.
[191] Shabu, K., & Ramankutty, V. (2022). Neo-banking in India: Opportunities and Challenges from Customer Perspective. SSRN Electronic Journal, P.34.

accessible from anywhere in the globe.[192] Bill Gates' 1994 commented, "Banking is necessary, banks are not," perfectly exemplifies the banking industry's digital transition.

The increasing growth and usage of neo-banks does not seem to stop, and forecasts from Statista (2023) estimate that the number of users in 2027 will be 376.9 million worldwide, which is a twentyfold increase from 2017 (18.95 million users). It is apparent that the trends and dynamics of banking are shifting; however, it is uncertain to what extent neo-banks presence threatens the traditional way of banking. The transaction value of Neo-banks worldwide increased from $0.45 trillion to $3.21 trillion (or 713%) between 2018 and 2022 and the number of users during the same years increased from 32.61 million to 188.4 million users worldwide (or 578%).[193]

Examples of neo-banks include; Chime - A user-friendly neo-bank for personal and business use, Revolut - Known for offering international money transfers with minimal fees, N26 - A Europe-based neo- bank popular for its low fees and mobile-first experience, Zopa Originally a peer-to-peer lender, now offering a range of neo-bank services, etc…

2.1 Definitions of Neo-banking.

Digital-only banks (neo-banks) are essential components of the banking-as-a-service ecosystem, which offers consumer convenience through mobile and internet banking.[194]

Neo-bank is a 100% digital bank and it reaches customers on mobile apps and personal computer platforms only.[195]

Neo-banks are fully online banks with no office network, developed on modern technological platforms.[196]

Digital- only bank, sometimes known as a neo-bank, is a bank that operates without physical branches and offers its customers digital banking services such as online and mobile banking.[197]

[192] Bouteraa, M., Chekima, B., Lajuni, N., & Anwar, A. (2023). Understanding Consumers' Barriers to Using FinTech Services in the United Arab Emirates: Mixed-Methods Study. SSRN, p. 8.
[193] Statista. (2023). Neo-banking. https://www.statista.com/outlook/dmo/FinTech/neo-banking/worldwide
[194] Bouteraa, M., Raja Hisham, R. R. I., & Zainol, Z. (2020a). Green Banking Practices from Islamic and Western Perspectives. International Journal of Business, Economics and Law, 21(5), p.5.
[195] Bouteraa, M., Raja Hisham, R. R. I., & Zainol, Z. (2020a). Idem, p.5.
[196] Glushchenko, M., Hodasevich, N., & Kaufman, N. (2019). Innovative financial technologies as a factor of competitiveness in the banking. SHS Web of Conferences, 69, 00043, p.43.
[197] Tosun, P. (2021). Brand Trust for Digital-Only Bank Brands: Consumer Insights from an Emerging Market. Atlas International Congress on Social Science 7, p.7.

Neo-banks are examples of digital banks that compete with an increasingly centralized banking sector by serving a more tech-hungry consumer base.[198] Additionally, in his paper revealed that there are several meanings of the term "neo-bank." For example, neo-bank is a type of direct bank that is entirely digital and offer services to consumers via mobile applications and personal computers.

Neo-banks are a branch of the prepaid card industry. They offer simulated bank-like services through internet-only operations, avoiding any branches entirely.[199]

Neo-banks are, in reality, banks with no physical branch locations that provide checking, savings, payment services, and loans to consumers through a purely mobile and digital network.[200]

Thus, from the above we concluded that there are many different ways of highlighting the neo-bank's definition but all of them have the same meaning.

2.2 Types of neo-banking:[201]

There are three main types of neo-banks in the market today:

- Neo-banks partnering with traditional banks; these neo-banks do not have their own banking license. Instead, they partner with a traditional bank and wrap their own services around the bank's existing products.
- Traditional banks launching neo-banks; In this case, a traditional bank creates its own fully digital version. These neo-banks offer all the services of a regular bank but operate exclusively online without any physical branches.
- Fully licensed neo-banks; these neo-banks have their own digital banking licenses, which allows them to operate independently without partnering with a traditional bank. However, this type of neo-bank is only available in countries that allow stand-alone digital banks.

Currently, most of the neo-banks that exist today fall under the first or second type. That is the reason why the majority of neo-banks have a bank as a partner. Banks act as a platform for neo-banks to offer core-banking services.

[198]Knewtson S., H., & Rosenbaum, Z. A. (2020). Toward understanding FinTech and its industry. Managerial Finance, 46(8), p.1045.
[199] Khayrallah, A., Radia, N., Hickey, J., Singh, J., & Xu, V. (2015). Technology & Banking. Applied Innovation Review, 1, p.23.
[200] Martinčević, I., Črnjević, S., & Klopotan, I. (2020). FinTech Revolution in the Financial Industry. Proceedings of the ENTRENOVA-ENTerprise REsearch InNOVAtion Conference (Online), 6(1), p.563.
[201] Buchi, G., Cugno, M., Zerbetto, A., Castagnoli, R. (2019). New Banks in the 4th Industrial Revolution: A Review and Typology. Proceedings of 22nd Excellence in Services International Conference, p.78.

2.3 Characteristics of neo-banking.

Neo-banks offer several key unique features and innovations that set them apart from traditional banks:

- The main landmark feature of neo-banks is their mobile-first approach. They are designed to be used primarily on mobile devices, which makes them more convenient for customers who are always on the go with an emphasis on giving their customers a seamless, user-friendly, and fully digital experience. Thus They provide their banking services via mobile apps and websites,
- Neo-banks are a particular class of financial institutions that exclusively conduct their business online. They do not have any physical branch locations at all, with memberships that are free of charge.
- They focus on user experience. Neo-banks are designed to be simple and easy to use, with intuitive interfaces that make it easy for customers to manage their finances.
- To provide innovative services and features like real-time transaction alerts, budgeting & investment tools, simple account opening procedures, as well as access to many trading markets e.g., crypto and stock exchange, neo-banks frequently rely on technological advancements.[202]
- They also offer a range of innovative services such as budgeting tools, savings goals and real-time notifications
- They offer services and form partnerships to serve their consumers far faster than traditional banks.[203]
- Neo-banks are also known for their affordability and easy accessibility. They do not have the same overhead costs as traditional banks, which allows them to offer better rates to their customers.
- They have fast and efficient customer service. They use technology to provide quick responses to customer enquiries and complaints.

2.4 Functioning and regulation of neo-banking.

2.4.1 Functioning of neo-banking.

Neo-banks work on a Banking as a Service (BaaS) model. This means that they rely on partnerships or licenses to provide banking services. One of the main causes of this is that

[202] Gulieva, V., Hopkinson, G., Klarova, D., & Turcan, R. V. (2019). How neo-banks' business models challenge traditional banks. ResearchGate, p.49.
[203] The Economic Times. (2022). Explained: Neo-banks, the next evolution of banking, p.4.

neo-banks frequently lack the infrastructure, regulatory clearances, and licenses necessary to offer services directly, such as loans and credit cards.

Neo-banks can provide these services because they collaborate with well-known financial institutions, which allows them to do so without having to invest in the necessary infrastructure or secure regulatory permissions and licenses on their own.[204]

For instance, neo-banks may collaborate with payment processors or suppliers of foreign exchange to give their clients services for making international payments or exchanging currencies. Partnerships can additionally help neo-banks navigate through some of the credibility and trust issues that are frequently connected to young and under-recognized financial service providers. Neo-banks can take advantage of the standing and credibility that long-standing financial institutions have gained by collaborating with them.[205]

An example of this is Google's Google Pay, which was made possible by their partnership with Citi and Stanford Credit Union. Another example is Ikea, which wanted to move into consumer banking internationally and bought a 49% stake in Ikano Bank, to be able to utilize their banking license.[206]

Neo-banks must successfully manage the risks brought on by these relationships while also being cautious not to grow overly dependent on them. It is also apparent that depending on what degree of partnership neo-banks indulge in, they also must follow certain sets of rules.

2.4.2 Regulations of neo-banking.

- Neo-banks need to follow Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations, which is a section within AML[207]. AML represents the group of laws, regulations, and acts that are designed to hinder the efforts to falsify illegal assets as lawful income.[208] KYC mostly aims to verify the identity of new customers against potential lists of crime suspects, firms or individuals under economic sanctions, and politically exposed persons.
- The implementation of Payment Service Directive 2 (PSD2) is another directive that heavily affects the operations of neo-banks. PSD2 was set in place to de-monopolize the access to customers' accounts and allow Third Party Payment Service. Providers (TPPs) secure

[204] Koibichuk, V., Ostrovska, N., Kashiyeva, F., & Kvilinskyi, O. (2021). Innovation technology and cyber frauds risks of neo-banks: gravity model analysis. Marketing Ì Menedžment Ìnnovacìj, 1, p.257.
[205] Pai, R. (n.d). How partnerships between neo-banks and payment providers can drive greater growth. Terrapay, p.5.
[206] Rize. (2022). How to Build a Neo-bank: Selecting a Bank Partner, p.3.
[207] Corander, B. (2021). Neo-banks: Challenges, Risks and Opportunities. p.47.
[208] Kenton, W. (2022). Anti-Money Laundering (AML) Definition: Its History and How It Works. Investopedia. p.103.

access to customers' accounts, to allow more seamless payment and transaction methods for merchants.[209] PSD2 is not only a regulation for banks to follow but also allows opportunities for neo-banks to operate as TPPs between the customers and their traditional banks.

- Regulatory sandboxes in regions such as Africa and the Middle East further facilitate experimentation and growth while ensuring consumer protection.

2.5 Differences between neo-banking, traditional banking and digital banking.

2.5.1 Neo-banking Vs traditional banking.

It is easier to differentiate between neo-banks and traditional banks since they are fundamentally so different in almost every aspect. Neo-banks are sometimes also referred to as "challenger banks" since they challenge traditional banks by offering more convenient and customer-centric banking services.

Table 6: The differences between neo-banks and traditional banks.

Feature	Neo-banking	Traditional Banking
Banking Access	100% online, no physical branches	Physical branches and online services
Account Setup	Fast, fully digital onboarding	Typically requires in-person visits or paperwork
Cost of Services	Low to zero fees (e.g., zero-balance accounts)	In-person, phone support, and online
Customer Support	Primarily digital (chat, email, apps)	Reloadable, no activation fees, rewards, budgeting tools, and direct deposit.
Service Hours	24/7 availability via mobile apps	Limited to business hours for branch visits
Transaction Speed	Instant processing (in many cases)	May take longer for traditional transactions
Customization and Personalization	Highly personalized services through AI and data	Standardized services
Transparency	Fee transparency and lower costs for customers	Hidden charges and complex fee structures
Banking License	None, partial, or full	Full
Approval process	Quick and automatic	Manual and lengthy

Source :https://www.fibe.in/blogs/neo-bank-vs-traditional-bank/

[209] Svenska Enskilda Banken. (n.d). The Payments Services Directive, PSD2, p.5.

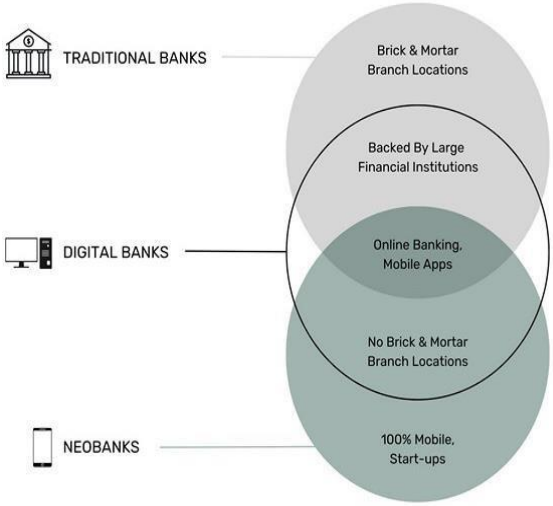
2.5.2 Neo-banking Vs Digital Banking.

Even though they provide similar services, neo-banks and digital banks are distinct financial entities[212]. People really struggle to differentiate between digital banks and neo-banks since they are so similar.

- Digital banks are seen as an online extension of traditional banks in the financial industry, whereas neo-banks are entirely online and operate independently of traditional banks.[213] Neo-banks address the inadequacy of traditional banking, which is a much-needed prerequisite for banks today.[214]

To understand the differences between the three banking types, below is a diagram that clearly differentiates neo-banks from traditional and digital banks.

Figure 3 : Differences between traditional and digital banks.



Source:https://www.researchgate.net/profile/MohamedBouteraa/publication/371983898/figure/fig2/AS:11431281171605758@1688275778642/Neo-Digital-and-Traditional-Banks-Source-Crassula-2019.png

2.6 Advantages of Neo-banking.

These include the following:

- Low cost; it is cost-effective compared to traditional banks. The lack of physical branches and the effective use of technology result in a smaller cost structure, allowing neo-

[212] Mahadevan PV. (2022). *Neo-bank Vs Digital Bank: Everything you need to know about the future of banking*. https://blog.accubits.com/neo-bank-vs-digital-bank-everything-you-need-to-know-about-how-it-differs/#:~:text=your FinTech product-,How is Neo-banks different from digital banks%3F,whereas Neo-banks are exclusively online.
[213] Bouteraa, M. (2020). Descriptive Approach of Green Banking in the United Arab Emirates, p.7.
[214] Mahadevan PV. (2022). Idem, p.5.

banks to provide accounts with no monthly fees or withdrawal fees.[215] Many neo-banks e.g., N26 and Revolut offer banking services to customers at low to no cost.

- Convenience; neo-banks offers top-notch convenience to their users since it is entirely digital. This means that customers can use all the banking services at the convenience of their smartphone.
- Improved customer experience; from quick account setup to real-time notifications, neo-banks offer an intuitive, user-friendly experience that customers and businesses love.
- Smart reporting; neo-banks offer users a considerably greater choice of money-management capabilities in real-time. This feature allows users to see the details of all their payments, transactions, expenditures, saving goals, and balances on a single app.[216]
- Fast processing time; neo-banks are known for their faster processing time compared to traditional banks. Neo-banks bypass all these time-consuming processes and leverage innovative strategies to speed up the entire process such as the account opening process. For example, SoFi enables a user to pre-qualify for loans and interest rates within a few minutes.
- International payments at ease; when it comes to making international payments, users may face difficulties in traditional banking. It is because to make cross-border payments, users have to request to upgrade their debit card to an international debit card. However, if you have an account in a neo-bank, the users have to add their card to the mobile app and make payments online to any country without any hassle.
- Value-added services; neo-banks offer value-added services like expense tracking, automated savings, and even business insights to help your company thrive.
- Advanced security features; neo-banks are also known to leverage some of the most advanced security features. They implement biometric verification, 2FA (2-factor authorization), RBAC (Role-Based Access Control), top-notch encryption technology, and many other advanced security since many neo-banks predominantly use mobile pay.
- Neo-banks often are more customer-centric and offer personalized services.

[215] Walden, S., & Strohm, M. (2021). What Is A Neo-bank? Forbes Advisor https://www.forbes.com/advisor/banking/what-is-a-neo-bank/

[216] Riemann, J. C. (2021). An examination of critical factors influencing the future usage intention of innovative digital financial solutions for investment activities: Consumers' attitude towards neo-banks in Germany, p.45.

2.7 Challenges and Strategies for Overcoming Challenges faced by neo-banking.

2.7.1 Challenges faced by neo-banking.

While neo-banks enjoy a multitude of advantages over conventional banks, they also face several challenges. Considering that the use of neo-banks and digital banks is a new concept that has emerged in the last decades, there are potential challenges.

- Security issues and cyber threats; cybercrimes and hacking are some challenges or risks that can haunt the banking industry and others that conduct their businesses online.[217] The banking sector is particularly vulnerable to cyber threats due to the vast amount of sensitive financial information it handles, the unauthorized exposure of which can have significant consequences. Delineate a few of these risks such as malware attacks, Distributed Denial of Service (DDoS) attacks, phishing attacks and insider threats.[218]

- Lack of brand recognition. Neo-banks are relatively new to the market and many people are not familiar with them. This can make it difficult for neo-banks to attract new customers. Moreover, over-relying on a partner comes up with several dangers, including possible conflicts of interest, a loss of control over the client experience and complete lack of brand recognition.[219]

- Lack of customer loyalty; as the number of neo-banks and digital banking platforms proliferates, a key obstacle these new age banks encounter is the lack of consistent customer loyalty. This presents a notable challenge in maintaining a stable customer base.[220]

- Regulatory challenges; they are legally required to follow the same regulations with traditional banks, which can be both resource intensive and time-consuming. Furthermore, they must prioritize strong security protocols to safeguard their customers' data. Another issue faced by neo-banks is implementing the necessary laws and regulations to conduct banking operations effectively. The licensing dilemma faced by many neo-banks often leads them to register their businesses and collaborate with conventional banks, which ushers in another issue (a heavy reliance on such partnerships).[221]

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[217] Larisa, G., Tetiana, N., & Viktoriia, V. T. (2019). Neo-banks Operations and Security Features. 2019 IEEE International Scientific-Practical Conference Problems of Infocommunications, Science and Technology (PIC S&T), p.152.

[218] Ahsan, M., Nygard, K. E., Gomes, R., Chowdhury, M., Rifat, N. I., & Connolly, J. F. (2022). Cybersecurity Threats and Their Mitigation Approaches Using Machine Learning—A Review. Journal of Cybersecurity and Privacy, 2(3), p.530.

[219] Leffert, C. (2022). Five types of risks that threaten bank-FinTech partnerships. American Banker, p.2.

[220] Corander, B. (2021). Neo-banks: Challenges, Risks and Opportunities, p.15.

[221] Kokh, L. V., & Kokh, Y. (2020). Banks and FinTech-companies. Proceedings of the International Scientific Conference - Digital Transformation on Manufacturing, P.8

- Profitability and Scalability issue; majority of neo-banks are still in the growth phase and are not yet profitable. Achieving scalability while maintaining a lean cost structure remains a significant challenge.[222] Offering services at lower cost, a common practice among many neo-banks, may impede their ability to generate and sustain revenue. Furthermore, their operational model demands substantial investments in technology, leading to high expenditure.
- Competition; with a saturated market, competition is fierce. Neo-banks need to continuously innovate and differentiate their services to retain customers and attract new ones.[223] Conventional banks have started offering digital banking services almost similar to those offered by neo-banks. Other FinTech companies are also entering the market, which can make it difficult for neo-banks to stand out.

2.7.2 Strategies for Overcoming Challenges faced by neo-banking.

Despite the numerous challenges and security threats looming over the neo-banking sector, there exist several measures that neo-banks can implement to mitigate or avoid these challenges.

- Building strong compliance and risk management systems: It is essential for neo-banks to align with all relevant regulations and enforce robust security measures to safeguard their customers' data. They should also identify potential risks and devise strategies to handle them effectively.
- Creating solid customer relationships and engagement: Neo-banks should strive to build strong bonds with their customers to instill trust. This can be achieved by delivering superior customer service, maintaining transparency about fees and costs and innovating with their products and services.
- Discovering innovative revenue channels and partnerships: Neo-banks should explore new avenues for revenue and partnerships. This could involve collaborating with other companies to offer additional services or designing new products tailored to their customers' needs.
- Improving customer acquisition and retention tactics: Neo-banks must formulate efficient strategies for customer acquisition and retention. This could include offering

[222] Valero, S., Climent, F., & Esteban, R. (2020). Future Banking Scenarios. Evolution of Digitalisation in Spanish Banking. Journal of Business Accounting and Finance Perspectives, 2(2), p.30.
[223] Nasir, M.A., & Rizvi, S.A.R. (2020). The emergence of the neo-banks in the FinTech industry. Journal of Financial Regulation and Compliaance, 28(3), p.278.

incentives for account creation, providing top-notch customer service and creating loyalty programs.

- Investing in enhanced cybersecurity and data protection: Neo-banks must prioritize investments in cybersecurity to protect their customers' data. Like all other industries, banking continues to adapt and discover ways to shield itself from the constant threat of cyber-attacks. Some of these protective measures include enhanced cyber security awareness among employees and suitable training,[224] data encryption,[225] multi-factor authentication,[226] incident response planning and third party risk management.[227]

Section 3: Advantages and Risks of New Financing Methods (FinTechs)

FinTechs, or companies providing technology-based financial services, have transformed the way we interact with the financial world and have significantly transformed the landscape of business financing. By leveraging advanced technologies, FinTechs offer innovative solutions that enhance accessibility, efficiency, and customization in financial services through digital platforms. However, alongside these advantages, they also introduce certain risks that businesses must consider. Below is an in-depth exploration of the main advantages and risks associated with FinTechs in business financing. This section will delve into the advantages and risks of FinTechs.

1 Advantages of FinTechs.

These include the following:

- Ease of Access and Affordability: Using digital platforms, individuals or businesses can access various financial services such as payments, loans, investments, and fund transfers anytime, anywhere. FinTech has also reduced transaction costs, making financial services more affordable for many.
- Efficiency and Speed: FinTech eliminates the need for time-consuming manual processes in traditional financial services. With technologies like automation, real-time data

[224] Abdulrahman, S., & Ismail, A. (2020). The Significance of Cybersecurity System Helping Managing Risk in Banking and Financial Sector. Journal of Xidian University, 14 (7), p.6.
[225]Lakhani, A. (2018). For Financial Services, Encryption is Essential – But So Is Performance. CSO Online.
[226] Ometov, A., Bezzateev, S., Mäkitalo, N., Andreev, S., Mikkonen, T., & Koucheryavy, Y. (2018). Multi-Factor Authentication: A Survey. Cryptography, 2(1),https://doi.org/10.3390/cryptography2010001
[227]Serkebayev, A. (2023). Cybercrime in Neo-banking. FINTECHNA. https://www.FinTechna.com/articles/cybercrime-inneo-banking/

processing, and advanced algorithms, FinTech provides more efficient and faster financial services. For example, online loan applications can be completed in hours or even minutes compared to the days-long process in conventional financial institutions.[228]

Example: Kabbage, a FinTech firm, offers automated funding to small businesses by evaluating real-time data. This enables loan approvals within minutes, a significant improvement over traditional banking timelines.[229]

- Innovation in Products and Services: FinTech drives innovation in financial products and services, creating new solutions that adapt to customer needs and preferences. FinTechs have introduced innovative business models such as peer-to-peer (P2P) lending and crowdfunding[230] providing businesses with alternative funding sources outside traditional banking systems.

Example: Platforms like LendingClub connect borrowers directly with individual lenders, democratizing the lending process and making capital more accessible to businesses that might not qualify for conventional loans.[231]

- Transparency and Security: Utilizing advanced security measures such as blockchain technology, FinTechs ensure secure and transparent financial transactions. The decentralized nature of blockchain provides robust security features such as Data encryption, two-factor authentication, reducing the risk of fraud and enhancing trust in financial operations.[232] Companies like Circle use blockchain to facilitate secure international money transfers, ensuring faster and safer transactions.[233]

- Financial Inclusion: FinTech has helped to address financial gaps by providing access to financial services for those previously underserved by traditional financial institutions. Using easily accessible technology like smartphones, FinTech enables individuals without bank accounts to access the financial services they need, contributing to financial stability and improved well-being.

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[228] Digalaki, E. (2022). The impact of artificial intelligence in the banking sector & how AI is being used in 2022. Business Insider. https://www.businessinsider.com/ai-in-bankingreport?r=US&IR=T.

[229] Martinčević, I., Črnjević, S., & Klopotan, I. (2022). Novelties and Benefits of FinTech in the Financial Industry. International Journal of E-services and Mobile Applications, 14(1), 1, p.9.

[230] Cumming, D.J., Leboeuf, G. and Schwienbacher, A. (2014). Crowdfunding Models:Keep-it-All vs. All-or-Nothing. Mimeo, p.332.

[231] Michels, J. (2012). Do Unveri able Disclosures Matter? Evidence from Peer-to-Peer Lending. The Accounting Review 87, p.1386.

[232] Lakhani, A. (2018). For Financial Services, Encryption is Essential – But So Is Performance. CSO Online. https://www.csoonline.com/article/3284351/for-financialservices-encryption-is-essential-but-so-is-performance.html

[233] Alzoubi, H. M., Ghazal, T. M., Hasan, M. K., Alketbi, A., Kamran, R., Al-Dmour, N. A., & Islam, S. (2022). Cyber Security Threats on Digital Banking. 2022 1st International Conference on AI Cybersecurity (ICAIC), p.2

For Example: M-Pesa, a mobile money platform, has revolutionized financial transactions in East Africa, allowing businesses and individuals to perform financial activities via mobile devices, thereby promoting economic growth in the region.[234]

- Lower costs: One of the biggest advantages of FinTech is its ability to lower costs for consumers. FinTech companies can offer lower fees and rates because they have lower overhead costs.

Example: Digital-only banks, known as neo-banks, like Chime and Varo, offer a full range of financial services with lower fees compared to traditional banks, benefiting businesses seeking cost-effective banking solutions.[235]

- Customization: FinTechs offer tailored financial products and services that cater to the specific needs of businesses. By analyzing vast amounts of data, they provide customized loan terms, repayment schedules, and financial advice, enhancing the overall customer experience.

For example, platforms like Revolut use analytics to offer personalized financial insights and real-time spending alerts, significantly improving user engagement and satisfaction.[236]

- Data-Driven Decision Making: FinTech platforms leverage big data analytics and artificial intelligence to offer personalized financial products and services. This data-driven approach enhances risk assessment and enables businesses to make informed financial decisions

For Example: AI-powered FinTech startups like Clerkie assist consumers in managing debt through integrated mobile apps, utilizing AI to provide tailored financial advice and solutions.

- Collaboration with Traditional Financial Institutions: FinTech companies often collaborate with traditional banks, combining technological innovation with established financial expertise. These partnerships enhance the range and quality of financial services available to businesses.[237]

Example: Swoop, a FinTech platform, uses AI and open banking tools to match SMEs with appropriate lenders, streamlining the financing process and improving access to capital.[238]

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[234] Arroyo, Maria, "The Evolution of the Payment System" bbva.ch/en/news/the-evolution-of-the-payment-methods/September 2022, p.7.
[235] Walden, S., & Strohm, M. (2021). Op.Cit. https://www.forbes.com/advisor/banking/what-is-a-neo-bank/
[236] Dehnert, M., & Schumann, J. (2022). Uncovering the digitalization impact on consumer decision-making for checking accounts in banking. Electronic Markets, 32(3), p.1505.
[237] Koibichuk, V., Ostrovska, N., Kashiyeva, F., & Kvilinskyi, O. (2021). Op.Cit., p.260.
[238] Vaidhyanathan, J. (2022, July 31). What Is Neo-banking And How Does It Work? Forbes Advisor India. https://www.forbes.com/advisor/in/banking/what-is-a-neo-bank/

- Improved Risk Assessment: By leveraging AI and big data, FinTechs can assess credit risk more comprehensively than traditional methods. They consider alternative data points beyond credit scores, such as transaction history and business performance metrics, leading to more accurate risk evaluations. This approach benefits businesses that may lack extensive credit histories but demonstrate strong operational performance.[239]
- Expanded Market Access: FinTechs have democratized access to financial services, reaching underserved or unbanked population through digital platforms and mobile banking solutions. This expansion allows businesses in remote or economically disadvantaged regions to access financing options previously unavailable due to the absence of physical banking infrastructure.

For instance, M-Pesa, a mobile money transfer and finance platform, has facilitated financial transactions for millions in East Africa, integrating them into the global market place.[240]

- Operational agility: FinTechs enable businesses to adapt swiftly to changing market conditions through flexible financial solutions. Cloud-based platforms allow companies to scale operations without significant capital outlay, offering both flexibility and economic efficiency.[241] For instance, FinTech startups can pivot their business models in response to regulatory changes, demonstrating agility that is often challenging for traditional financial institutions.[242]

2 Risks of new financing methods (FinTechs).

New business financing models have emerged as innovative alternatives to traditional funding, offering greater flexibility but also introducing new and complex risks. These risks include operational, regulatory, financial, technological and consumer protection risks.

❖ Operational risks: FinTech companies depend heavily on technology platforms to deliver services, making them vulnerable to operational failures. One of the major threat is cybersecurity because FinTechs store and process sensitive financial and personal data, they are

[239] Serkebayev, A. (2023). .op.cit., https://www.FinTechna.com/articles/cybercrime-inneo-banking/
[240] Harrist, Margaret.(2017, March 14): "How FinTech is Powering the Global Economy", forbes. https://www.forbes.com/sites/oracle/2017/03/14/how-FinTech-is-powering-the-global-economy/
[241] FinTech Futures. (2021). Global Neo-banking Market Growth Outlook to 2026: Rising Adoption of Digital Tools Set to Increase Adoption Rates of Internet-Only Banks. Globe Newswire. https://www.globenewswire.com/news-release/2021/06/29/2254670/0/en/global-Neonanking-Market-Growth-Outlook-to-2026.html
[242] Bu, Y., Li, H., & Wu, X. (2021). Effective regulations of FinTech innovations: the case of China. Economics of Innovation and New Technology, 31(8), https://doi.org/10.1080/10438599.2020.1868069

prime to targets for hackers. A breach could expose customer data, lead to financial theft, and damage the company's reputation. In addition, technical problems like system crashes or software bugs can halt transactions or access to accounts, frustrating. Moreover FinTechs often use third –party services, (such as cloud providers or payment gateways), so if those partners fail or are compromised, it affects the FinTech's operations.

- Regulatory and compliance risks: FinTechs often operates in areas where laws and regulations are still evolving or inconsistent across countries. This creates regulatory uncertainty where companies might unintentionally break rules or face sudden regulatory changes that disrupt business. For example, FinTechs may lack traditional banking licenses or face unclear requirements, which can expose them to legal penalties or restrictions.
- Financial risks: Some FinTechs provide loans or credit services, which exposes them to credit risks, the possibility that borrowers will default on payments. If defaults rise, FinTechs can suffer significant financial losses. In addition, many FinTech startups face liquidity risks, meaning they may struggle to access cash to meet obligations, especially in tight funding environments or economic downturns. Market risks such as fluctuating interest rates or currency values can also affect FinTechs, particularly those with investments or cross-border operations.
- Technology risks: FinTech innovations rely heavily on algorithms and AI for decision-making, like credit scoring or investments advice. If these algorithms are poorly designed, biased, or trained on incomplete data, theey can produce inaccurate or unfair outcomes. This is called model risk. Moreover, if FinTechs depend too much on AI systems without transparent oversight, errors or unintended consequences might go unnoticed and cause harm.
- Consumer protection risks: FinTech services can sometimes lack transparency, leaving customers unsure about fees, risks, or true nature of products. This can lead to misunderstandings or poor financial decisions by users. FinTechs also collect many personal data, raising concerns about privacy and data misuse.

Conclusion of chapter 2.

Financing models are especially vital in the FinTech sector where innovation, scalability and speed to market are crucial. FinTech companies often rely on a combination of venture capital, crowdfunding and strategic partnerships to secure early stage funding while more mature firms may explore debt instruments or public offerings. Given the high risk, high

reward nature of FinTech, selecting the right financing model can influence not only growth but also regulatory compliance, investor relations and long-term viability.

CHAPTER THREE: COMPARATIVE STUDY OF FINTECHS IN THE WORLD.

Introduction.

This chapter is structured around three main sections. Section 1 focuses on the global evolution of FinTechs, section 2 addresses the current state and perspective of FinTech in the world and finally section 3 provides an overview of the current state of FinTech in Algeria.

Section 1: Evolution of FinTech in the world.

The research approach applied in this section, we used the descriptive approach when presenting the basic information, and then the analytical method when analyzing data in form of reports, scientific journals and internet platforms.

1 COVID-19 Pandemic.

The COVID-19 pandemic began as a shock to the global health and healthcare systems. However, the nature of the epidemic coupled with the speed of its transmission required societies to adopt measures of "social distancing" or stricter lockdown measures[265] imposed by the government. To control virus infection, this was the case in both affected and unaffected areas of the actual outbreak.

1.1 The impact of the COVID-19 pandemic on FinTech globally.

The COVID -19 pandemic acted as a powerful catalyst for digital transformation of the financial sector, Most COVID-19 scenarios show global economies shrinking and not returning to pre-crisis levels. Until 2023[266] the black swan event, as it was called, affected every region of the world significantly during the first half of 2020. Extensive efforts to contain the virus led to a major shift in customer and corporate behavior, a shift that affected many sectors, including financial technology in the world that remains uncertain.

- The COVID-19 pandemic increased the adoption of financial mobile phone applications primarily driven by government restrictions rather than the spread of COVID-19 itself. The impact on adoption is less in countries with higher levels of economic development and with higher rates of pre-adoption and greater in countries with larger market size (population and demographics).

[265] Abdillah, L. A. (2020). FinTech E-Commerce Payment Application User Experience Analysis during COVID-19 Pandemic. 7(2), p.265.
[266] Pollari, I., & Ruddenklau, A. (2020). Pulse of FinTech. KPMG-FinTech-Report, February, p.5.

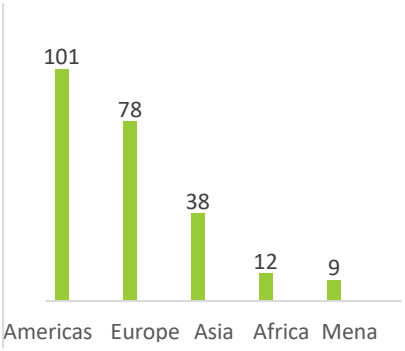
- The pandemic also severely impacted single-line businesses such as peer-to-peer (P2P) lending, and market financing B2B FinTech firms that sell services and technology to financial institutions are grappling with extremely hard selling environments. These P2P lending firms earn the difference between interest charged to borrowers and money returned to the lender.

1.2 Analysis.

Below, we are going to analyze the impact of COVID-19 pandemic on FinTech globally.

1.2.1 Analysis by Region.

Figure 4 : Global FinTech hub, 2020.



Source: Global FinTech Index 2020: Rebooting the future of financial services, p. 16.

FinTech activity is globally diverse, with the Americas, particularly the United States leading the field, Europe ranks second in hub count, with 78 groups, benefiting from regional coordination , surpassing even Asia. Meanwhile, Africa and the MENA region remain the least developed, with only 12 and 9 hubs respectively, largely due to low levels of financial inclusion.

It is undeniable that COVID-19 had an impact on FinTech activity in 2020 and that is why we decided to shed light on the most important impacts in various leading countries.

During the COVID-19 pandemic, technology created new opportunities for digital financial services to accelerate and enhance them, amidst measures of social distancing and containment.

1.2.2 Global FinTech investments in light of the COVID-19 pandemic.

The following are the value of investment deals in the Americas, Europe and ASIA.

1.2.2.1 FinTech Investment in second half (H2) 2020.

Among the top ten global financial technology deals in the first half of 2020, Table 5 shows the top 10 profitable deals made by FinTech start-ups.

Table 7: Top 10 FinTech start-ups investment deals in H1 2020.

FinTech	Value deal	Position	Range
Gojek	$3B	Jakarta, Indonesia	Payments/transactions
Open Lending	$1.3B	Austin, US	Lending
Grab	$886M	Singapore	Payments/transactions
Stripe	$850M	SanFrancisco, US	Institutional/B2B
RDC	$700M	King of Prussia, US	Regtech
Chime (Financial Software)	$700M	SanFrancisco, US	Banking
N26	$570M	Berlin, Germany	Banking
Revolut	$500M	London, UK	Payments/transactions
Robinhood	$430.3M	Menlo Park, US	Wealth/Investment management
Navi Technologies	$397.9M	Bengaluru, India	Payments/transactions

Source: Bensaad .O,Yaagoub ,A, December 2021, The COVID-19 Pandemic's Impact on FinTech Startups, Volume VII, n°03, p.1016.

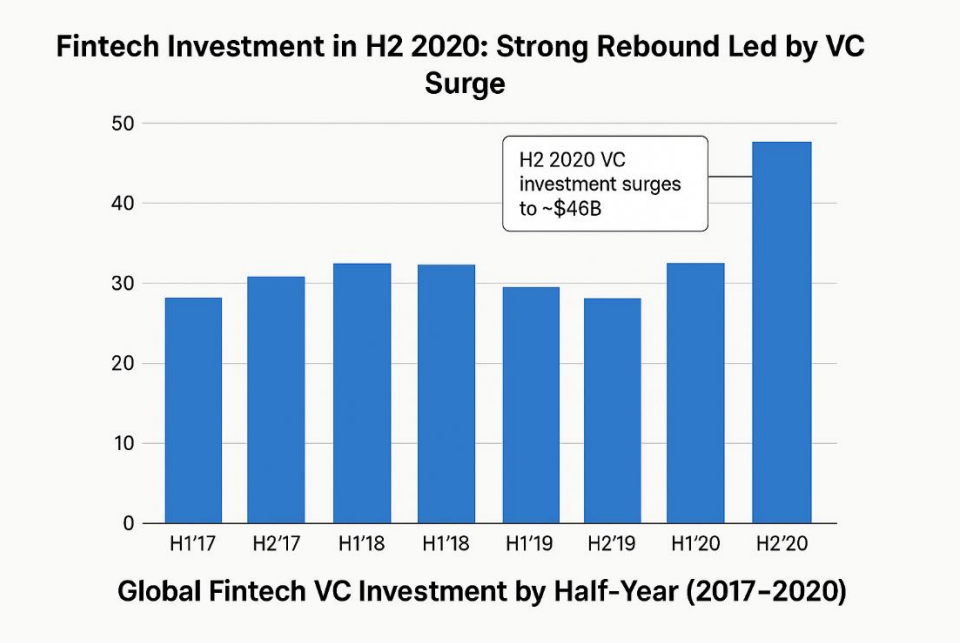
FinTech start-ups received increasing investments on a global scale in the first half of 2020, according to the above table. Gojek[267] is in the first place and it is an application that provides payment / transaction services. This application contains the most important service, which is Go-Pay, which has a good level of efficiency through analyzing big data, the value of the deal was $ 3 billion.[268]

1.2.2.2 FinTech Investment in second half (H2) 2020: Strong Rebound Led by VC Surge

After a slow and uncertain first half (H1) of 2020 due to the COVID-19 pandemic, the second half (H2) of the year marked a robust recovery in global FinTech investment, largely driven by venture capital activity.

[267] Abdillah, L. A. (2020). Op.cit., p.265.
[268] Tripalupi, R. I., & Anggahegari, P. (2020). The Impact of Covid-19 Pandemic: Challenges and Opportunities of Syariah Financial Technology. International Journal of Nusantara Islam, 8(1), p.505.

Figure 5: FinTech investments in H2 2020 globally.



Source: KPMG. (2021). Pulse of FinTech H2 2020. KPMG International, p.4.

VC investments rebounded sharply, reaching nearly $46 billion globally in H2 2020. This was fueled by investor confidence in digital financial services in response to changing consumer behavior and the acceleration of digital transformation. It was driven by several factors such as; surge in digital payment solutions and neo-banking platforms; increased adoption of remote financial services and continued innovation in InsurTech, RegTech, and WealthTech.

Conclusion.

The impact of COVID 19 pandemic made all the economies of countries subject to pressure and a state of uncertainty, and the same was true for FinTech start-ups, as obtaining funding became difficult, especially for those that were still in their early stages. On the other hand, the pandemic's impact was good in that it opened up new opportunities for some FinTech startups around the world, as there was an increase in the use of digital financial services and e-commerce during social distancing and quarantine. As traditional financial institutions struggled with operational disruptions and risk aversion, many businesses especially SMEs turned to FinTech platforms for more agile, accessible, and digital-first financing solutions.

2 Unicorn startups.

These are startups that achieve high growth and have a market value estimated at more than one billion dollars, are less than 10 years old, and are not listed on the financial market, so they resort to venture capital companies to obtain financing. Startup unicorns played a central role meeting emerging digital needs.

The first to use the term unicorn companies was the American expert Aileen Lee, president of the venture capital company Cowboy Ventures. She wrote this in an article entitled "The Unicorn Club" in 2013, in reference to Silicon Valley companies whose shares exceeded one billion US dollars in a very short period. They are considered very rare.

2.1 Characteristics and fields of unicorns.

2.1.1.1 Characteristics of Unicorns.

This type of institution is characterized by the following:

- Unicorn is characterized by rapid growth in a very short time.
- Unicorn companies do not want to become joint stock companies so that their market value does not decrease in the financial market due to the distribution of profits.
- Unicorn is funded by venture capital companies.
- Most unicorns work in the field of technology because they are characterized by creativity and aim to solve a specific problem in society in a distinctive way.
- Unicorn companies are characterized by greater risk and greater returns.
- Most unicorn companies are acquired by larger companies in the world.

2.1.1.2 Fields of unicorns.

Most unicorn companies in the world are commercial companies, not industrial ones, and operate in the following fields:

- B2B or B2C e-commerce.
- Internet software services
- Financial technology.
- Health care.
- Social Media.
- Travel technology, transportation, Cars...etc.

2.2 Impact of unicorns on FinTech globally.

✓ Unicorns have significantly influenced the global FinTech ecosystem by accelerating innovation, attracting investments, and reshaping financial landscapes as of 2024.

Companies like Stripe, Robinhood, and Nubank exemplify how unicorns introduce advanced digital services that challenge conventional banking models.

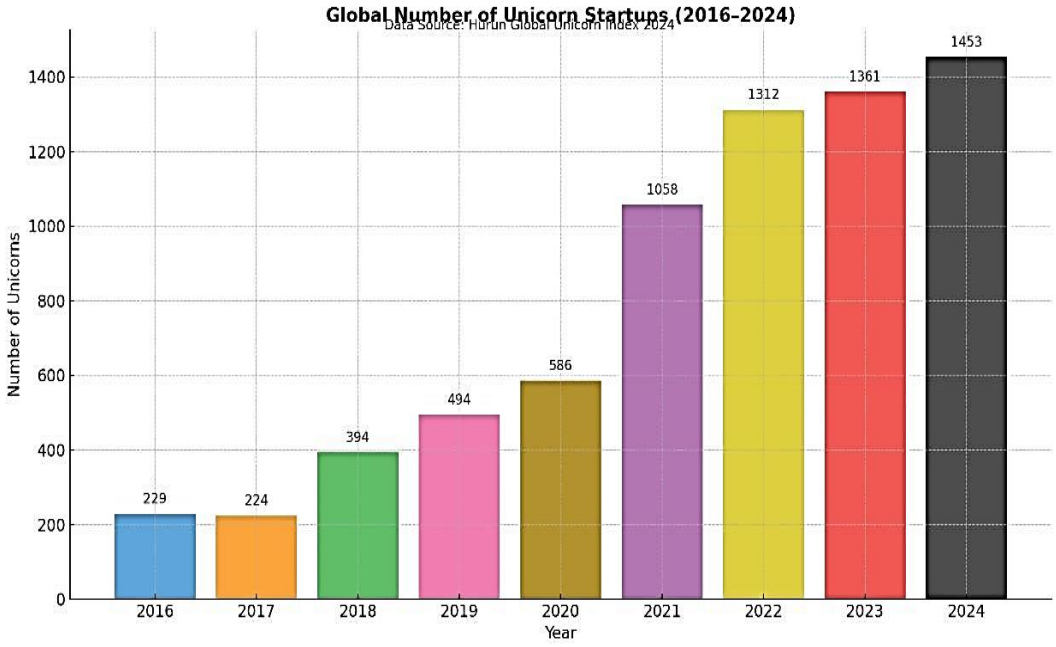
✓ Their impact has also forced traditional banks to innovate or form strategic partnerships to remain competitive. For instance, Monzo has been in discussions about listing on the US stock market, reflecting the shifting dynamics in the banking sector.

2.3 Statistical study of unicorns.

2.3.1 Number of unicorns in the world.

Between 2016 and 2024, the global number of unicorn startups experienced significant growth. The following figure shows the number of unicorn in the world between the years 2016 to 2024.

Figure 6 : Number of unicorns in the world, 2016- 2024.



Source: Hurun report info Global Unicorn index 2024;
https://www.hurun.net/enus/rank/hsrankdetails?pagetype=unicorn

The number of unicorn exceeded 1300 companies in the world in 2024.[269] From 2016-2020, the global growth was from 229 to 586 unicorn. In 2021, there was a major surge to 1,058 unicorn startups, nearly doubling in a single year likely due to COVID-19 pandemic digital acceleration and investor optimism. 2022-2024 experienced a continued growth but at a slower

[269] Hurun report info Global Unicorn index,(2024)
https://www.hurun.net/enus/rank/hsrankdetails?pagetype=unicorn

pace, reaching 1453 unicorns by 2024. This shows a clear upward trend over the 9-year period, with 2021 being the key inflection point.

2.3.2 Market value of unicorn companies in the world in 2024.

As of 2024, the global startup ecosystem boasted several highly valued unicorns with valuations exceeding $1 billion. The top ten most valuable unicorns span various industries, including artificial intelligence, aerospace, FinTech, and e-commerce.

Table 8: Top 10 Global Unicorn companies by market value, 2024.

Global Unicorn Index 2024 TOP 10

Unicorn	Valuation (US$bn)	Change (US$bn)	Country	Sector	Year Founded
ByteDance	220	20	China	Social Media	2012
SpaceX	180	43	USA	Aerospace	2002
OpenAI	100	80	USA	AI	2015
Ant Group	80	-40	China	FinTech	2014
Shein	65	0	China	E-Commerce	2012
Stripe	61	11	USA	FinTech	2010
Databricks	43	12	USA	Big Data	2013
Canva	39	18	Australia	SaaS	2012
Binance	34	14	Malta	Blockchain	2017
WeBank	33	0	China	FinTech	2014

Source: Hurun Research Institute * New to Top 10

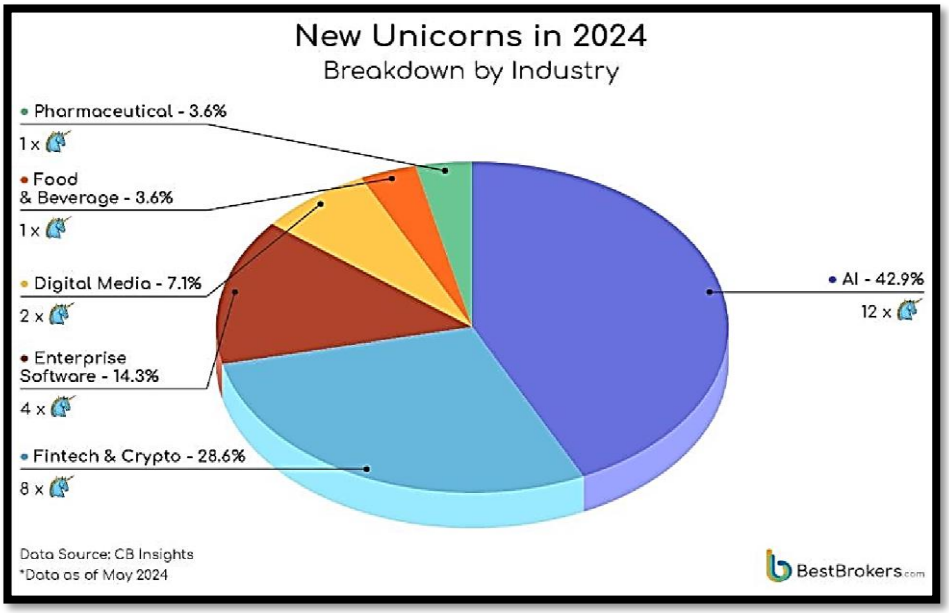
Source: Hurun report – info – Global Unicorn index 2024,
https://www.hurun.net/enus/rank/hsrankdetails?pagetype=unicorn

The market value of start-ups is constantly changing. The Chinese company Byte dance, which is considered the parent company of the TikTok application, ranked first, with a market value of 220bn US dollars reflecting its dominance in media. Then in second place is the American company Spacex, underscoring its significant role in aerospace with a market value 180 US dollars. Then Open AI Company ranked third, known for developing advanced AI models, with a market value of 100 US dollars. It is followed by Ant group in fourth place, dealing in financial Services, with a market value of $80 billion. In addition, ranked fifth is SHEIN specializing in the electronic retail sale of fashion items in enterprise technology with a market value of 65 billion US dollars in 2024 and the rest follows as shown in the table above.

2.3.3 Number of unicorn in the world by industry.

The following figure shows the number of unicorns by industry globally as of 2024.

Figure 7. Number of unicorn startups in the world by industry, 2024



Source: Best brokers unicorn, Unicorn Startups in 2024: AI is taking over - BestBrokers.com

In 2024, FinTech and crypto accounted for 28.6% of all the new unicorns, highlighting their pivotal role in transforming traditional financing models. These sectors are driving the adoption of innovative financial solutions such as decentralized finance (DeFi), which enables businesses to access capital through blockchain-based platforms without intermediaries, and peer-to-peer (P2P) lending and crowdfunding, which allow direct investment from individuals and communities.

2.4 Companies financing unicorns.

Unicorns are funded through several mechanisms, including: love-money, crowdfunding platforms, venture capital firms, and business angels. However, with regard to unicorn companies whose value exceeds one billion dollars, venture capital companies, according to the statistics given in the world, funded most of them. The European Association defines venture capital companies as capital that is invested by a financial intermediary and with a very high degree of risk[2].

2.4.1 Number of venture capital companies in the world in 2024.

These firms have demonstrated significant success in identifying and investing in high growth startups that have achieved valuations exceeding $1 billion. The data highlights the competitive landscape among leading venture capital firms in the global startup ecosystem.

Most important venture capital companies in the world in 2024 invested in unicorn companies are shown in the following table.

Table 9 : The most important venture capital companies according to the number of unicorn companies, 2024.

Rank	Venture Capital companies	Number of Unicorns
1	Tiger Global Management	205
2	SoftBank	169
3	HongShan	125
4	Sequoia Capital	119
5	Andreessen Horowitz (a16z)	105
5	Insight Partners	105
7	Accel	101
8	Goldman Sachs	100
9	Coatue	97
10	Y Combinator	96

Source: Hurun report – info – Global Unicorn index 2024;
https://www.hurun.net/enus/rank/hsrankdetails?pagetype=unicorn

Tiger Global Management is one of the most important American venture capital companies that invest in unicorn institutions for the year 2024 and specializes in the field of financial technology, with 205 unicorns in Japan investing in technology companies. Then followed in second place by the Japanese company Soft Bank, which invests in technology companies and the field artificial intelligence and robotics with 169 unicorn companies. One of the most important Chinese venture capital companies is Sequoia Capital, which invested in the Chinese company Byte dance, as well as the SHEIN, which specializes in electronic commerce.

Conclusion.

The rise of unicorn startups, particularly in the FinTech sector, has significantly influenced the development of new methods of business financing. These high-growth companies have pioneered innovative financial solutions such as digital lending platforms, decentralized finance (DeFi), crowdfunding, and embedded financial services, offering more accessible and flexible alternatives to traditional banking. The rapid increase in FinTech and

crypto unicorns reflects a global shift towards digital-first financial ecosystems, driven by technology, investor interest, and market demand. As a result, unicorns have not only disrupted conventional financial institutions but also have become key drivers in shaping the future of business financing.

Section 2: FinTech in the world: current state and perspectives.

Under this subsection, we are going to focus on cryptocurrency, neo-banking and crowdfunding globally.

2.1 CRYPTOCURRENCY

Cryptocurrency is a digital or virtual currency that uses cryptographic techniques to secure transactions, control supply, and facilitate decentralized financial exchanges. Unlike traditional currencies, cryptocurrencies operate on blockchain technology, a distributed ledger system that ensures transparency, immutability, and security.

2.1.1 Current state of cryptocurrency globally

Below, we are going to analyze the current state of cryptocurrency globally.

2.1.1.1 Cryptocurrency by Market Size.

The global cryptocurrency market size was worth USD 2,492.7 billion in 2024 and is estimated to reach an expected value of USD 5,734.95 billion by 2033**,** growing at a CAGR (Compound Annual Growth Rate) of 9.7% during the forecast period (2024-2033).

The growth in the forecast period can be attributed to institutional adoption, global acceptance, decentralized finance (DeFi), government and regulatory clarity, increased tokenization. Major trends in the forecast period include technological upgrades, blockchain technology development, technological advancements, rise of central bank digital currencies, NFTs (non-fungible tokens) boom.

Figure 8: cryptocurrency market size, 2024-2033.

Source: www.straitsresearch.com

2.1.1.2 Cryptocurrency by region.

The global cryptocurrency market has evolved into a significant driver of new business financing methods under FinTech, with each region contributing uniquely to its growth and adoption.

In the Americas, the United States leads with strong institutional investment, regulatory engagement, and corporate treasury adoption of cryptocurrencies, while Canada emerges as the fastest-growing market, especially in mining and crypto ETFs.

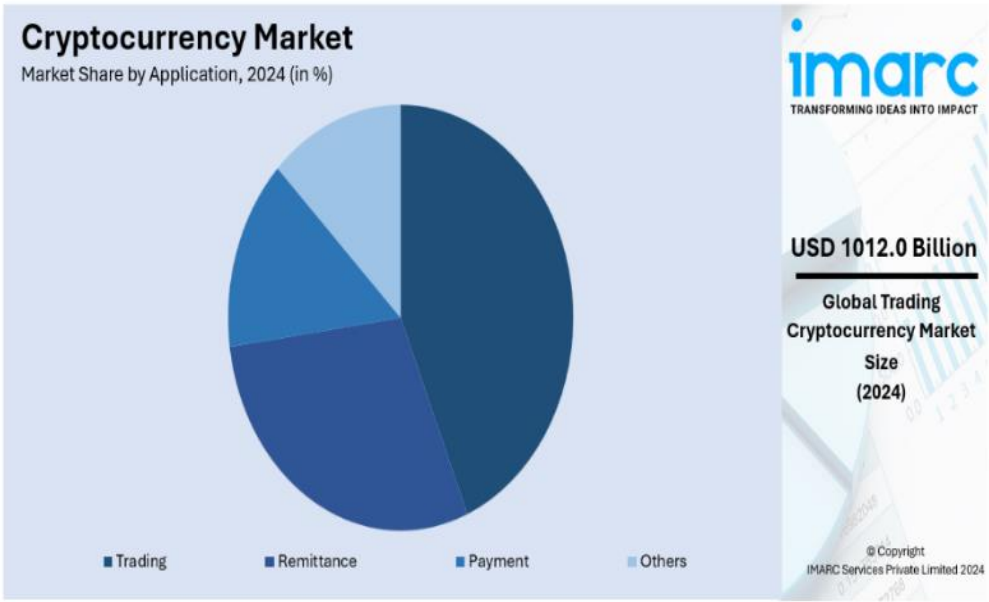
In Europe (excluding the UK), countries like Germany and France are fostering institutional trust through comprehensive regulations such as MiCA, enabling transparent and secure crypto operations. Germany dominates in market share, while France leads in growth, especially in crypto-based payments. Meanwhile, the UK, with London as a FinTech powerhouse, has built a resilient and innovative crypto environment, supported by regulatory clarity and a thriving startup ecosystem.

In the Asia-Pacific region, the cryptocurrency market holds the largest global share, driven by innovation in both retail and institutional sectors. Countries like China dominate in market size, while Vietnam and India lead in adoption due to remittance needs and grassroots digital engagement.

The Middle East and Africa, though still developing in terms of regulation, have seen rapid uptake in crypto for remittances and peer-to-peer payments, with the UAE fostering a blockchain-friendly environment and Nigeria showcasing the potential of digital currencies like the eNaira. These regional dynamics highlight cryptocurrency's growing role in offering decentralized, cross-border, and inclusive financing options, fundamentally reshaping the global FinTech landscape.

2.1.1.3 Cryptocurrency by application.

Figure 9: cryptocurrency market by application, 2024.



Source: IMARC Group. (2024), https://www.imarcgroup.com/cryptocurrency-market

Trading leads the market with around 40.6% of market share in 2024.[271] The trading segment within the cryptocurrency market is the largest and most dynamic. This includes everything in between activities like cryptocurrency exchanges, over-the-counter (OTC) trading, and speculative endeavors. Traders buy and sell cryptocurrencies to profit from price fluctuations. With dynamic liquidity and volatility, they find use not only for individual retail traders but also for institutional investors. It has very high trading volumes and continues to be dynamic with the introduction of new trading pairs, derivatives, and trading strategies.

[271] IMARC Group. (2024). Cryptocurrency market: Global industry trends, share, size, growth, opportunity and forecast 2024-2032. https://www.imarcgroup.com/cryptocurrency-market, consulted on 20/04/2025.

2.1.1.4 Key players in cryptocurrency market.

The cryptocurrency industry in 2024 continues to mature, driven by rapid technological innovation, increasing institutional participation, and evolving global regulations.

Table 10: List of key players in Cryptocurrency Market, 2025.

Company Name	Headquarters	Overview
Binance	Cayman Islands	The world's largest crypto exchange by trading volume, offering a wide range of cryptocurrencies and advanced trading features.
Coinbase	United States	A publicly traded exchange popular for its user-friendly platform, supporting retail and institutional investors.
Kraken	United States	Known for its security measures and compliance, Kraken offers a broad selection of cryptocurrencies for trading.
Bitfinex	Hong Kong	A major exchange providing advanced trading features and liquidity for institutional and retail traders.
OKX	Seychelles	Offers spot trading, derivatives, and DeFi services, with a wide array of supported cryptocurrencies.
Huobi	Seychelles	A global exchange with a strong presence in Asia, offering a variety of cryptocurrencies and trading pairs.
KuCoin	Seychelles	A global exchange that provides advanced trading options, DeFi services, and a large selection of altcoins.
Gemini	United States	Known for its regulatory compliance and user-friendly interface, Gemini focuses on security and institutional solutions.

Source: CoinMarketCap. (2025). Top crypto exchanges by volume, p.50.

2.1.1.5 Cryptocurrencies by market capitalization, 2025.

The market capitalization of bitcoin and other major cryptocurrencies are listed below from largest market capitalization to smallest. Cryptocurrencies are also known as coins or virtual currency. The value of bitcoin is growing with time and is the largest currency by market capitalization currently. Exchange rates for the currencies are shown in U.S. dollars. New coins are being brought to market via initial coin offerings (ICO) frequently so expect the list of cryptocurrencies below to grow.

Table 11 : The top largest cryptocurrencies by Market Capitalization, 2025.

Rank	Name (Symbol)	Market Cap	Market Share	Price (USD)	24 Hr % Change
1	Bitcoin (BTC)	1,913,906,034,151	63.8476%	$96,372.5792829933	-0.3309835
2	Ethereum (ETH)	220,554,136,207	7.3577%	$1,826.7974736295	0.11350023
3	Tether USDt (USDT)	149,238,933,572	4.9786%	$1.0003671869	0.0235746
4	XRP (XRP)	128,748,936,936	4.295%	$2.2007031662	-0.25415731
5	BNB (BNB)	84,115,162,794	2.8061%	$597.0275010864	-0.20002165
6	Solana (SOL)	76,452,452,479	2.5504%	$147.5701154094	-1.35772098
7	USDC (USDC)	61,521,728,470	2.0524%	$1.0000438495	0.02578668
8	Dogecoin (DOGE)	26,753,087,495	0.8925%	$0.1794217916	-0.40348339
9	Cardano (ADA)	24,724,794,415	0.8248%	$0.7003636177	-0.60321053
10	TRON (TRX)	23,608,701,145	0.7876%	$0.2487072051	1.59340805

Source: https://coinmarketcap.com consulted on 6/05/2025.

Bitcoin, as the pioneer and dominant cryptocurrency, constitutes the largest segment in the market. It attracts every type of investor, from the large institutional body that uses it as a store of value to regular retail traders or those who believe in the long term. Bitcoin, given its

market capitalization and fame, is a favorite entry point into the crypto world for many investors. It is generally regarded as a digital form of gold for those seeking protection against economic uncertainty.

2.1.2 Perspectives of cryptocurrency.

Cryptocurrency continues to reshape global finance, with varying regional responses shaped by economic priorities, regulatory philosophies, and technological readiness. In North America, the United States has recently adopted a more crypto-friendly stance under former President Donald Trump, who announced the creation of a strategic Bitcoin reserve and issued an executive order to boost the sector.[272] These actions have encouraged global firms such as Deribit and OKX to expand into the U.S. market.[273] Canada, meanwhile, maintains a progressive approach, having approved Bitcoin exchange-traded funds (ETFs) and supported cryptocurrency innovation within a regulatory framework.[274]

In Europe, a harmonized regulatory shift is underway through the implementation of the Markets in Crypto-Assets (MiCA) regulation. This legislation is designed to standardize cryptocurrency oversight across all EU member states.[275] The United Kingdom is also advancing its regulatory agenda; the Financial Conduct Authority (FCA) is preparing to ban retail crypto purchases made with borrowed funds such as credit cards to prevent over-leveraging by consumers.[276] Simultaneously, the UK plans to exempt overseas stable coin issuers from the new rules to remain competitive globally while addressing investor protection.[277]

Asia presents a diverse policy landscape. China has banned crypto trading and mining activities due to concerns over financial instability and environmental damage, but has embraced state-controlled innovation through the digital yuan, a central bank digital currency. In contrast, Japan and Singapore have regulated the crypto sector to protect users while supporting blockchain innovation. India remains ambivalent, having reversed an initial ban but

[272] Investors Business Daily, (2025). Bitcoin price surges as Trump announces U.S. crypto reserve, executive order. https://www.investors.com/news/bitcoin-price-us-crypto-reserve-president-trump-executive-order/
[273] Financial Times, (2025a). Crypto industry descends on Dubai as Trump euphoria recedes. https://www.ft.com/content/dc5f80ae-513b-48a3-ae88-a53fbbdce883
[274] PwC (2024). Navigating the global crypto landscape: PwC 2024 outlook, p.8.
[275] PwC, 2024,Idem. p. 9.
[276] The Guardian, 2025, UK preparing to ban consumers from buying crypto with borrowed funds – FCA. https://www.theguardian.com/technology/2025/may/02/uk-preparing-to-ban-consumers-from-buying-crypto-with-borrowed-funds-fca
[277] Financial Times, 2025b, UK to exempt overseas stablecoin issuers from new crypto rules. https://www.ft.com/content/55590385-5e51-4912-a145-4d9de469824a

now imposing taxation and examining further regulation as the government debates crypto's long-term role in its financial system[278]

In Latin America, the cryptocurrency boom is largely driven by inflation, weak currencies, and the need for accessible financial services. El Salvador made headlines as the first nation to adopt Bitcoin as legal tender in 2021, aiming to enhance financial inclusion and remittance flows. Argentina and Brazil have also seen strong grassroots adoption fueled by economic volatility, with citizens turning to crypto-assets as hedges against inflation despite regulatory uncertainty.

Africa and the Middle East reveal two emerging perspectives on cryptocurrency. Nigeria, despite a central bank ban on crypto transactions via commercial banks, has one of the highest adoption rates in the world, driven by youth innovation and remittance needs. South Africa is following a cautious but structured path toward regulation. In the Middle East, the United Arab Emirates, particularly Dubai, is positioning itself as a crypto hub through regulatory sandboxes and economic free zones that welcome blockchain startups. Saudi Arabia, meanwhile, remains more conservative, focusing on blockchain applications within traditional finance rather than embracing decentralized currencies.

Conclusion

Cryptocurrencies offer faster, borderless, and more inclusive access to capital by decentralizing financial transactions and removing intermediaries. Startups and businesses can now raise funds through Initial Coin Offerings (ICOs), token sales, and decentralized finance (DeFi) platforms alternatives that bypass conventional banking systems and venture capital. Moreover, the dynamic trading ecosystem and global investor participation have introduced new liquidity channels, empowering businesses with greater financial flexibility.

2.2 NEO-BANKING.

Neo-banks refer to digital- only financial institutions with no physical locations providing a broad range of financial services to target tech-savvy clients primarily. Neo-banking offers services including payments, debit cards, money transfers, lending, and more that are mostly digital and mobile in nature. They offer streamlined, app-based financial services that challenge traditional banks by focusing on user experience, low fees, and accessibility.

[278] PwC, 2024, op. cit. p. 16

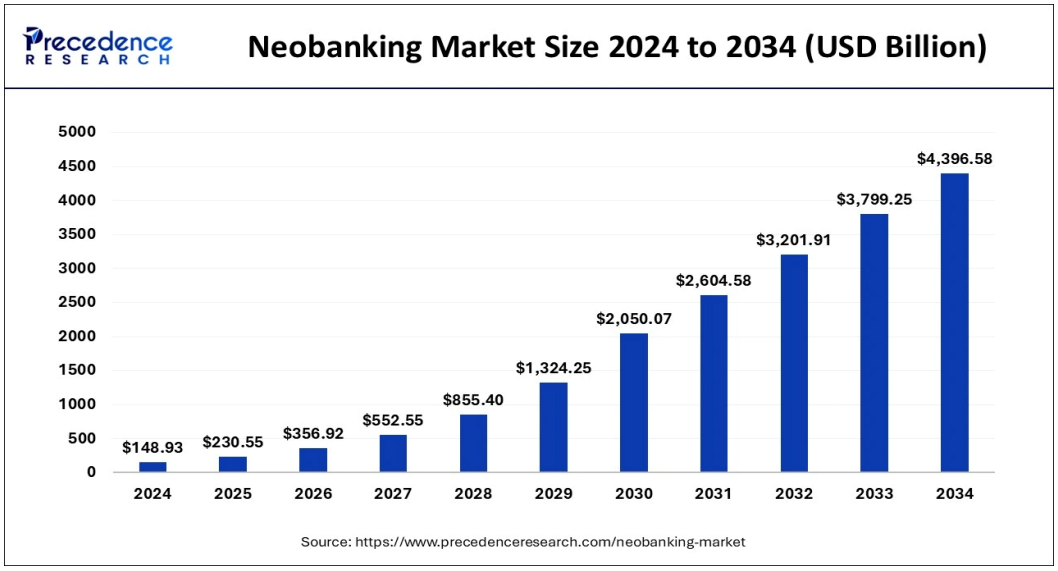
2.2.1 Current state of neo-banking globally.

Below, we are going to analyze the current state of neo-banking globally.

2.2.1.1 Neo- banking by market size.

The global neo-banking market has experienced remarkable growth over the past years. The figure below demonstrates the global market size forecast from 2024 to 2034.

Figure 10 : Global neo-banking market size and growth between 2024- 2034.



Source: https://www.precedenceresearch.com/neo-banking%2Dmarket.

The global neo-banking market size accounted for USD 148.93 billion in 2024 and is predicted to increase from USD 230.55 billion in 2025 to approximately USD 4,396.58 billion by 2034, expanding at a Compound Annual Growth Rate (CAGR) of 40.29% from 2025 to 2034. Major trends in the forecast period include integration of open banking platforms, partnerships with FinTech and technology giants, AI and machine learning in personalized finance, virtual and contactless banking features, customer-centric approach.

2.2.1.2 Neo-banking by region.

By region, the market is analyzed across North America, Europe, Asia-Pacific, LATAM (Latin America) and MEA (Middle- East and Africa)

Neo-banking has revolutionized traditional financing methods by leveraging digital platforms to offer streamlined, accessible, and cost-effective financial services.

In Europe, especially in FinTech hubs like the United Kingdom and Germany, neo-banks such as Revolut, N26, and Monzo have replaced in-branch services with fully digital offerings. These platforms provide real-time payment tracking, budgeting tools, and

international transactions at lower fees, pressuring traditional banks to digitize and modernize their offerings.[279]

In North America, neo-banks like Chime and Varo have redefined personal banking by targeting underserved communities, offering features such as early paycheck access and no-fee accounts. Their mobile-first approach has pushed legacy institutions to innovate their digital channels.[280]

In the Asia-Pacific region, countries such as India and China have seen rapid neo-banking adoption driven by mobile penetration and gaps in traditional financial infrastructure. Neo-banks like Jupiter and WeBank offer digital lending and payment solutions without physical branches, accelerating financial inclusion.[281]

In Latin America, Nubank in Brazil has empowered millions with low-cost, user-friendly digital banking services.

In Africa, Kuda in Nigeria and emerging neo-banks in Algeria have begun transforming banking landscapes by leveraging mobile banking to reach underserved communities. In Algeria, the government has supported digital banking as part of its broader financial inclusion strategy, though adoption is still in early phases.[282]

Across all regions, neo-banking has shifted the financial paradigm from branch-based, manual services to digital-first, user-centered ecosystems.

2.2.1.3 Neo-banking leading players.

The following are the top thirteen major global neo-banking players.

Table 12: Major Global Neo-banking Players, 2024–2025.

Neo-bank	Country/Region	User Base	Key services	Notable features
Revolut	UK / Global	40+ million	Multi-currency, crypto, Investments	Expanding as a super app globally
N26	Germany / EU	8 million	Current & business accounts, savings, insurance	Transparent pricing, sleek UX

[279] Ziegler, T., Shneor, R., Wenzlaff, K., Johanson, D., Hao, R., & Zhang, B. (2021). The Global Alternative Finance Market Benchmarking Report. Cambridge Centre for Alternative Finance, p.14.
[280] Accenture. (2021). The rise of neo-banks: Reimagining the future of banking. Accenture Strategy, p. 8.
[281] KPMG. (2022). Pulse of Fintech H1 2022. KPMG International, p. 27.
[282] Bank of Algeria. (2022). Annual report on the financial sector and digital transformation. Algiers: Bank of Algeria, p.33.

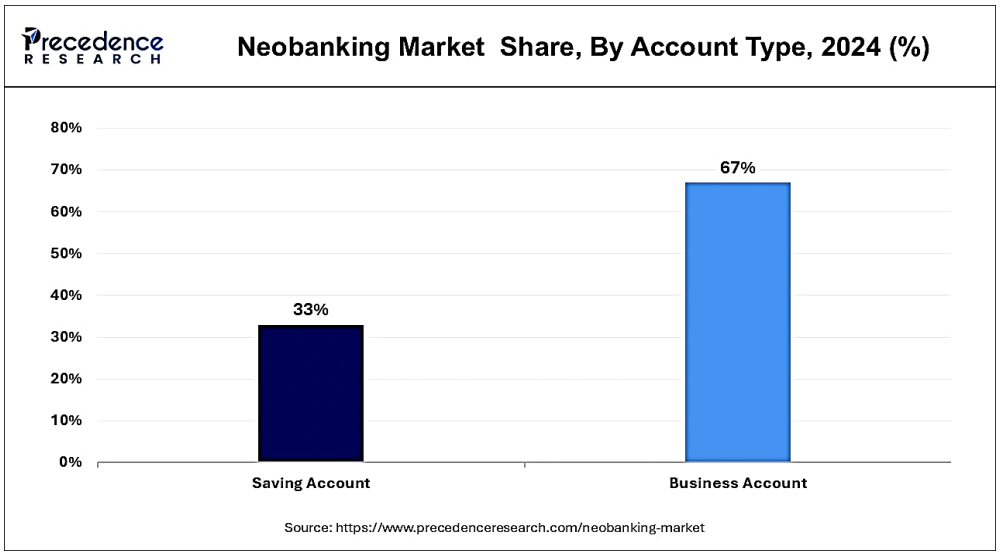
Monzo	UK	8+ million	Current accounts, savings pots, overdrafts	Strong community input, intuitive interface
Chime	USA	15+ million	No-fee checking, credit builder, early pay access	Focus on underserved Americans
Varo Bank	USA	~6 million	Full banking services (FDIC chartered)	First U.S. neo-bank with full banking license
SoFi	USA	7+ million	Loans, banking, investing	Diversified services; publicly traded
Nubank	Brazil/ LATAM	90+ million	Credit, personal loans, savings	Largest neo-bank by users; NYSE listed
Ualá	Argentina	5+ million	Prepaid cards, P2P transfers, savings	Expanding across Latin America
Paytm Payments Bank	India	100+ million	Payments, savings, insurance	Operates under RBI regulations
KakaoBank	South Korea	20+ million	Loans, savings, payments	Integrated with KakaoTalk messenger
WeBank	China	~300 million	Micro-loans, digital banking	Backed by Tencent; high tech integration
TymeBank	South Africa	7+ million	Low-cost accounts, savings	Hybrid digital + in-store kiosks
Zand Bank	UAE	Emerging	Retail & corporate accounts	First digital-only bank in UAE

Source: Major global neo-banking players, 2024–2025. Data Compiled from CB Insights (2024), p.8, EY (2024), p.14, McKinsey & Company (2023), p. 6, and official company reports and press releases (2023–2024).

2.2.1.4 Neo-banking by account Type.

Based on account type, the market is categorized into business account, and saving account as seen in the figure below.

Figure 11 : Neo-banking market share, by account type, 2024.



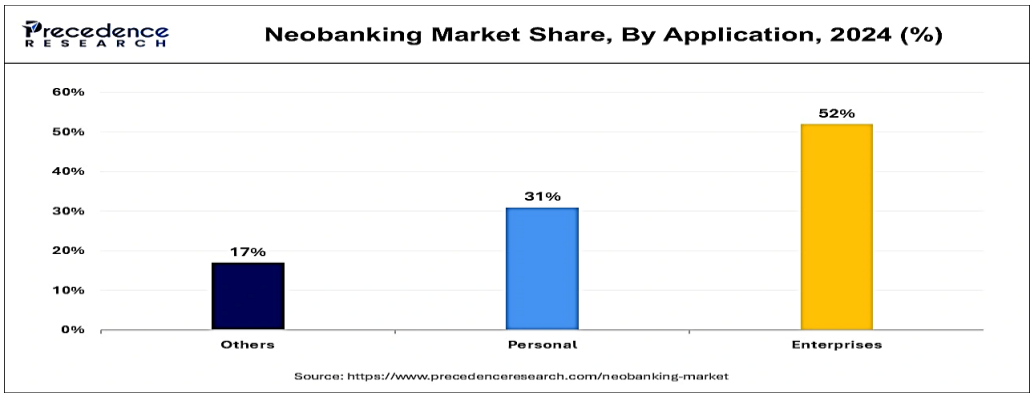
Source: https://www.precedenceresearch.com/neo-banking%2Dmarket.

The business account segment held the largest share of the neo-banking market in 2024 and is expected to maintain its position during the forecast period. Neo-banks frequently provide a number of features designed to meet the needs of businesses, like digital invoicing, tracking expenses, connectivity with accounting software, and team member rights that may be customized. The saving account segment is expected to witness significant growth in the neo-banking market over the projected period. Neo-banks usually run completely online, enabling users to register and maintain their accounts via websites or mobile applications.

2.2.1.5 Neo-banking by Application

Based on Application type, the market is categorized into enterprises, personal and others.

Figure 12: Neo-banking market share, by Application, 2024.



Source: https://www.precedenceresearch.com/neo-banking%2Dmarket

- The enterprise segment dominated the neo-banking market in 2024. The segment has recorded more than 52% of revenue share in 2024. The market for neo-banking has been growing quickly, and many businesses have entered it to take advantage of the rising demand for digital banking services.
- The personal segment is expected to witness the fastest growth in the neo-banking market. In the new banking sector, the term "personal segment" refers to the offering of banking services that are custo mized for individual customers. Peer-to-peer and bill-paying functions are among them, as is the option to send money abroad often at a lower cost and with quicker processing times than with traditional banks. Some neo-banks provide their clients with credit cards, overdraft protection, and personal loans despite being less prevalent than traditional banks.

2.2.2 Perspectives of neo-banking globally.

The global financial landscape has undergone significant transformation with the emergence of neo-banking. Globally, the perspective on neo-banking is largely positive, driven by its potential to enhance financial inclusion, improve customer experience, and modernize outdated financial systems.

In Europe, neo-banks such as Monzo, Revolut, and N26 are seen as innovators disrupting conventional banking by offering low-fee, mobile-first services. These platforms emphasize user experience, real-time notifications, and budgeting tools, appealing especially to millennials and digital natives. European regulators have largely supported their growth through open banking regulations like PSD2, which mandates data sharing between financial institutions and licensed FinTechs, encouraging competition and transparency.[283]

In North America, particularly in the United States, neo-banks like Chime, SoFi, and Varo have gained popularity by offering services such as early wage access, zero-fee accounts, and simplified credit products. These platforms are particularly attractive to underserved populations and younger demographics who seek alternatives to the high fees and limited accessibility of traditional banks.[284] The U.S. market shows a hybrid regulatory stance, with neo-banks often partnering with licensed banks for compliance while leveraging technology to scale rapidly.

[283] KPMG. (2022). OP.Cit., p. 19.
[284] Accenture. (2021). Op.Cit., p. 8.

In the Asia-Pacific region, perspectives are shaped by population size, digital infrastructure, and regulatory openness. In China, WeBank and MYbank backed by technology giants Tencent and Alibaba have pioneered digital lending and microfinance using alternative credit scoring, providing services to individuals and SMEs that were previously unbanked. In India, neo-banks like Open, Jupiter, and Fi are integrating financial services with accounting, payments, and analytics to serve freelancers and small businesses.[285] Governments in the region have generally encouraged FinTech innovation as a means to enhance financial inclusion.

In Latin America, particularly Brazil, neo-banks such as Nubank have become household names by challenging the dominance of traditional banks and democratizing financial access. Nubank's customer-first approach, transparency, and mobile banking capabilities have made it one of the most valued FinTech companies globally.

In Africa, where banking infrastructure is limited, neo-banks are seen as essential tools for financial inclusion. In Nigeria, platforms like Kuda offer digital accounts with no fees, easy transfers, and basic lending. The neo-banking model is also emerging in Algeria, where financial digitization policies are being adopted to modernize the banking system. According to the Bank of Algeria, reforms supporting digital platforms aim to improve access to finance for individuals and small businesses, reflecting a positive national stance toward the growth of neo-banking.[286]

Conclusion

In conclusion, neo-banking has emerged as a transformative force in the evolution of traditional financing methods by leveraging technology to enhance accessibility, efficiency, and customer-centricity. Unlike conventional banks, which often rely on legacy systems and rigid credit processes, neo-banks utilize data-driven tools, real-time analytics, and digital infrastructure to offer faster, more flexible financial solutions especially for underserved individuals and small businesses. By introducing services such as instant lending, integrated accounting, and Banking-as-a-Service (BaaS), neo-banks have lowered barriers to credit and operational finance. Although challenges around profitability and regulatory compliance persist, the global impact of neo-banking lies in its ability to democratize finance, reduce reliance on physical banking networks, and redefine the relationship between financial institutions and their clients. As neo-banks continue to mature, they are not only complementing

[285] Ziegler, T., Shneor, R., Wenzlaff, K., Johanson, D., Hao, R., & Zhang, B. (2021). Op.Cit., p.33.
[286] Bank of Algeria. (2022). Op.Cit., p. 35.

but also reshaping the traditional banking ecosystem into one that is more inclusive, innovative, and responsive to modern economic demands.

2.3 CROWDFUNDING.

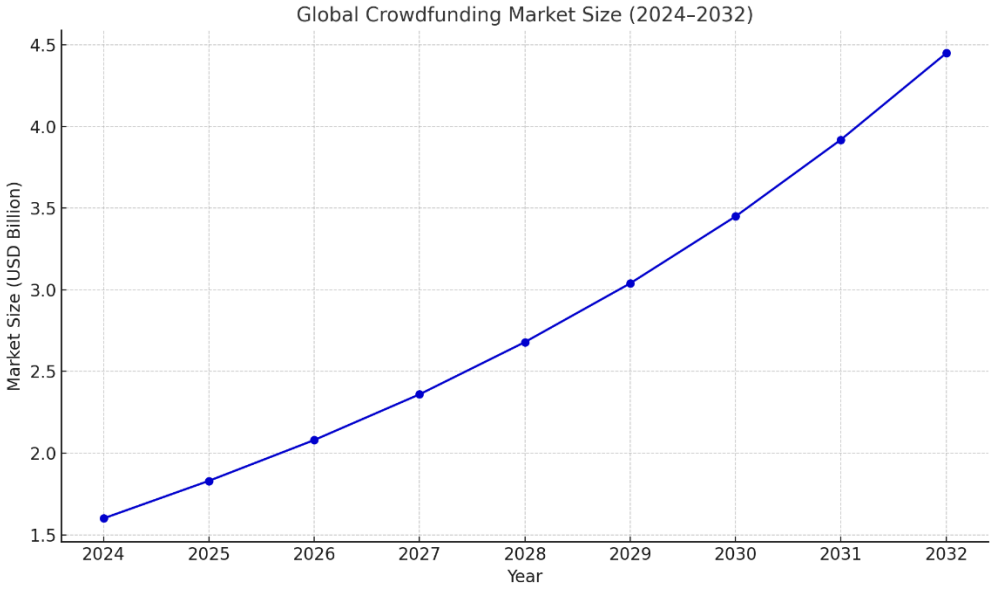
Crowdfunding is a method to raise funds for a particular project or cause by asking many individuals and businesses to contribute money, generally in small amounts, for a relatively short period. It is done online via social networks, which makes it easy for groups to share a project or cause within their social platforms.[287] Furthermore, it usually entails a private company asking a large number of people for small contributions.

2.3.1 Current State of Crowdfunding globally.

2.3.1.1 Crowdfunding by Market Size.

The global crowdfunding market has experienced remarkable growth over the past years. The figure below demonstrates the global market size forecast from 2024 to 2032.

Figure 13 : Global crowdfunding market size, 2024-2032.



Source: https://www.fortunebusinessinsights.com/crowdfunding-market-107129

The global crowdfunding market size was valued at USD 1.60 billion in 2024 and is projected to grow from USD 1.83 billion in 2025 to USD 4.45 billion by 2032, exhibiting a CAGR of 13.5% during the forecast period.[288]

[287] Belleflamme, P., Lambert, T., & Schwienbacher, A. (2014). Crowdfunding: Tapping the right crowd. Journal of Business Venturing, p.589.
[288] https://www.fortunebusinessinsights.com/crowdfunding-market-107129

2.3.1.2 Crowdfunding by regional insights.

In 2024, North America dominated the global crowdfunding market, accounting for 40% of the total share, largely due to the high concentration of startups and the strong presence of leading platforms such as GoFundMe, Indiegogo Inc., and Real Crowd. These established players contribute to a robust crowdfunding environment that supports entrepreneurial activity and innovation across the region.[289]

Meanwhile, the Asia Pacific region is expected to witness the highest growth rate during the forecast period. This growth is driven by a surge in startup businesses, innovative projects, increased internet penetration, and accelerating digitization, all of which enhance access and attractiveness of crowdfunding platforms.

Europe is projected to grow steadily, supported by new regulatory guidelines, emerging technologies, and initiatives by EU member states to allow crowdfunding platforms to operate across borders.

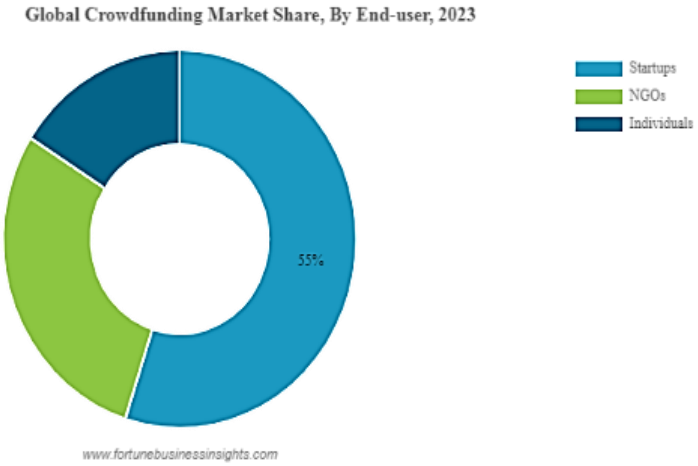
South America shows promise due to its growing startup base, especially for early-stage ventures seeking to supplement funding and attract key stakeholders.

In the Middle East and Africa, although platforms face barriers to entry, the high recognition of global names like Kickstarter, Indiegogo, and GoFundMe continues to drive awareness and gradual growth.

2.3.1.3 Crowdfunding by End-user

From the end user's perspective, crowdfunding offers an opportunity to support innovative ideas, creative ventures, or social causes by directly contributing financially

Figure 14: Global crowdfunding market share by end user, 2023



Source: https://www.fortunebusinessinsights.com/crowdfunding-market-107129

[289] Fortune Business Insights. (2024). Crowdfunding market size, share & COVID-19 impact analysis, https://www.fortunebusinessinsights.com/industry-reports/crowdfunding-market-100122

According to end-user, the market is divided into startups, NGOs, and individuals. The startups segment held the largest market share in 2024, aiding them in testing their ideas and products in the market without a final Minimum Viable Product (MVP). Startups help in new product development, financial support, and feedback from investors and potential users on a single platform. It is a great way for startups to raise capital and build a community of supporters. It is a good way to test business ideas with the market before committing to them.[290]

The individuals' segment is expected to record the highest CAGR during the forecast period. This is attributed to the increase in usage of social media platforms and podcasting. These platforms are incorporated with major social media, including Facebook and Twitter, so that organizations can reach out to more donors.

Several NGOs are raising funds using such campaigns. These campaigns provide easy access to large networks of people and assist equity in fundraising for a shorter period. Organizations are welcome to post images, links, and videos related to the cause they are fundraising for.

2.3.1.4 Market driving factors of crowdfunding globally.

- Expansion of market aided by use of social media platforms to boost market growth. Increasing crowdfunding activities on social media platforms plays a vital role to fuel the demand for upcoming crowdfunding projects. Social media and technological improvements have provided much-needed acceleration to this industry. Social media platforms such as Twitter, Facebook, LinkedIn, Reddit, and Instagram are gaining more popularity for activities to raise funds by gathering donations from investors. Furthermore, rising internet penetration and smartphone usage, as well as the increasing trend of the P2P (peer-to-peer) crowdfunding business model is expected to provide a positive outlook for the market in the coming years. For instance, as per startups.com, 3% of Twitter shares, 12% of Facebook shares, and 53% of email shares convert to donations.[291]
- Technological advancements and digitalization. The escalating integration of artificial intelligence (AI), machine learning, blockchain, and the Internet of Things (IoT) to transform business operations, enhance consumer satisfaction, and enable data-driven decision-making is positively impacting the market and the crowdfunding market revenue. Along with

[290] Agrawal, A., Catalini, C., & Goldfarb, A. (2015). Crowdfunding: Geography, social networks, and the timing of investment decisions. Journal of Economics & Management Strategy, p.253.
[291] Startups.com. (2024). Crowdfunding stats. https://www.startups.com/library/expert-advice/crowdfunding-statistics

this, businesses are also incorporating these technologies to provide new income streams and business models. Therefore, this is significantly supporting the market. Moreover, the wave of digital transformation generates a more inclusive and widely accessible global marketplace, supports entrepreneurship, and drives economic development.[292]

- Globalization and cross-border trade. Globalization, intensified by the simplicity of cross-border trade, is a key driver of the global economy. Additionally, the development of trade agreements, lowering of tariffs, and enhancement of logistics and supply chain networks make it easier for businesses to penetrate new markets, streamline material sourcing, and expand their customer base. Such interconnectedness enhances economic growth, diversifies crowdfunding market opportunities and encourages competition, leading to innovation. By adjusting to international regulations and cultural distinctions, businesses create more resilient and adaptable strategies, contributing to a more dynamic and robust global economic landscape.[293]

- Consumer preferences and sustainability. The crowdfunding market statistics are changing because of consumers' growing emphasis on sustainability and moral company conduct. In confluence with this, organizations must include sustainable practices in their business plans as essential components and as a means of fulfilling ethical commitments to meet the demands of their customers and comply with legal requirements. Furthermore, sustainability influences the part that businesses may play in solving global concerns while meeting customer expectations since it reflects a broader cultural drive towards environmental conservation and social responsibility.[294]

2.3.1.5 Platforms of crowdfunding.

Crowdfunding platforms are online marketplaces that connect project creators or entrepreneurs with a large number of individual backers who provide funding.

Table 13: The top 10 platforms of crowdfunding globally, 2025.

Platform	Primary Focus	Model Type	Key Insights
Kickstarter	Creative & tech Projects	Reward-based	Raised $7B+ since 2009; community-driven platform for innovation and the arts

[292] Accenture. (2023). AI and the future of crowdfunding. https://www.accenture.com
[293] IMF. (2021). Fintech and cross-border finance. https://www.imf.org
[294] Ministry of Corporate Affairs, India. (2024). ESG initiatives. https://www.mca.gov.in

Indiegogo	Inventions & consumer tech	Reward-based (flexible)	Known for global campaigns and prototype testing; supports entrepreneurs and hardware developers
GoFundMe	Personal & charitable causes	Donation-based	Over $30B raised globally; dominant in personal healthcare, education, and disaster relief
Crowdcube	UK startups & SMEs	Equity-based	FCA-regulated; strong presence in UK and Europe; early-stage equity investment access
Seedrs	Early-stage ventures (EU/UK)	Equity-based	Merged with Republic; known for cross-border investing and secondary share trading
Republic	Startups, crypto, real estate	Equity & token-based	Over $2.6B raised; major player in US and Europe; expanded via Seedrs acquisition
Wefunder	Startups & SMEs (US)	Equity (Reg CF)	Reg CF leader; allows public to invest in startups for as little as $100
StartEngine	US-based startups	Equity (Reg A+, CF)	Regulated investment platform; large investor base; investor education tools
Gamefound	Tabletop gaming	Reward-based (niche)	Hosted 6 of top 10 tabletop campaigns in 2024; niche tools for game creators
Patreon	Creator content monetization	Subscription-based	Recurring revenue for creators; used by artists, podcasters, writers

Source: Top 10 crowdfunding platforms globally: Summary of features and performance. Based on data retrieved from Kickstarter, Indiegogo, GoFundMe, Crowdcube, Seedrs, Republic, Wefunder, StartEngine, Gamefound, and Patreon websites between April–May 2025.

Some of the key companies in the crowdfunding industry include Kickstarter, PBC, Indiegogo, GoFundMe, and others. These companies are leveraging advanced technologies like AI, machine learning, and data analytics to optimize platform operations, enhance user experience, and improve fundraising success rates. To stay competitive, key players are adopting various strategic initiatives such as expanding their platform offerings, forming partnerships, and pursuing mergers and acquisitions to strengthen their market positions.

2.3.2 Perspectives of Crowdfunding.

As of 2025, crowdfunding has become a mainstream global financing mechanism, helping entrepreneurs, non-profits, and individuals raise capital for everything from startups to social causes. With models such as donation-based, reward-based, equity-based, and debt-based (P2P lending), crowdfunding is widely used in both developed and developing economies.[295]

In North America, particularly the United States, the JOBS Act continues to play a pivotal role in enabling equity crowdfunding by allowing non-accredited investors to participate in startup funding. Platforms like GoFundMe, Kickstarter, and Wefunder have facilitated billions in campaigns, while LendingClub and Prosper have provided digital lending alternatives.[296]

Europe has established a more standardized regulatory environment through the European Crowdfunding Service Providers Regulation (ECSPR), promoting cross-border investments and investor protection. Platforms like Crowdcube, Seedrs, and Funding Circle are prominent players, particularly in the UK, Germany, and France.

In Asia, crowdfunding is thriving in countries like China and India, where major e-commerce firms and platforms like Ketto and Milaap are driving growth. These platforms are especially prominent in medical and educational fundraising. However, regulatory fragmentation and financial literacy remain obstacles to broader equity participation.

In Africa, Latin America, and the MENA region, crowdfunding is bridging significant financial gaps. Platforms such as Thundafund (South Africa), M-Changa (Kenya), and Kiva are supporting everything from micro-enterprises to community health initiatives, aided by the growth of mobile money.[297] While these regions face challenges like low internet penetration and regulatory ambiguity, countries like the UAE are improving frameworks to encourage innovation.

By 2025, blockchain and AI have begun reshaping crowdfunding globally. Blockchain enables secure, transparent transactions and fractional investments, while AI helps optimize

[295] Grand View Research. (2024). Crowdfunding market size report. https://www.grandviewresearch.com/industry-analysis/crowdfunding-market
[296] Wired. (2015, November). You too can now invest in startups—what could go wrong? https://www.wired.com/2015/11/you-too-can-now-invest-in-startups-what-could-go-wrong/
[297] GSMA. (2023). State of the industry report on mobile money 2023. https://www.gsma.com/mobilefordevelopment/resources/state-of-the-industry-report-on-mobile-money-2023/

campaign performance and fraud detection.[298] Crowdfunding platforms are also supporting sustainability and SDG-aligned projects, signaling a shift toward purpose-driven finance.

Conclusion.

Crowdfunding stands out as one of the most significant developments among new forms of business financing, offering a practical alternative to traditional sources such as bank loans and venture capital. As highlighted in the problem statement, many entrepreneurs and small businesses especially in developing regions face limited access to conventional financing due to stringent requirements, lack of collateral, and bureaucratic processes. Crowdfunding addresses these challenges by leveraging technology to connect fundraisers directly with a broad audience of potential backers.

Section 3: FinTech in Algeria.

The relationship between financial technologies (FinTech) and banks in Algeria is still in the process of being evaluated and developed. FinTechs are seen as a threat to traditional banks due to their ability to offer innovative financial solutions, providing alternative ways to deliver financial services in a faster, more accessible, and personalized manner.[299]

On the other hand, banks also view FinTechs as an opportunity for collaboration and innovation. This partnership can take various forms: banks can, for example, partner with FinTechs to develop new, value-added products and services for their customers. They can also adopt FinTech solutions, such as blockchain technology, to improve operational efficiency and reduce costs.

1 State of FinTech in Algeria.

FinTech in Algeria is still in its early stages, raising the question of two alternatives:

- To be considered as a non-integrated banking entity, developing outside the control of central banks with competition from commercial banks.
- To be seen as an integrated banking entity, working in collaboration with banks, where FinTechs implement collective development policies to offer financial services.

[298] ArXiv. (2025). Blockchain-based crowdfunding models for financial inclusion. https://arxiv.org/abs/2501.11145
[299] Amrane, S., & Damene, O. (2023). FinTech Adoption in the Algerian Banking Sector: Reality and Challenges. Journal of Economic Integration, 11(5), p.213.

Table 14: List of Algerian FinTechs (Non-exhaustive list).

Name/ Founder	Description	Main Activity
Global Cash Management (GCM)	The startup Global Cash Management, an Algerian company, This business model is increasingly widespread both globally and in Algeria. It began to gain traction from 1990 in Algeria	-Specializes in managing installment sales, commonly known as sales through payment facilities. -By choosing this type of sale, customers have the option to purchase a product or service by paying the agreed price over an extended period, directly to the supplier. - It has a client portfolio in several banks: BEA, SGA, AGB, BNA, HSBC Algeria, Citi Bank, BADR, Arab Bank Algeria.
KEPLER Technologies / Cyril Crichton, Kader Salhi	In 2009, a FinTech established itself in Algeria as a subsidiary of a major European group. Kepler Technologies offers international services and solutions to financial institutions, particularly in Africa.	- Kepler Technologies has a client portfolio in several banks: FRANSABANK, SOCIETE GENERALE, BNP PARIBAS, ABC BANK, AL SALAM BANK, NATIXIS, CNEP Bank, Housing Bank, Gulf Bank Algeria, ARAB Bank. - It allows financial institutions and major accounts to automate their digital communication (SMS and email) in compliance with Algerian regulations and with a service quality that meets their requirements.
UBEX-PAY Technologies / Benlakhdar Adel	Ubexpay is the first electronic bank in Algeria, using the latest technologies in the financial world. It was founded in 2020. It is the first winner of the Algerian FinTech event and holds the "Startup Label" from the Ministry of Micro-enterprise.	- Payments and transfers to/from: CNEP Bank, BNA, BNP Paribas. - Pay online or in supermarkets. -SMS notifications. - Web and e-commerce integration. - Allows customers to send and receive money online via a smartphone or computer.

GEODAB / Ali Maameri 	-A platform specializing in the management of electronic payment terminals and Automated Teller Machines (ATM). It provides real-time location tracking and allows instant visualization of their operational status, as well as a dashboard displaying real-time deployments.	- Allows and banks to manage and optimize the deployment of electronic payment terminals and ATM in real-time, determining their locations across the national territory. - Facilitates navigation and visualisation.

Source: MELAKHESSOU Rania. (2024). Les obstacles à l'adoption des technologies financières dans le secteur bancaire Algérien : Analyse et perspectives p.1174.

State of cryptocurrency in Algeria.

As of 2025, Algeria maintains a strict prohibition on the use, possession, trading, and mining of cryptocurrencies under Article 117 of the 2018 Financial Law. The legislation explicitly bans all virtual currencies, deeming them illegal forms of payment and exchange within the country. This legal framework reflects the Algerian government's broader concerns regarding capital flight, illicit financial activity, and the lack of central oversight over decentralized digital assets. Consequently, no regulatory licenses or provisions exist for cryptocurrency exchanges, wallets, or related financial services and domestic banks are mandated to block any transaction linked to digital currencies. While the legal stance remains rigid, enforcement of the ban is selective, with regulatory scrutiny intensifying in cases involving large or traceable transactions through formal financial institutions.

Despite the legal restrictions, the use of cryptocurrencies continues informally in Algeria through peer-to-peer (P2P) transactions and underground digital networks. A growing number of Algerians, particularly tech-savvy youth and informal traders, engage in crypto trading using cash exchanges facilitated through social media platforms such as Facebook or Telegram. These informal markets operate discreetly, often below regulatory detection thresholds, but participants face considerable legal risks, especially when dealing in large volumes or attempting to use bank accounts for crypto-related transfers. Reports of arrests, asset seizures, and short-term detentions highlight the punitive consequences of noncompliance. Thus, while Algeria's cryptocurrency ecosystem remains officially outlawed, its informal

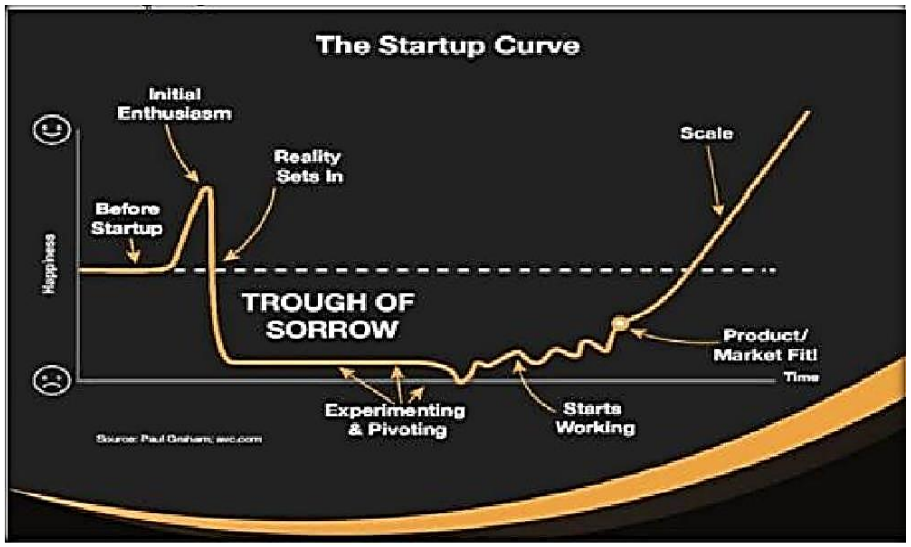
adoption underscores a disconnect between regulatory policy and the on-the-ground demand for alternative financial tools.

2 Ecosystem of FinTech Startups in Algeria.

A start-up is defined as an innovative organization at an early stage of development, where innovation plays a crucial role in realizing products and services.[300]

Startups often come into being to meet specific market needs or gaps, using technology and creative methods to differentiate them from their competitors. The concept of a startup encompasses several dimensions, including its stage in the lifecycle, the entrepreneurial ecosystem in which it operates, and its ability to grow and innovate. It is often described as those enterprises in the early stages of their development, usually characterized by high levels of uncertainty and the need for rapid cycles of iteration and adaptation.

Figure 15: lifecycle of a startup.



Source: Juma, A., & Hadhoudia, A. (2022). Startups in Algeria: From the conceptual and regulatory framework to the supporting structures and programmes. International Journal of Economic Perspectives, 16(3), p.37.

2.1 The Evolution of Startups in Algeria (2020-2024).

The startup movement in Algeria began in the early 2000s, driven by the government's recognition of innovation and entrepreneurship as critical economic drivers. Significant reforms and measures have since been implemented, leading to the creation of 5,000 startups and an

[300] Almeida, F., & Miguel-Oliveira, J. (2022). The role of intrapreneurship in Portuguese startups. Periodica Polytechnica Social and Management Sciences, 30(1), p.72.

increase in innovation hubs from 14 to 60 in recent years. Algeria's startup ecosystem now ranks fourth in Northern Africa and 115th globally.

The evolution of startups in Algeria from January 1, 2020, to August 25, 2024, reflects significant institutional and policy changes to foster a vibrant entrepreneurial ecosystem. Below is a summary of the key developments during this period:

Table 15: The Evolution of Startups in Algeria, 2020-2024.

Period	Key developments	Impact
2020-2021	Establishment of the Ministry of Economy, Startups, and Microenterprises.	Created a regulatory framework to encourage innovation and entrepreneurship.
2021-2022	The Algerian Startup Fund (ASF) was established with collaboration from six banks.	Provided financial support tailored for startups, leading to increased funding opportunities.
2022-2023	Growth in the number of startups to 5,000; increase in innovation hubs from 14 to 60.	Marked substantial growth in the startup ecosystem, particularly in high-tech sectors.
2023-2024	Strengthening entrepreneurial culture and international collaboration (e.g., the Shiraka program in the Netherlands).	Enhanced training and development of entrepreneurial skills; sought to reduce bureaucratic hurdles.

Source: Zakaria, H., Almi, H., & Boucenna, W. (2024). Startup Development in Algeria: Navigating Challenges and Seizing Opportunities. Journal of Economic Integration, 12(4), p.250.

2.2 Current state of Startups in Algeria.

Algeria's startup ecosystem is growing, ranking 4th in Northern Africa and 115th globally. The country has seen significant investment, with startups raising an average of $7.25 million. Key institutions and recent reforms are fostering a supportive environment for entrepreneurs. Despite some challenges, Algeria has almost 743 active startups, with total funding across all rounds of $1.06 billion for every startup.[301]

[301] Benlefki, N., Bouchetara, A., Saba, L., & Gahlam, M. (2024). Startup development in Algeria: Navigating challenges and seizing opportunities. Journal of Economic Integration, 12(4), p. 252.

Key players in the ecosystem include leading startups such as Yassir, a ride-hailing and delivery platform that raised $150 million in one of the largest funding rounds across Africa in 2022. Other vital sectors driving activity within the ecosystem are e-commerce, recruitment platforms, and agricultural technology.

2.3 Legal Framework for Startups in Algerian.[302]

The legal framework for startups in Algeria is designed to foster innovation and support the growth of new businesses. Below are some of the key legal instruments governing startups in Algeria.

- Executive Decree No. 20-254 dated September 15, 2020, issued by The Algerian legislator relating to establishing the National Committee for Brands of Startups, Innovative Projects, and Incubators and defining their tasks, formation, functioning, company age, turnover, and ownership structure.
- Executive Decree No. 20-356 dated 14th Rabie Ethani 1442, corresponding to 30th of November 2020, pertaining to the creation of "Algeria Venture," the institution of promotion and management of the Start-ups' support structures and fixing the missions, organization and operation .
- Executive Decree No. 20-54**,** dated 01st Rajab 1441 corresponding to February 25, 2020, established the framework for governance in the sectors of micro-enterprises, startups, and the knowledge economy in Algeria. According to Article 1 of this decree, the Minister of Micro-enterprise, Start-ups, and Knowledge Economy is responsible for proposing and guiding the elements of the national policy related to these fields. This includes overseeing the development and implementation of strategies to support innovation, entrepreneurship, and the broader knowledge-based economic transformation in the country.[303]
- Finance Law 2021: The Algerian government introduced several tax incentives for young entrepreneurs in the 2021 Finance Law to bolster economic recovery despite the economic challenges posed by the COVID-19 pandemic, Micro-enterprises and incubators benefited substantially. Notably, Article 86 of the 2021 Finance Law, amending Article 33 of Law No. 20-07 dated July 4, 2020 (the Supplementary Finance Law for 2020), ushered in a

[302] Abdellaoui Khadidja, (2024). Does the legal framework governing emerging institutions in Algeria differ from that of traditional projects? 10(2), p.3.
[303] Ministry of Knowledge Economy, Startups, and Micro-enterprises. (n.d.). Organismes sous tutelle. https://bawabatic.dz/?id=24&idS=10&lang=en&op=structure&req=organismes

comprehensive range of exemptions specifically tailored for startups, fostering an environment conducive to innovation and growth.

- Finance Law 2022: The 2022 Finance Law under Article 117 further amended Article 69 of the 2020 Finance Law. This amendment grants startups bearing the startup label a four-year exemption from professional activity tax, total income tax, and corporate profits tax, starting from the date they receive the startup label. An additional year of tax relief is available upon renewal of the startup label, underscoring the government's commitment to supporting entrepreneurial activities.
- Finance Law 2023: Recognizing the significant economic role that startups play in driving economic growth through the knowledge economy, the Finance Law of 2023 has eased measures related to reinvesting tax benefits granted to support investment.[304]

2.4 Financing Startups in Algeria.

Financing for startups in Algeria can be categorized into two types: traditional and innovative methods. However, since are dealing with FinTech, we shall take the innovative financing methods.

The term "innovative methods" refers to those new to developing countries, as these methods or techniques have been long adopted in many developed countries but remained limited or unused in many developing nations including Algeria.

2.4.1 Algerian Startup Fund.

The Algerian Startup Fund, was established by Article 68 of Law No. 20-07, as amended and supplemented by Article 131 of Law No. 19-14 (the Finance Law for 2020). The fund sources its resources from state subsidies, tax and quasi-tax fees, donations, bequests, and other contributions, playing a pivotal role in financing enterprises designated as startups.

The official launch of this fund took place during the National Conference for Startups, held at the International Conference Center in Algiers, resulting from collaboration between the Ministry delegated for the Knowledge Economy and Startups, Sonatrach, the Local Development Bank (BDL), the Algerian Popular Credit (CPA), the Foreign Bank (BEA), the National Algerian Bank (BNA), the National Fund for Savings and Providence (CNEP-Bank), with an initial amount of twenty million dollars.

[304] EY Global. (2023, January 9). Algeria introduces Finance Law 2023: Key measures applicable to companies. .https://www.ey.com/en_gl/technical/tax-alerts/algeria-introduces-finance-law-2023---key-measures-applicable-toErnst & Young+3Ernst & Young+3investmentpolicy.unctad.org+3

This fund relies on a financing mechanism based on investing in capital rather than on different traditional financing mechanisms based on loans.

2.4.2 ASICOM (Algerian-Saudi Investment Company).

In April 2004, the Ministers of Finance of Algeria and the Kingdom of Saudi Arabia signed an agreement establishing the ASICOM. This company aims to support investment projects by offering various financing methods tailored to the specific needs of each project. ASICOM can participate by acquiring equity stakes in existing companies or those under formation. It can also provide complementary financing in the form of participatory securities and/or shareholder current accounts. These financing tools can be combined within customized financial structures designed to meet the specific requirements of each investment.

2.4.3 The Algerian Innovation Fund.

This new $80 million fund, equivalent to approximately 11 billion dinars, has been established through a partnership between the public accelerator "Algerian Venture" and the Global Fund for Assisting Micro Enterprises.

The agreement was signed by Sid Ali Zerouqi, General Manager of Algeria Ventures, and Huberts van der Vart, Director of Investments at the Global Fund, in the presence of the Minister of Knowledge Economy, Startups, and Micro Enterprises, Yassin El Mehdi Walid.

This fund is set to operate as an Algerian investment institution under local legislation, focusing on injecting substantial capital into the burgeoning startup ecosystem, particularly those in emerging markets.[305]

2.4.4 SOFINANCE (Société Financière d'Investissement, de Participation et de placement).

A financial institution established on April 4, 2000, and approved by the Bank of Algeria on January 9, 2001, with a capital of 5 billion DZD. Its goal is investment, participation, employment, in addition to supporting and revitalizing the national economy. Its scope of work is limited to manufacturing industries such as food products, agricultural product storage, packaging materials, and clothing industry. SOFINANCE's tasks focus on supporting and assisting enterprises in their qualification and development by guiding them in restructuring their financial and strategic frameworks and providing all suitable financing opportunities from capital, medium-term loans, and leasing.[306]

[305] Elraed. (January 27, 2023). Retrieved from Economy: https://www.elraed.dz/157340-

[306] Dhiab, A., & Hamana (2016). Venture capital, a global trend for financing startups – The case of Algeria. Economic Researcher Journal, (5), University of Badji Mokhtar, Annaba, June, p.178

2.4.5 FINALEP Company (Financière Algero-Europeenne de Participation).

It was established in 1991 with its headquarters in Staoueli, Algeria. It was founded as a financial institution with a capital of 73.75 million DZD by four shareholders: Local Development Bank at 40%, Algerian Popular Credit at 20%, French Development Fund at 28.74%, and European Investment Bank at 11.26%. It can be considered as a pioneer and dean of venture capital. Its creation aimed to assist small and medium enterprises in solving financing problems.[307]

2.4.6 El Djazair Istithmar.

It is a private equity company established as a joint-stock company on December 28, 2009, and became operational on July 7, 2010. It is a subsidiary of two public Algerian banks: the Bank of Agriculture and Rural Development (BADR), which holds 70% of the shares, and CNEP Bank, which owns the remaining 30%. The company was approved by the Ministry of Finance on May 11, 2010, and has a share capital of one billion Algerian dinars. Its primary objective is to make minority and temporary equity investments in cash in the capital of small and medium-sized enterprises (SMEs). It also engages in operations involving equity and quasi-equity financing to support the growth and development of these businesses.[308]

2.4.7 The National Agency for Entrepreneurship Support and Development (ANADE).

It was established in September 1996 as a government entity with a special character, legal personality, and financial independence under the supervision of the Minister of Labor, Employment, Youth, and Social Security.[309] It aims to encourage and support young people with investment ideas through establishing enterprises and offering various incentives and facilities such as tax aids (exemption from VAT, customs duty reduction, free aids), reception, guidance, training, financial aids (interest-free loan, interest rate reduction at the agency with 51 branches across all provinces).

2.4.8 The participatory financing systems “Crowdfunding.”

This new mode of funding is revolutionizing the Start-up sector in Algeria, having proved its worth throughout the world by enabling the project holders in need of funding to take the step of entrepreneurship all the way through conducting their business creation projects. In

[307] Boualraihan, F., et al. (2021). The role of venture capital in financing startups in Algeria - The case of the Algerian European Financial Company. International Collective Symposium on The Problem of Financing Startups in Algeria Between Traditional and Innovative Methods, University of Jijel, p.336.

[308] Abadi M Mairif A (2016). Le capital Investissement: Une Voie de Financement Alternatif Journal Of Contemporary Economic Studies**.** Vol 1 n°: 01, p.12

[309] National Agency for Entrepreneurship Support and Development (ANADE). (1996). supporting young entrepreneurs in Algeria: Government incentives and programs. Algerian Government Business Journal, 11(4), p.122.

this respect, the first Crowdfunding initiatives in Algeria date back to 2013, which witnessed the creation of two platforms, mainly the TWIZA platform and the CHRIKY platform, whilst the third initiative is the NINVESTI platform in 2019.[310]

2.5 Structure of business accelerators and incubators in Algeria.

Incubators are structures that offer support to entrepreneurs who want to create a company or a Startup, through providing them with an environment conducive to apprenticeship, and a network of support necessary for entrepreneurs in the key stages of launching their projects.[311]

There exists a variety of incubators in Algeria, whether public or private, planned or active, which support the project holders and Startups, alongside providing them with supervision, accommodation during their Startup phase. Nevertheless, these structures are not supposed to provide direct funding to Start-ups, but prepare them for fundraising and the launch of their own activities, along with directing them towards potential funders.

As for accelerators, they symbolize structures that take over from incubators and succeed them through continuing to support the structured Start-ups being at a more advanced stage, by coaching them in intensive way, for the purpose of accelerating their business with a fixed period, usually 3-6 months. They are distinguished into two: public accelerators whose goal is to stimulate the emerging business ecosystem within an organization or technology sector and private accelerators whose goal is to bridge the gap between startup entrepreneurs and investors.

We quoted some examples of the incubators and accelerators operating in the Algerian entrepreneurial sphere, such as ANVREDET, HABA Institute, ANPT, DarTech, CDTA, Incub Me, Cap, FCE Incubator, ESAA Incubator, Algerian Venture, Business Incubators, mainly mobile operators, University Incubators, as well as Sylabs and the Pivot accelerators, both of which are private initiatives.[312]

It is indeed remarkable to observe that the number of accelerators and incubators in Algeria continues to increase, which reflects the growing interest in entrepreneurship and the creation of startups in the country. This development shows that local stakeholders recognize

[310] Dabah M.R. & Benbraika A. (202). Le Crowdfunding comme mécanisme innovant de financement des Start-up-Les plateformes Ninvesti et Twiiza comme modèle. Milev Journal of Research & Studies.7(2), p.366.
[311] Djelti M. & other. (2016). Etat Des Lieux Des Incubateurs En Algerie Cas De Lincubateur DeLinttic Doran. Revue algerienne deconomieet gestion. 9(1), p.105.
[312] Khelil S Analyse de l'écosystème des startups en Algérie (Etat des lieux et Perspectives**.** La Revue du développement et des Prospectives Pour Recherches et études, vol : 04 n°:01 2022, p.303.

the importance of supporting young entrepreneurs and project owners by providing them with a favorable environment for their growth and the success of their projects. This movement thus contributes to the revitalization of the local economy and job creation.

2.6 Successful Models of Algerian Startups.

Successful startups in Algeria show visible and notable progress in capitalizing on innovation and leveraging government support. Building on the above, we present the leading and distinguished startups in the following table:

Table 16: Successful Startups in Algeria, 2024.

Rank	Startup	Sector	Description
1	**Yassir**	Mobility / FinTech	Super-app for ride hailing, delivery, and digital payments. Algeria's first unicorn.
2	**TemTem**	Mobility / Logistics	Offers transport and delivery services in major cities.
3	**Zawwali**	E-commerce	Online platform for fashion and tech products with a trendy selection.
4	**Opticharge**	Logistics / B2B	Real-time freight management platform connecting shippers and carriers.
5	**Fatoura**	SaaS / Accounting	Billing and accounting automation tool for SMEs.
6	**Legal Doctrin**	Legal Tech	Platform for accessing legal texts, regulations, and jurisprudence across Africa.
7	**Freehali**	Social Commerce	Helps small businesses market and sell products through targeted campaigns.
8	**3S PAY**	FinTech	Provides secure digital payment solutions for businesses and individuals.
9	**Piassa**	E-commerce/ Automotive	Online marketplace for car spare parts from local suppliers.
10	**Goutra**	Green Tech / Water Tech	Develops smart solutions to monitor and reduce water consumption.

Source: StartupBlink. (n.d.). Startup ecosystem rankings.https://www.startupblink.com accessed on May 8, 2025.

3 Challenges facing FinTech startups in Algeria.[313]

The challenges of startups come under the umbrella of a broader picture, the Algerian socio-economic landscape. These challenges include:

3.1 Regulatory and legal barriers.

- Lack of a comprehensive FinTech regulatory framework: Algeria does not yet have a dedicated legal framework specifically for FinTech, digital banking, crowdfunding, or cryptocurrencies. This creates legal uncertainty for startups and investors, discourages innovation due to fear of regulatory backlash, limits the growth of sectors like peer-to-peer lending and digital wallets.
- Restrictions on foreign exchange and capital flow: Strict controls under the Ordinance 03-11 of 2003 related to money and credit. It makes it difficult for Algerian startups to raise funds internationally and it limits cross-border financial transactions, hindering foreign investment and partnerships.
- Ban on cryptocurrencies: The 2018 Financial Law explicitly bans the use, holding, and trade of cryptocurrencies such as Bitcoin in Algeria. It prevents the development of blockchain-based financial solutions, discourages tech startups from exploring decentralized finance (DeFi) and puts Algeria behind regional and global digital finance trends.
- Bureaucratic business registration processes: Legal procedures to register a business, obtain permits, or enter the financial sector are complex and time-consuming. It discourages entrepreneurship and slows innovation, pushes many startups into the informal economy, reduces access to institutional financing or legal protection.
- Lack of legal recognition for crowdfunding: No formal legislation exists that regulates crowdfunding platforms or activities. It limits alternative fundraising opportunities for startups and SMEs, causes uncertainty for investors and entrepreneurs, platforms may operate in legal grey zones or avoid Algeria altogether.
- Data protection and cybersecurity gaps: Algeria has a data protection authority (ANPDP), but the legal framework is still evolving. Weak legal guarantees reduce trust in

[313] Bouzidi, M. (2022). Startup development in Algeria: Obstacles and opportunities. Journal of Economic Growth and Entrepreneurship ,12(4), p.247

digital financial services, creates legal risk for companies dealing with user data, delays adoption of AI, big data, and digital identity services in finance.

- Limited financial inclusion legislation: The legal system does not adequately support financial inclusion tools like microfinance, digital payments, and mobile banking. Many people remain unbanked or underbanked, hinders rural and informal sector access to finance, prevents full deployment of inclusive FinTech solutions.
- Slow legal reforms and state dominance: State dominance in the financial sector and slow legislative reform reduce market dynamism. Outdated laws often block innovation or lack of political will, private FinTech actors face obstacles entering or competing in the market.

3.2 Access to Finance.

- Limited funding opportunities: One of the significant difficulties for startups in Algeria is access to finance. Without access to affordable financing options, many entrepreneurs struggle with the capital requirements for launching and growing their businesses. The area has little venture capital and angel investors, so the innovation landscape is impoverished along with its growth potential. Therefore, startups deploy personal savings or informal funding sources that do not always provide enough funds to scale their operations effectively.
- High interest rates and unfavorable loan terms: For the few startups that have managed to secure financing, the high interest rates and unfavorable loan terms imposed by financial institutions can spell real trouble. This makes startups capital-starved to invest in growth and improve their competitiveness in the market.

3.3 Culture.

Culture presents a major challenge to the growth of fintech in Algeria due to deep-rooted habits and societal attitudes toward money and technology.

Algerians largely rely on cash transactions, reflecting a strong preference for tangible, face-to-face dealings over digital alternatives. This cash-based mentality is reinforced by a general mistrust of digital financial systems and limited financial literacy among the population. Many people lack a clear understanding of how fintech works, making them hesitant to engage with digital wallets, online banking, or mobile payment solutions. Additionally, older generations and rural communities are less familiar with digital tools, creating a divide in fintech adoption that companies must address through education and user-friendly design.

Religious and ethical values also shape how financial services are received in Algeria. As a predominantly Muslim country, financial products must often align with Islamic finance principles, such as the prohibition of interest (riba), which many conventional fintech offerings do not account for. Moreover, Algerians tend to place trust in traditional institutions like state

banks, further complicating the acceptance of new, independent fintech startups. This cultural resistance to change means fintech companies must not only introduce innovative solutions but also work to build trust, educate users, and adapt their services to local values and expectations.

3.4 Market access and competition.

- Difficulty in penetrating local and international markets: Market access is one of the most prominent problems startups face in Algeria. Some startups also lag in local and export markets due to the marketing dimension and inadequate knowledge of consumer demands. Barriers to entry in this region may also exist, such as Algeria's complex trade policies and protectionist preferences.[314]

- Competition with established businesses: Competition with State-Owned Enterprises (SOEs): Startups in Algeria are often locked into a vibrant competition, as they have to contend for market share against SOEs dominating most economic sectors. SOEs are likely to give domestic companies and state vendors an easy ride, as highlighted by the fact that SOEs' procurement decisions are often influenced more by political concerns than efficiency concerns. Further, there is inadequate collaboration between new ventures and larger companies (e.g., revenue-sharing partnerships), which could further limit the growth prospects for such firms as they battle established market incumbents and launch aggressive upstarts from China.

3.5 Talent and human resources.

- Skills gap and talent retention issues: In the case of Algerian startups, they are more concerned about finding and keeping high-end talent. However, most startups have difficulty being able to pay top dollar, as big companies are generally better equipped to do in terms of salary and other people's detractions on skilled professionals.[315] Additionally, points out that startup companies lack better recruitment procedures in the long-run, which sometimes makes it difficult to form a strong team for development or innovation.

- Limited access to skilled labor and training: One more challenge faced by startups in Algeria is access to skilled labor capacity building and continuous training. This means that without relevant training schemes and a lack of support for developing a skilled workforce, an enterprise's potential to build a qualified workforce is significantly constrained.

[314] Zaidi, R., Khan, M., Khan, R., & Mujtaba, B. (2021).). Do entrepreneurship ecosystem and managerial skills contribute to startup development? South Asian Journal of Business Studies, 12(1), p.41

[315] Wang, Z. (2023). Entrepreneurial ability, entrepreneurial orientation, and new-startup challenges: basis for Chinese startups growth mechanism framework. International Journal of Research Studies in Management, 11(7). https://doi.org/10.5861/ijrsm.2023.1092

3.6 Infrastructure and technology.

Algeria faces institutional and infrastructural limitations that slow FinTech progress. Data protection laws, such as Law No. 18-07 (2018), exist but are weakly enforced, leaving startups unsure of how to comply with privacy and cybersecurity expectations. The digital infrastructure necessary to support FinTech including interoperability between banking systems and access to APIs remains underdeveloped. Despite the launch of a National Strategy for Financial Inclusion in 2021, implementation has been slow, particularly in expanding digital access to underserved populations. Without regulatory reform, streamlined licensing, and stronger support for innovation, the FinTech sector in Algeria will continue to face significant roadblocks to growth and scalability.

4 Measures to boost the FinTech startup ecosystem in Algeria.

FinTech is a rapidly growing sector worldwide, including in Algeria. Although the FinTech ecosystem in Algeria is still emerging, there are signs of development and investment in this field. The Algerian government has also taken steps to encourage the development of FinTech in the country.

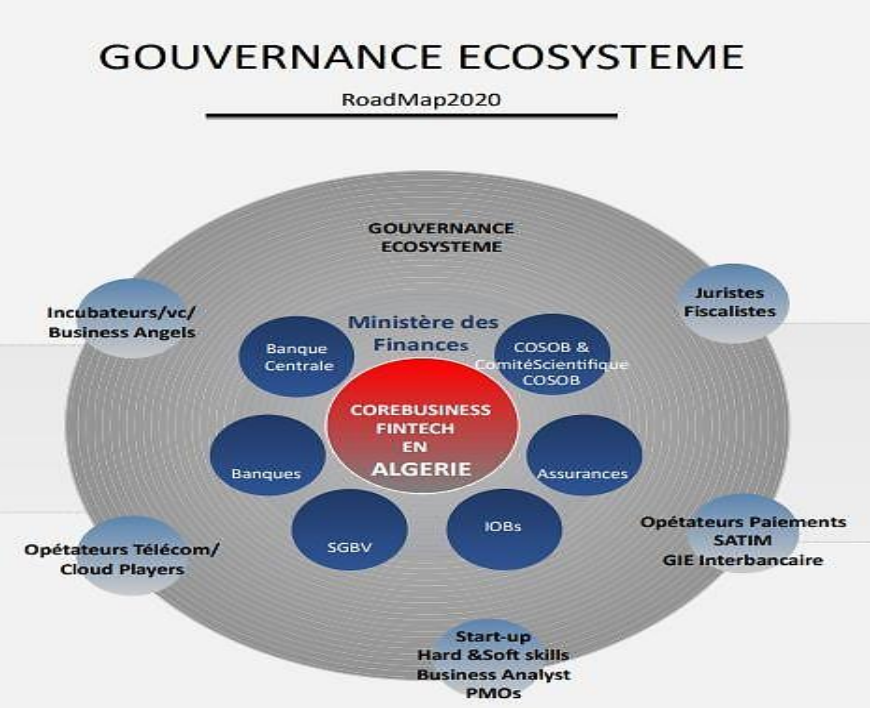
4.1 The Creation of the first FinLab in Algeria.

On September 30, 2021, the Commission for the Organization and Supervision of Stock Market Operations (COSOB) signed a founding agreement with the Algerian Union of Insurance and Reinsurance Companies (UAR) to inaugurate the first technological innovation development laboratory in the financial market (FinLab) in Algeria.

The Delegate Minister to the Prime Minister, in charge of the Knowledge Economy and Startups, Yacine El-Mahdi Oualid, announced that the FinLab would initially be based at the "Algeria Venture" accelerator. The goal of the FinLab is to create an ecosystem for startups active in financial technologies and to support project developers in the FinTech sector in creating solutions that modernize banking and insurance services while promoting financial inclusion. The laboratory will operate across all areas of finance and will act as a catalyst for innovation in the financial sector, thereby supporting the rollout of digital finance in Algeria and promoting new technologies such as Blockchain and Artificial Intelligence. The FinLab will also be involved in collaborative discussions with the participation of academics, researchers, and representatives from financial institutions to identify their needs in terms of technical, regulatory, and functional aspects.[316]

[316] Algérie Eco : https://www.algerie-eco.com/2021/09/30/la-cosob-lance-le-premier-finlab-en-algerie/

Figure 16: Core FinTech Business Areas in Algeria.



Source : COSOB. (2020). Roadmap Algeria FinLab [Présentation PowerPoint]. Commission d'Organisation et de Surveillance des Opérations de Bourse, p.2.

This FinTech laboratory is working on developing a roadmap, as shown in the figure above, for the FinTech ecosystem in Algeria, which includes various stakeholders contributing to the development of FinTech in the country.

4.2 Organization of the first event dedicated to FinTech.

As part of the initiatives undertaken to develop the FinTech sector, Algeria hosted a major event in February 2023 dedicated to financial technology and e-commerce in its first edition. This event, titled "ALGERIA FINTECH and E-COMMERCE SUMMIT," was organized by the company "Guiddini" and received sponsorship from several ministries, including the Ministry of Post and Telecommunications, the Ministry of the Knowledge Economy and Startups and Microenterprises, and the Ministry of Digitalization and Statistics.

This event aims to contribute to the development of e-commerce and online payment in Algeria, as well as to offer a unique opportunity to build valuable relationships with partners and potential clients. It is open to all public and private companies that are part of the financial technology and e-commerce ecosystem, as well as to visitors passionate about online commerce and payment technologies.[317]

[317]NTIC : https://www.nticweb.com/it/10378-le-sommet-algeria-fintech-e-commerce-summit-se-tiendra-les18et-19-fevrier-a-alger.html

The summit also featured the participation of over 50 speakers, 100 exhibitors, and more than 2,700 visitors.[318] The event concluded with the presentation of numerous recommendations for the development of the financial technology sector. Among these recommendations were:[319]

- Include stakeholders, especially startups operating in the fields of e-commerce and FinTech, to express their views and proposals on current and future regulations and legal texts.
- Create a legislative experimental environment that allows companies active in financial technology to test and launch their innovative products with financial institutions in a safe and secure setting.
- Launch an initiative to develop an open banking project in partnership with financial institutions and digital technology companies.
- Simplify licensing procedures for InsurTech activities and reduce the required capital, which is unsustainable for FinTech startups from 3 billion Algerian dinars across all branches to a few million dinars within the framework of support programs for startups, particularly for officially recognized FinTech startups.
- Accelerate the issuance of certificates to private companies by the government electronic certification authority, which plays a crucial role in the development of electronic transactions.
- Ensure effective coordination among all government departments and administrations involved in e-commerce and financial technologies.
- Promote the integration of digital solutions and encourage collaborations with startups.

4.3 Organization of competitions dedicated to FinTech startups.

Each year in Algeria, a competition called the "FinTech Startup Challenge" is organized as part of the broader event "Algerian Startup Challenge." This competition aims to identify startups in the field of financial technologies.

For its third edition, the competition was held in collaboration with the Commission for the Organization and Supervision of Stock Market Operations (COSOB). Among the

[318] eBourse dz : https://ebourse.dz/algerian-fintech-e-commerce-summit-un-vecteur-pour-le-developpementlocalet-social/
[319] Rapport Algeria Fintech & E-Commerce Summit, (18-19 février 2023). P.23.

participants, three FinTechs were selected as winners.[320] We will refer to these companies as follows:

- Global Cash Management (GCM): The startup *Global Cash Management*, an Algerian company, specializes in managing installment sales, commonly known as sales through payment facilities.
- GEODAB**:** GEODAB is a geolocation solution for ATMs and electronic payment terminals. It is a management platform for POS (point of sale) terminals and ATMs, providing real-time geolocation and status updates (active or inactive), along with a real-time deployment dashboard.
- UbexPay**:** It is the most advanced cash management system in Algeria for e-payment and e-commerce, tailored for merchants, freelancers, or for use as a payment method on any website or application via API or direct installation.

5 Survey results.

Referring to an analysis conducted by MELAKHESSOU Rania 2024 on several Algerian banks through questions addressed to branch managers, aimed at analyzing the integration of Algerian banks into FinTech,[321] we have summarized the main results of this survey as follows:

Question 1: What factors contribute to the failure of integrating financial technologies in the Algerian banking sector?

a) Lack of an adequate regulatory framework.
b) Lack of awareness and understanding of financial technologies.
c) Lack of technical expertise and delayed infrastructure implementation
d) High implementation costs.
e) Resistance to change.

Response

According to recent findings, 25% of respondents believe that the failure to integrate financial technologies (FinTech) in Algeria is primarily due to a lack of awareness and understanding. Many Algerians remain unfamiliar with the concept of FinTech and the benefits it can offer, making it difficult for FinTech companies to effectively reach their target markets.

[320] Algeria Startup Challenge. (2021). Fintech startup challenge: https://algeriastartupchallenge.com/fintech/
[321] MELAKHESSOU Rania. (2024). Les obstacles à l'adoption des technologies financières dans le secteur bancaire Algérien : Analyse et perspectives, p.1176.

Additionally, 14% of respondents identified the lack of technical expertise as a major barrier to successful integration. The FinTech sector in Algeria is still in its early stages of development, and there is a notable shortage of professionals with the necessary technical skills to design, implement, and manage FinTech solutions.

Notably, 48% of respondents attribute this failure to the absence of a proper regulatory framework. Algeria's banking sector is heavily regulated, and the lack of clear, updated, and FinTech-specific regulations creates a challenging environment for innovation. Without an appropriate legal framework, FinTech companies face significant operational and compliance uncertainties, which hinder their ability to grow and integrate within the traditional financial system.

Question 2: Has your bank collaborated with financial technology (FinTech) companies?

a) Yes, our bank has already collaborated with FinTech companies.
b) No, it is not planned.
c) No, but we are considering it.

Response.

The results show that 21% of Algerian bank executives surveyed have already collaborated with FinTech companies. However, 50% of banks plan to collaborate in the future. This reflects a growing national trend toward FinTech adoption. As a result, the number of FinTechs is rising, and the banking sector is gradually digitalizing.

Question 3: What models of collaboration with FinTeech, your bank led?

a) Startup collaboration.
b) FinTech as a solution provider.
c) FinTech as part of an innovative project.
d) No collaboration planned.
e) Incubation program.

Response

The most common form of collaboration among Algerian banks is the use of FinTech companies as solution providers. For instance, a bank may integrate a mobile payment solution developed by a FinTech into its remote banking services. The Algerian National Bank (BNA), for example, acquired the FinTech Company DIGIPAY in 2022. Similarly, NATIXIS Algeria became the first African bank to launch video-based customer identity verification.

Other forms of collaboration are also starting to gain traction among Algerian banks, such as incubation programs and FinTech-focused events (e.g., startup showcases and

innovation projects). Overall, the collaboration between Algerian banks and FinTech companies represents a positive evolution for the banking industry.

Question 4: With which types of FinTech companies has your bank collaborated?

a) Payment FinTechs – Specializing in providing payment-processing services.
b) Investment FinTechs – Offering investment products and services.
c) RegTechs – Assisting banks with compliance and regulatory requirements.
d) Lending FinTechs – Specializing in providing loans and other forms of credit.
e) Other types – Please specify: _____

Response

The collected results show that 38% of the surveyed banks are considering collaborating with payment FinTechs. This is a popular FinTech service in Algeria, as it is both convenient and secure. As a result, banks are forming partnerships with these FinTechs to integrate their payment solutions. Examples include Slick-Pay and Kepler Technologies most of which are developed by telecommunications operators.

Similarly, the results show that 20% of the surveyed banks have collaborated or are considering collaboration with lending FinTechs. This is an important FinTech service in Algeria, as it helps promote financial inclusion.

Moreover, the questionnaire results indicate that 15% of the banks surveyed plan to establish partnerships with investment FinTechs. On the other hand, the surveyed banks have not yet shown significant interest in RegTechs.

Conclusion.

Although Algeria's FinTech startup ecosystem is still nascent, it offers immense potential for development. Key challenges hindering startup growth include limited access to finance, bureaucratic hurdles, a shortage of skilled labour, and infrastructural deficiencies. These obstacles can significantly impede startups' sustainability and scalability. However, the survey also identifies several promising opportunities for fostering a more vibrant startup ecosystem.

Several strategic actions are necessary to maximize the potential of Algerian startups. These include improving access to finance, streamlining regulations, enhancing education and training, investing in infrastructure, and fostering a culture of innovation and entrepreneurship. By addressing these challenges and capitalizing on these opportunities, Algeria can create a more dynamic and resilient entrepreneurial ecosystem, contributing to long-term economic prosperity and diversification. A collaborative effort involving entrepreneurs, investors,

policymakers, and educators is essential to support the growth and development of Algerian startups. Through concerted action, Algeria can overcome the obstacles hindering its startup ecosystem and unlock the immense potential that startups offer for the country's economic future.

Conclusion of Chapter 3

In summary, this chapter has demonstrated how FinTech has fundamentally transformed traditional business financing by introducing faster, more accessible and technology-driven alternatives. The COVID-19 pandemic accelerated this shift, pushing businesses away from conventional banking toward digital solutions, while the rise of unicorn FinTechs provided scalable models that challenged legacy systems. Globally, innovations such as cryptocurrency, crowdfunding, and neo-banking have redefined how businesses raise, manage, and transfer funds, reducing reliance on traditional financial intermediaries. In Algeria, although FinTech is still emerging, there is growing potential to modernize business financing through digital tools and regulatory reforms.

General conclusion

This study has explored the transformative impact of financial technology on traditional business financing mechanisms, emphasizing its advantages, associated risks and its role in enhancing financial inclusion. The findings demonstrate that FinTech has significantly disrupted conventional financial systems by introducing agile, inclusive and data driven alternatives. These innovations ranging from algorithmic credit scoring and peer-to-peer lending to blockchain-based platforms have enabled businesses, particularly small and medium sized enterprises and startups to access capital with greater speed and fewer barriers. By minimizing bureaucratic inefficiencies and leveraging digital infrastructure, FinTech solutions have redefined how capital is distributed and who is able to access it.

A key feature of this transformation is decentralization and democratization of financial services. Traditional financing systems are often characterized by inflexible procedures, high collateral requirements and limited accessibility particularly developing countries. In contrast, FinTech solutions offer more direct, user friendly and low cost alternatives. Crowdfunding and P2P lending platforms facilitate direct investor business engagements while neo-banks and digital lending platforms use artificial intelligence and big data to deliver tailored financial products. These solutions not only speed up credit decision making but also improve liquidity management and reduce transaction costs especially in cross border context.

The COVID-19 pandemic played a catalytic role in accelerating the adoption of FinTech. As traditional financial institutions struggled to meet the urgent financing needs of business affected by lockdowns and economic uncertainty, FinTech firms rapidly deployed digital first contactless services. Emergency loans, mobile wallets and real time payments became vital tools for sustaining business continuity during the crisis. In many cases, FinTech emerged as the only viable financing channel for SMEs and informal enterprises. The unprecedented shift further validated FinTech's role as a main stream component of financial system, compelling policy makers and regulators to reassess its relevance and resilience. In the post pandemic era, the proliferation of FinTech unicorns has underscored the scalability and global reach of FinTech innovations. These companies have successfully disrupted conventional models by offering accessible, low cost services across various financial domains. Their growth has reinforced investor confidence in the FinTech sector while expanding service coverage in both mature and emerging markets. However, their dominance also raises concerns regarding competitive fairness, consumer protection and systematic risk especially when innovation outpaces regulatory development.

Against this global backdrop, Algeria presents an insightful case study. Although the Algerian financial system has historically been marked by low banking penetration, reliance on cash transactions and regulatory rigidity, recent developments indicate a growing openness to FinTech adoption. The COVID-19 pandemic revealed significant gaps in digital financial access, prompting renewed interest in digital payment systems, e-wallets and online banking. Emerging FinTech startups in Algeria are increasingly active in areas such as mobile payments, digital microfinance and crowdfunding. Nonetheless, challenges persist including inadequate digital infrastructure, limited venture capital investment, and underdeveloped regulatory frameworks. Algeria's ongoing reforms particularly those promoting digital financial inclusion and entrepreneurial support signal the potential for FinTech to advance economic diversification and financial democratization.

Despite its many advantages, FinTech ecosystem also presents notable risks. Chief among these issues of cybersecurity, data privacy, algorithmic discrimination and regulatory fragmentation. In many jurisdictions including Algeria's existing legal frameworks are poorly equipped to oversee rapid FinTech innovations, leaving both providers and consumers vulnerable to operational and legal uncertainties. Furthermore, some FinTech business models are driven by aggressive market acquisition strategies without adequate attention to long-term financial sustainability or risk management.

Maximizing the developmental impact of FinTech requires coordinated action among governments, regulators, financial institutions and technology providers. Regulatory frame works must be adaptive and forward-looking, striking a balance between innovation and consumer protection. FinTech firms must uphold ethical standards in algorithm design, data governance, and service delivery. Moreover, partnerships between FinTechs and traditional financial institutions can support innovation while maintaining stability, especially in hybrid financial ecosystems.

In conclusion, FinTech represents a systemic evolution in the way financial services are conceived, accessed and delivered. Its advantages make it a cornerstone of modern business development. The COVID-19 pandemic and the rise of FinTech unicorns have demonstrated its capacity to adapt and scale rapidly, while Algeria's emerging FinTech landscape offers a valuable example of how innovation can take root in developing contexts. However to realize the full potential of FinTech in promoting inclusive and sustainable economic growth, stakeholders must address the sectors challenges with strategic foresight, cross sector collaboration and a strong commitment to equity and accountability.

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ABSTRACT

The purpose of this research is to explore the emerging new forms of business financing. This study aims to understand how these innovations are reshaping access to capital, particularly for small and medium sized businesses, entrepreneurs and startups.

The rise of financial technology has transformed traditional business financing by introducing innovative, technology driven alternatives. These include peer-to-peer lending, crowdfunding, revenue based financing, and blockchain enabled funding methods. Unlike conventional bank loans or venture capital, these models are more inclusive and accessible particularly for startups and small to medium sized enterprises that often struggle with credit access.

By leveraging data analytics, artificial intelligence and mobile platforms, FinTech-financing solutions offer faster approval times, lower operational costs and customized lending experiences. At the same time, neo-banks and embedded finance platforms have streamlined how businesses manage and secure funding, integrating financial services directly into non-financial environments.

While challenges such as regulations, fraud risks and market volatility persist, FinTech is increasingly viewed as a catalyst for financial inclusion and innovation. As these models evolve, they continue to reshape the global funding landscape offering more flexible and scalable capital solutions for modern business.

Keywords: Financial technologies, business financing.

RESUME.

L'objectif de cette recherche est d'explorer les nouvelles formes émergentes de financement des entreprises. Cette étude vise à comprendre comment ces innovations redéfinissent l'accès au capital, en particulier pour les petites et moyennes entreprises, les entrepreneurs et les startups.

La montée en puissance de la technologie financière a transformé le financement traditionnel des entreprises en introduisant des alternatives innovantes et technologiques. Celles-ci incluent le prêt entre pairs, le financement participatif, le financement basé sur les revenus, ainsi que les méthodes de financement basées sur la blockchain. Contrairement aux prêts bancaires traditionnels ou au capital-risque, ces modèles sont plus inclusifs et accessibles, notamment pour les startups et les PME qui rencontrent souvent des difficultés d'accès au crédit.

En tirant parti de l'analyse de données, de l'intelligence artificielle et des plateformes mobiles, les solutions de financement proposées par les FinTechs offrent des délais d'approbation plus rapides, des coûts opérationnels réduits et des expériences de prêt personnalisées. Parallèlement, les néobanques et les plateformes de finance intégrée ont simplifié la manière dont les entreprises gèrent et obtiennent des financements, en intégrant les services financiers directement dans des environnements non financiers.

Bien que des défis tels que la réglementation, les risques de fraude et la volatilité du marché persistent, la FinTech est de plus en plus perçue comme un catalyseur d'inclusion financière et d'innovation. À mesure que ces modèles évoluent, ils continuent de transformer le paysage mondial du financement, en proposant des solutions de capital plus flexibles et évolutives pour les entreprises modernes.

Mots clés : Technologie financières, financement des entreprises.