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Chapter 1: Fintech disruption and innovation: Transforming the future of global financial services

1.1 Introduction

In the last few decades, the financial sector has seen a great revolution, where many of its historic players have either disappeared or transformed dramatically. The reasons for this phenomenon range from the evolution of technology infrastructures such as the internet, smartphones, big data, artificial intelligence, mobile and cloud computing technologies, and the rise of new players utilizing these available breakthroughs in technology to rethink the delivery of financial services to embrace a more client-centric focus. The realization of the enormous potential of technology on the ability to connect lenders and borrowers directly anywhere at any time has become a prime attraction for a myriad of new players offering innovative new solutions for a disconnected younger audience. Banks have also moved to partner with fintech innovators to find the right mix of collaboration or competition by investing in startup ideas in the fintech fields.

Fintech or financial technology originally referred to a back office technology used by financial institutions, but the term has evolved to represent the disruption and innovation that is transforming the future of global financial services. The foundations as to how fintech began can be traced to the early 2000s with the emergence of new broad-based technology companies offering major benefits from technology enabled platforms, and with a company founded in 2012 triggering the raising of small unsecured loans using an online marketplace model that began the real changes in the space. However, 2008 saw the true emergence of fintech into the public spotlight with the global financial crisis that began to erode the consumer trust in banks along with a severe liquidity squeeze for sub-prime borrowers. When traditional banks had little or no capital to lend, new non-traditional tech-based marketplace lenders emerged providing needed cash flows to

door-step borrowers at the risk of charging much higher interest rates on unsecured loans (Arner et al., 2017; Gozman et al., 2018; Nicholls & De Cock, 2018).

The history of financial services is a journey into the core of the evolution of modern economic life. From the moment business activities moved from basic self-sufficient existence to trading with neighboring communities, people began to specialize their activities. As the community economy developed, factors of production started being combined in a larger scale to allow for greater benefits. Property became more complex, and the movement of capital resources through trade became essential. Complementing these bigger actions, people as a group became allowed to take on more risk, enjoying the benefits of success but also suffering distress in the case of loss.

It is around this moment, with the clear establishment of risk and reward as an emergent property of human collaboration, that the essence of financial activity is established, facilitating investment sustainability, capital resource movement, mitigation of risk, and redistribution of wealth. The first existing records of financial activity come from the temple and palace curators in Ancient Mesopotamia. As well as keeping record of transactions, the temple collected deposits. These deposits were often considered debt that the temple owed to its depositors, and from which depositors collected a certain amount of interest. The temple also lent money and stored grain and silver, allowing merchants to withdraw deposits at their leisure (Nicoletti, 2017; Puschmann, 2017).

Authorized deposit taking was also done in the old empires of China, Egypt, Greece, and Rome. Although private bank-like enterprises existed in ancient Greece, the first banks as we imagine them today appeared in the Middle Ages, with money-lending and the issue of bills of exchange by merchant bankers in the Italian cities of Florence and Venice. Soon, banking associations for the exchange, discounting, and remittance of bills were set up in all the Italian cities. With the development of Renaissance, banking consolidated its significance in the economy, with powerful institutions offering letters of credit, bill discounting, and loans to merchants and governments.

1.2. The Rise of Fintech

The rapid rise of technology-facilitated disruptive innovation in global financial services, the so-called fintech revolution, is widely witnessed to have transformed most sectors of the financial services ecosystem – banking loans and deposits, payments, investment and wealth management, capital markets and securities, insuretech, and crypto and blockchain innovation. New companies founded mostly by young entrepreneurs unencumbered by legacy technology and operational models have successfully entered the financial service arena, led by technology-delivered innovative financial products and services, consumer-enabled business models, and customer-

centric approaches. With the formation of massive new billionaire fortunes, the rise of fintech has upended traditional competition to such an extent that even the venerated statement that “financial services is a technology business” is now not monopolized anymore by large bank incumbents relying on decades-old legacy IT systems to deliver services.

The growth of fintech can be attributed to a number of key drivers, for example, growth of mobile devices and internet access worldwide with greater bandwidth and lower costs, the capacity and willingness of customers to switch incumbent banks for challenger banks and new nonbank tech companies, harnessing vast amounts of customer data in payment and lending decisions from social media and transaction partners that lower the costs and risks of lending among consumers and small businesses, digital-onboarding capabilities that streamline opening of accounts and completing transactions, technology innovation with “safe” app capabilities ranging from contactless payment to online peer-to-peer lending marketplaces to “robo-advisors” for wealth management and investment – and 2020 demonstrated the global regulatory acceptance of fintech innovation.

Fig 1 : The Rise of Fintech

1.2.1. Key Drivers of Fintech Growth

The birth of Fintech was born out of the inherent dysfunctions in the traditional banking systems, spurred on by the increased need for banks to keep pace with evolving needs of their customers, aggravated by events that hindered the growth of traditional banks. Traditionally, banks have operated as sovereign entities, unencumbered by global competition. The banks had complete control over consumers' financial lives and used this advantage to build huge empires. Due to their size, scope and complexity, banks did not adapt quickly to significant changes in customer needs and preferences. Operations and servicing capabilities were built around branch networks over many decades and thus resistant to more agile and quicker competitors. Today's bank customers are tech-savvy, overwhelmed by higher degrees of choice, and drifting towards more convenient delivery modes. They have a low tolerance for friction at every interaction footprint, and do not hesitate to switch banks for even slight reductions in cost or valueless experiences.

Many of the disgraceful acts by large global banks during the financial crisis triggered rapid deregulation, and focused potential tech-savvy players who witnessed the incredible availability of sizable pools of venture funding ready willing and able to invest in the Fintech space. With low costs of technology and regulatory entry, many new players started attacking areas of the banking value chain which were not clearly protected by economic moats. Over the next decade, they rolled out responsive, low cost solutions which were innovative, transparent, simple, quick, and borderless. Eventually aware, empowered customers started shifting away from traditional bank relationships towards these new options, causing banks to lose significant customer share.

1.2.2. Global Trends in Fintech

Fintech has undergone tremendous innovation and growth over the past decade. The Covid-19 pandemic appears to have accelerated existing patterns of digital and fintech adoption across different demographics, as in-person interactions were curtailed. The fintech sector has several distinct attributes that need to be understood. It is very diverse in terms of product and company focus. Fintech adopters are not just millennials; they come from all walks of life. There are huge intertwining drivers from within the tech ecosystem, including enhancements of the core hardware and software, the productization of fintech services, startups and venture capital gains, fintech incubators and accelerators, innovative and effective talent pools and flows, and enhancements in design, branding and user experience. Financial institutions need smart and innovative partners not just because they are under threat, but because they must innovate themselves. Governments and regulators have to find effective and efficient ways to support the ongoing disruption and innovation. This involves the allocation of public

goodies, including public funding and public data. Global growth rates vary tremendously both geographically within regions and across sectorial niches.

Fintech is a mix of enabling technology and industry-specific domain knowledge applied to a broad range of product or service focus areas serving both consumer and business markets. In the consumer market, payments are the largest category, followed by insurtech, lending, capital markets, banking and investment. Traditionally, online retail has primarily targeted high-income individuals, but middle-income consumers are slowly being introduced. In workplace-centric business markets, the largest consumer portfolio primarily targets human capital management, while cybersecurity, tax compliance, ceremonial compliance, business management, and document management target various niche users in a more fragmented manner.

1.3. Technological Innovations in Fintech

The major forces contributing to the cross-sectoral spread of fintech are financial deregulation and globalization, the convergence of industries, digitization, and technological innovations. Essentially, from financial deregulation, new entrants are encouraged to enter the financial sector, and financial services are integrated into the global economy, leading to the globalization of financial services. The growing extent of the convergence of industries is a natural extension of globalization. More specifically, industry deregulation and market demand have made financial services an integrated component of business activities, thus leading to the growing convergence of industries. On the other side, advances in computing power and software structure stemming from digitization and technological innovations have made information technology mature and widely available, laying the foundation for expanding related-party trading within the financial sector.

Among other things, technological innovations are indispensable complements to globalization and convergence. The absence of sufficient technological innovations would make it difficult to realize the advantages brought by global trade in financial services, which are essentially knowledge-based services. Likewise, in the absence of cutting-edge technologies, the convergence of industries would make it impossible to achieve the rapid changes in cost structures that accompany the ongoing digital revolution and the increasingly important role of core competencies. Since the early 2010s, the rise of fintech business models has been made possible by the rapid innovations in the following pillars of digital financial technologies. This sort of new technology plays a pivotal role in reshaping the landscape of the global banking sector and of the financial services industry at large.

1.3.1. Blockchain Technology

Blockchain technology, as the underlying ledger for Bitcoin, has shown the world that trust can be engineered with software. Digital currencies have generated global momentum but have struggled with use. More recently, several technology startups have begun using blockchain technology for many business ideas, showing that the ledger can be used for many non-currency business applications. Globally, large corporations from the financial services industry, technology, and others have begun to collaborate with each other, engaging in blockchain technology projects and making investments in both the technology and new startup coverages. In parallel, law groups have begun studying the many legal issues that blockchain technology encounters, and the official support for the original intended currency use of blockchain technology from the government has launched a global wave of interest in the technology.

Blockchains use any programming language; the implementation in Bitcoin is an assembly language that looks different from normal assembly language because it only implements certain operations to make cryptocurrency functional. Unlike traditional ledgers, data on the blockchain is untouchable by intervention after being entered. Unlike traditional ledgers, data on the blockchain are not stored in a specific location or device. Anyone can be a node, and the code to run the blockchain is open source. In terms of consensus, blockchains make compromises. Bitcoin uses a setup based on proof of work, which consumes a lot of energy, with the idea that people are wasting energy doing a search for a specific hash value creating the next block. There are other algorithms for consensus, but in the end, some form of consensus is essential for a blockchain to function for a wide variety. Ethereum is an example of a blockchain that is changing its proof of work consensus to a form of proof of stake to reduce energy use.

1.3.2. Artificial Intelligence in Finance

Artificial intelligence applies the idea of a human mind working in a replicable way to many types of algorithm and knowledge-based systems. AI can recognize and replicate thought processes of human beings when making decisions, and can also be programmed to begin learning on its own, thereby becoming even more efficient and effective through continuous improvement. Once seen as just a technological gimmick, artificial intelligence has matured rapidly over the last 30 years, to the point where its algorithms today are applied as unbiased assessments, forecasts, and recommendations, and are accepted by governments, businesses, and consumers as legitimate, accurate, and valuable.

AI has a long way to go. Its algorithms still assume that the world will continue to operate as it has in the past, that people will operate out of their considered best interests and

will not abuse the rules of logic, behavior, and decision trees that algorithms are designed to utilize, and that human thinking can be replicated by the use of algorithms. But as linguistic and sociological nuances become apparent to AI, the use of artificial intelligence will have to adapt new models and approaches. AI in finance is used to assess risk, personalize wealth management, optimize trading strategies, generate hedge fund recommendations, evaluate compliance, and detect money laundering and fraud. AI is also vital to the development of digital depositories, the creation of cryptocurrency valuation algorithms, and the identification of tailored cryptocurrency investment strategies.

AI will continue to evolve and become an increasing part of technology-driven investment management, as its rules and parameters are adjusted over the next decade or so so that its knowledge-based algorithms can better adapt to the changing investment environment. However, the absolute need for people for investment management to succeed is that there should be a shared vision between investors and management, as this cannot be programmed into a machine.

1.3.3. Mobile Payments and Digital Wallets

Mobile payments bypass the need for debit or credit cards to process transactions. Instead, the payer's mobile device or other smart device provides the transaction credentials at point-of-sale. Mobile payment systems employ near-field communication or a sound-based technology such as sound waves or sonar to transfer payment information to the merchant's POS equipment. In certain cases, mobile payments are linked to a digital wallet. The digital wallet twirls together different credentials and produces to simplify online purchases. This technology eliminates the need to input multiple IDs and passwords for a safe online transaction. Digital wallets can be app-based or available via a web browser. App-based storage solutions allow users to keep various cards including payment, transit, ID and event passes in one central application on their mobile device.

Virtual cards are offered by many fintechs and can protect customers from fraud by providing temporary credit card numbers instead of real numbers. A 3D persona of a user can create a different card for each three-dimensional shopping environment, allowing users to protect themselves from fraudsters. At a time when many still lack access to the financial services ecosystem, blockchain initiatives expand into established alternative payment infrastructure by connecting third-party app stores to a user’s existing financial accounts.

Although they are often used synonymously, mobile payments continue to be distinct from digital wallets and virtual cards. The fintech revolution, characterized by the

creation of a broad range of new personal finance applications, has been primarily driven by the increasing convergence of mobile computing, social networking, and cloud-based software combined with a suite of updated financial services infrastructure technologies, including mobile payments, digital wallets, biometrics, and virtual cards. Hence, the future potential of the fintech revolution and the significance of mobile payment technology goes beyond its use as a payments platform.

1.3.4. Robo-Advisors and Automated Trading

A relatively new innovation in financial services is account management software, or robo-advisors, to assist investors with the management of their investment accounts.

Fig 2 : Robo-Advisors and Automated Trading

These software programs represent a technological disruption in an area, which involves both portfolio management and market and order execution. For developed market institutional investors, who typically charge hundreds of basis points for active management, this technology provides a more cost-effective solution under different market conditions. In fact, with the recent financial crisis, many clients of asset managers

who were charging a percentage of assets under management left for the relative safety of low-cost index funds. And the sophistication of algorithms employed by the large index investors resulted in higher trading costs due to excess volumes in index stocks. There has also been a proliferation of quant trading hedge funds.

The algorithms now available to both the buy and sell side also provide large mutual fund and pension fund companies the ability to implement quantitative hedging solutions in a manner that was not possible even five years ago. The emergence of artificial intelligence and machine learning have changed the sophistication of portfolio management, portfolio hedging, and trading. Investment advisors working in areas such as commodities, equities, currencies, and fixed income have available to them much improved systems to assess and hedge the risks in their portfolios as a result of fintech innovations in this area.

1.4. Regulatory Challenges and Compliance

The rapid evolution of the fintech sector has raised perplexing regulatory challenges for global financial cooperation and domestic authorities. The global dispersal of innovation across borders has added complexity to the development and implementation of rapid in-country policy responses and risk mitigation measures. Digital finance allows for the circumvention of traditional barriers between sectors, products, and countries. Global financial cooperation, regulatory coordination, and information exchange can help facilitate a global regulatory framework, thereby safeguarding the stability of the global economy. Policymakers and regulators are wary of the adverse unintended consequences of excessive innovation and fragmentation.

Financing fintech innovations with a regulatory light touch avoids stifling technological development, but market innovation regulations are evolving. This regulatory evolution must balance the benefits of international coordination designed to enhance cooperation and international exchange of information against potential trade-offs such as delays in the development of regulatory policies that protect consumers and establish fair conditions for competition. With the development of a regulatory toolkit, global collaboration can enhance the competency of a patchwork of domestic policymakers and regulators. To facilitate a global framework on supervisory cooperation established in the shadow of risk and uncertainty, several issues have to be considered.

A major challenge faced by global finance and domestic regulatory authorities is the complexity of balancing the benefit of innovation with the risk of regulatory arbitrage, i.e., the use of less stringent regulations by nonbanking fintech firms to avoid the risk reduction capital requirements applied to banking institutions. Banks have the burden of maintaining high capital reserves that financialize the banks but have a relatively lower

risk than fintech firms that believe in risk-neutral value-maximizing of their shareholders. Since the market is open to innovation that disrupts the traditional financial services sector, fintech firms can develop infrastructures, methodologies, and financial planning analytics that financialize or optimize bank financial interpreters, thereby advising individuals to optimize their consumption decisions to risk-maximize their utility functions.

1.4.1. Global Regulatory Landscape

In addition to the fact that the use of financial services by the general population has greatly increased, and continues to emerge as an essential part of the daily lives of both businesses and individuals, underpinning these financial interactions is data — vast amounts of personal and sensitive information that would be quite attractive to fraudsters. These two attributes make the proper regulation of fintechs by the regulatory authorities a huge and significant challenge. The race of constantly evolving technology against time-tested regulation and policy designed to protect investors and the traditional financial services infrastructure from disruption is growing in asymmetry. Traditional regulatory frameworks were not designed to cope with the disruptive influence of technology, and only recently have we witnessed the development of a patchwork of domestic and international regulations aimed at overseeing the fintech ecosystem. Even within domestic markets, regulatory uncertainty can abound. Each of the products and services provided by a fintech could involve compliance issues with each of the various state and federal agencies charged with overseeing those issues, especially in the United States, where, with certain exceptions, the authority to regulate financial agents, institutions, or activities generally rests with the individual state governments. The parliament of the United Kingdom recognized the challenge presented for regulators and proposed the establishment of a new supervisory body designed specifically to oversee the fintech movement.

1.4.2. Data Privacy and Security Concerns

Rapid technological advancement and technological adoption by financial organizations has created an unprecedented digital world. From apps on mobile devices to edge-based cloud storage, the financial sector has experienced a push towards digitalization. However, true digital transformation needs a long-term investment in technology, culture, infrastructure and promotion of best data protection practices. Digital transformation is only effective if organizations understand the importance of putting data protection principles first. The success of any digital initiative or product is directly linked with how organizations view data protection.

In response to the rising number and scale of data breaches and the identification of big data's potential privacy risks, global regulatory control, public scrutiny, and potential reputational damage are all increasingly prevalent and costly pressures on fintechs adopting, or considering the adoption of big data technologies and analytics. Big data enable fintechs to offer more tailored financial service products and solutions but this utility comes with risks for fintechs. Failure to meet increasingly stringent technical and organizational compliance requirements connected to data security and breach notification, algorithmic transparency, profiling, data subject rights, and consumer consent, can result in potentially devastating consequences like criminal sanctions, fines, civil liability, and exposure to class actions.

Under GDPR, each member state also retains the ability to impose stricter national laws. In many countries, additional consumer protection laws regulate how businesses can use personal consumer data for marketing and other purposes. Also, as a fintech expands into new markets with local government oversight and laws, that fintech may also experience additional, potentially material data protection-related compliance obligations. With the exception of California, the United States does not impose laws as strict as the GDPR. Current federal legislation and individual state privacy regimes in the U.S. have not historically embraced robust data privacy and cybersecurity protective measures to the same extent as the GDPR. Nevertheless, data subject and consumer privacy rights in the U.S. are becoming a growing and contentious focus of discussion.

1.5. Impact on Traditional Financial Institutions

Disruption is not always a bad thing. In fact, while the threat of Fintechs has triggered discussions about innovation in the established banks, many banks are behaving in a heightened partnership mode, teaming up with Fintechs for their innovation needs. Investment banks are significant investors in Fintech innovation, not only to learn about new technology, but also to leverage these technologies for their own organizations to facilitate quicker and more effective innovation and product offerings. Financial institutions in this growth market remain open to partnerships that allow them to explore a wider choice of strategies at lower levels of risk. The interplay of co-opetition amongst the players in the ecosystem is therefore a key driver of Fintechs.

The initial incredulity at the profitability of the Fintechs lost little by way of momentum in undermining traditional business models, especially in the space of the Millennials. The emergence of the Prime Banking concept of radical customization of services by major banks specifically focused on delivering seamless service to selected high net worth individuals has often run into roadblocks on costs due to their backlog of legacy IT. With investment banks returning to profitability in the aftermath of the Global Financial Crisis, the focus of attention post-GFC has gradually turned to addressing the

challenges of technological change amidst the countervailing pressures of business risks, regulation, competition for talent both with Fintechs as well as the major technology firms in the area of Artificial Intelligence and security, and finally the rising cyber-security risks. These challenges are expected to spur the ongoing collaborative evolution of the banking sector rather than kill digital disruption. There is hope in the tacit acknowledgement that banks, Fintechs, and major technology firms are all best served by a collaborative framework that allows each to focus on what they do best.

1.5.1. Collaboration vs. Competition

The rise of fintech companies posed a disruptive challenge within the financial industry - for both startups and incumbents. The question arises whether these new players can gain enough market share to threaten the position and profitability of traditional banks and financial institutions, or if they will become valued partners, unlocking new areas of growth. In the short terms, for specific activities and niches, fintechs are growing fast, but in the long term, their business model may be threatened by justice in competition and discrimination issues. Furthermore, traditional institutions with their core technology stacks may find it easier to compete by developing new technology-based offerings for their customers. And with the persistent need to reinvest in new successes, many digital-neobanks may be diversifying between investment products, loans, and other banking services.

New startups will partner with banks, and together they will provide a wider special mix of tailored services. Other fintechs will leverage banks capabilities and build a fund on regulatory expertise. Some will fail and will be acquired at a low cost by banking. The bankers will provide new banking apps developed by fintechs that will reconsume in front-end, UX, and data science for financing.

Competition will favor the client, bring a higher offer of products to choose from, lower products costs, and bring to the market new services, a customer spirit, and client experience because the old traditional bank process and offer were sometimes soporific. The startups that will persistently invest in the development of great technology platforms and the continuous improvement of UX will take the lion's share of fintech.

1.5.2. Adapting to Technological Change

The compatible evolution of fintech solutions and established firms requires continuous change and adaptation. Those banks that hope to thrive in an increasingly competitive environment need to embrace innovation by making sustained investments in systems that support evolving customer expectations through secure banking products and

services. Failure to achieve an adequate rate of adaptation, however, risks capital erosion, leading not only to bottom-line challenges but also problems associated with the diminished recruitment and retention of top modifying talent. Banks cannot afford to ignore adaptation for long given the damage that even a temporary lag may enact to reputation. End-users prioritize security and trust in financial service relationships but they do not obsess over the security of only the bank; they equally fret over the security of their credit cards, other sensitive data, data breaches, and other issues that may expose them to cyber or identity theft fraud. In an increasingly integrated and interconnected environment, banks cannot become complacent about safety and security.

Regulators have also taken notice of private-sector adaptation challenges. Regulators are examining openness of traditional providers to fintech disruption by tracking new entries into respective financial services sectors; fintech's reception and acceptance by end-users; and the associated impact on the activities and revenues of historic regulated institutions, such as banks and exchanges. Two specific adaptation challenges already under scrutiny include fortifying cybersecurity layers somewhat independently of the extent of customer submersion in associated digitized services and the implementation of new governance models that integrate nontraditional fintech operators into the overall risk framework of regulated entities.

1.6. Consumer Behavior and Fintech Adoption

Behavioral finance encompasses various topics related to how emotions, biases, consequences, preferences, welfare, and other human factors influence decisions regarding money management and investments. Such factors may influence financial actions either positively or negatively. However, behavioral biases may be temporarily altered as a consequence of external events. Consumer behavior in the financial services environment has been an important area of inquiry for both academics and practitioners. Recent years have witnessed numerous innovations in the global financial services sector, such as the rise of fintech innovations. As with other innovative products or services, such financial technologies face a gap between intentions and actual adoption behavior. Consequently, research concerning consumer behavior relating to fintech has gained a great deal of attention recently, given that understanding consumer acceptance of mobile payments is critical to fostering its growth.

While many works related to fintech adoption at a macro level exist, the extant literature has only begun to examine individual factors influencing adoption and, by extension, fintechs' longer-term success globally. The current understanding of fintech has primarily followed two approaches: an initial view brandished fintech as a tech-based alternative to traditional financial services providers, while the latest perspective emphasized fintech as a subset of the overall tech landscape. Although both perspectives

present valuable insights, they largely ignored individual behavior differences. Such low adoption rates indicate that various factors beyond technological affordances play essential roles in the diffusions and adoptions of fintech. External environmental forces, such as the political and regulatory environment, the extent of infrastructure and technology development, and the level of economic and financial development, combine to define an overall environment that either encourages or inhibits individual consumer behavior.

1.6.1. Demographic Influences

About 40% of the world's population is aged 25 or younger. Technology often helps incumbents catch up to their younger competitors, but it's quite clear that technology founders have a significant first mover advantage over technology laggers. Today, financial technology founders will be in their late 20s to early 30s. They have the creative mindsets of today's youth and yet the experience of their 5-10 years in today's technology environment. They tend to have established relationships in the financial service industry, whether working for startups looking to partner with older companies for customer acquisition, funding, or technology transfer.

On the demand side, young consumers' comfort with phone-based transactions and lower account balance has convinced banks to launch mobile-only banks targeting millennials. These new financial services are fast-tracking bank accounts for first-time users, with minimal paperwork, through biometric identification verification for consumers who have smartphones but do not have bank accounts. These new services help young people start filling in their financial account histories. As they graduate to adult life, young people may find themselves naturally increasing their balance and requesting products for student loans, car loans, mortgages, and investments. With their focus on mobile-only functionality and lower prices, young, web-native fintech entrepreneurs may slowly grow their businesses to fill these users' needs, and may then grow into a financial services conglomerate over time. This is the base case for vertical specialization and specialization over time.

1.6.2. Trust and Security Perceptions

Understanding trust is critical to understanding the adoption of new technologies. In the fintech context, it is important to consider the key factors that affect the way consumers engage with financial services technologies. A major factor influencing consumer decisions is the perception of risk. In general terms, risk perception can be referred to as the subjective judgment that people make about the severity and probability of a risk. Consumers can perceive risk negatively, as a major worry blocking transaction

completion and resulting in avoidance strategies; or positively, as a judgment about probabilities and severity that will induce a willingness to pay so that the transaction can go through. Risk perception is composed of two different concepts: the probability of someone incurring loss and the severity of the loss if an adverse event happens. While negative risk perception diminishes the desire to transact, positive risk perception relates to the degree of trust in transactional partners and the transactional technology, increasing consumers' willingness to pay a premium price to continue using a service.

Risk is more influential on adoption decisions when it is perceived as high. Financial service considerations will likely trigger higher risk perceptions than other industries, since they involve monetary properties that might be stolen or manipulated. Cryptocurrencies have been differentiated by the level of actual implementation. Hypercryptocurrencies are not implemented, but are concept; cryptocurrencies are implemented but are not scaled; and cryptocurrency networks are developed and available for use by external parties. Understanding consumer response to risk of the different currencies in these stages of development is important. Research suggests that brand trust is a contributor to consumer acceptance attitude towards crypto adoption, and an additional challenge for cryptocurrencies is to convince consumers of their security.

1.7. Case Studies of Successful Fintech Companies

This section explores three successful companies in the Fintech world in particular, focusing the study on companies that have successfully carved out a niche market by providing specialized products or services: PayPal, Square, and Robinhood.

PayPal is a digital wallet solution, enabling individuals and businesses to make payments and send money online. It is a payment system used by millions of businesses across the globe, and it has revolutionized the way businesses and consumers make payments. Founded in 1998, it has ensured that businesses and consumers can connect hand-in-hand and contributed to the global expansion of e-commerce. Behind PayPal's success lies its performance: with an average of 322 payment transactions completed every minute, it has successfully processed $1,396 billion worth of payments in one quarter alone in 2021, accounting for nearly half of its parent company's total revenue.

Square is a merchant processing solution that allows small- to medium-sized businesses to accept credit card payments through mobile devices. Led by its CEO, the service was launched in 2010 to give businesses easy access to processing payments while avoiding some of the costs associated with terminals. Equipped with a small reader, it allows any smartphone user to accept payments, even at remote locations where there are no card terminals, through its application. With its transparent pricing and ease of use, Square has gained popularity with both businesses and consumers; in the first three years

following its launch, transaction volumes had exploded to over $6 billion per year, drawing investment interest from various sources.

Robinhood is a commission-free stock trading application that is aimed primarily at millennials who are new to investing. Launched in 2013 by co-founders in a bid to disrupt the financial services industry, the Fintech unicorn enables clients to buy and sell stocks on a mobile device without paying any commissions. Protected under the Securities Investor Protection Corporation, Robinhood is the first of its type in the United States and has gone one step further: aside from stock trading, it also offers access to options trading, Bitcoin and Ethereum trading, and ETFs. Recently, it has also expanded its services to allow for cryptocurrency trading. Financed via market makers, it is currently valued at $11.7 billion.

1.7.1. PayPal

The financial technology (fintech) industry is an exciting near trillion dollar market that is being rapidly adopted worldwide. This niche market has a complex web of competitors from old traditional global banks to new challengers throughout nearly every aspect of everyday financial services including the global payment network, international remittances, retail bank branch networks, money transfers and management, payment processing for merchants, insurance services, alternative finance lenders, investing services including online brokers, as well as cryptocurrency based transactions. This is a fiery playground for fintech startups, incumbents from related industries seeking expansion, and big tech players disrupting the market from outside.

Founded in December 1998, PayPal was created to develop and market a device to allow cryptography to be used on Palm Pilots for digital wallets. After it developed an actual functional digital wallet before the device itself, it launched a digital wallet service in late 1999. Failing to get traction with their device but achieving success with their service, the company shifted focus. Following multiple successful rounds of investment, PayPal created a new version of its service in 2001, focusing on both B2C and C2C transactions, successfully integrating with eBay for sales on the auction website. This proved critical to fueling its rapid growth up through 2002.

In February 2002, PayPal went public. Credit card fraud rampant on eBay was killing eBay sellers, generating trust concerns for buying on eBay. PayPal solved the problem and became the high profile pick for both consumers and sellers for paying and being paid on eBay. Only four months later, eBay acquired PayPal for $1.5 billion, completing the acquisition in October, in order to protect its dominant payment system from being eclipsed. Since then, PayPal has become the dominant online payment service throughout the world.

1.7.2. Square

Many people use Cash App like a prepaid debit card, something which Square never intended. When Cash App allowed customers to make direct deposits into their Cash App account, it was modeled after the prepaid debit card allowing customers to receive payments into the account, claim their money on a Cash Card, spend their money, and sometimes pay fees. The next phase in the company's efforts to compete came when the prepaid visa cards became the Cash Card. Subsequently, the prepaid debit card aspect faded, even though another service launched its own prepaid card at about the same time. For Square, it was an opportunity to write the wrongs of the initial market placement and try to become a digital bank. Cash App allowed customers to make direct deposits into their Cash App account, and either keep the money there or deploy it via the Cash Card.

In September 2018, a financial authority offered Square the first electronic money license for its British operations. A few months later, customers lost access to another service when they switched to a new firm and launched the first peer-to-peer payment processor using only email and phone numbers. Instead of cashing a check, customers could use Cash App and keep the money in the app until they request a Cash Card. Square is positioned competitively against another service, which had massive problems getting its product functional in the last two years, and its new peer-to-peer crypto payment processor running on a new technology. Other services actually have separate prepaid cards.

1.7.3. Robinhood

Robinhood was founded in 2013 by Vladimir Tenev and Baiju Bhatt. The goal of Robinhood was to bring stock trading to the masses. Following the financial crisis, the world had witnessed the magic of the digital revolution and access to information. Even small investors could buy and sell stocks directly through their computers. However, the major players in the industry had developed business models based on prohibitive commission fees and weeding out of small investors. This had led to a situation where small investors could not profit from this technological advance, and the founders sought to fix that. The name "Robinhood" itself is derived from the famous folklore character Robin Hood.

Robinhood has been popular among millennial investors and has been credited with introducing many first-time investors to the stock market. In 2015, Robinhood had 200 thousand users. By 2016, this had increased to a million. This rapid increase in interest has also led Robinhood to expand its offerings to cryptocurrency trading and other financial services. In 2019, they crossed 10 million in users and was valued at 7.6 billion. Their clientele had expanded to include mostly anyone aged between 18-35, who

expressed interest in investing as a wealth-building strategy but were disillusioned with the existing financial services companies who charged high commission fees. Interest in the stock market among young investors had exploded due to social media and increased personal savings during the pandemic, and they sought to capitalize on this burst of enthusiasm.

1.8. Future Trends in Fintech

The future of fintech promises to deliver innovation that will drive new business models, change rules of engagement, and provide a host of products and services that push barriers as well as disruption. But while disruption has been a key theme for the past decades, distributing the spoils of this innovation to include those who have been excluded from the privileges that financial services create has arguably received less attention. The two key themes in our view that, going forward, we could see defining boundaries for the innovation in fintech are Decentralization and Inclusivity. In this section, we cover these two themes in greater detail, and discuss how the said mechanisms likely to enable fintech innovation in the future, while discussing the associated challenges as well.

Decentralized Finance (DeFi) – Defined broadly as blockchain-based financial services to replace or augment traditional finance. DeFi removes the need for trusted intermediaries in the traditional banking system – banks, savings and loan associations, insurance companies, stock exchanges, and the like allow market participants to secure transactions, which eliminates the friction for engaging in transactions. Incentives and alignment of interest drive their success. However, DeFi has been mired in alleged cases of fraud, abuse, hacking and poor risk management. 2022 was often called the "winter of DeFi", and in many ways it deserved the title. However, all over the world, DeFi is forcing the traditional players to take a look at their workflow and business models, not least because creative destruction is at the heart of what drives change in any industry.

1.8.1. Decentralized Finance (DeFi)

More than anything, 2020 was the year when could have taken two different pathways of deploying governance tokens. In the DeFi summer of 2020, there were projects who just gave money in an untrustworthy centralized model in order to mobilize liquidity for riskier protocols. 2021 was about questioning: was this approach a good one? What about instead of having a flying governance who goes to a faraway land, where no one has any brand, gives tokens for free, migrate liquidity, and brings like 89% of their liquidity to an untrustable place. So that was DeFi year one, people talk about DeFi summer. But it was not as interesting as if you compare it with all the other summers

who followed. It was based on untrustable coins, and weird governance models, like moving aphorisms from one place to each other and becoming rich.

The first chapter of decentralization was about having boring APIs monopolized by inflexible liquidity provisioning like you understand from the beginning, you're a little bit investing in Aave, you're going to invest for years there. I do not want to say that users are going to invest their money to move between market makers and liquidity providers. So this caused us to have less quality and more dangerous. It allowed this explosion to happen in like 10 or 20 DeFi ideas, who could centralize almost all of the decentralized capital for one month or two. Until finally, it was decided to apply the same methods and follow the same route again. So governance tokens are under discussion, DeFi 2.0 is about to evolve, exploring what is the adaptability of giving governance. And asking how to create something better.

1.8.2. Sustainability in Fintech

The irrepressible march of climate change demands that few sectors are left unchallenged to reconsider where they fit in the net-zero carbon road map. The military, air travel, and oil, gas, and mining, amongst others, are fully recognized by a hostile public and policy makers alike as landing heavy on the carbon dumpster. If we then turn the spotlight on other less obvious sectors, fintech stands out: an arms-length player in the financial intermediation game dependent on little more than screens and servers, using light consumer interfaces and invisible backend operations. It's easy to see how an industry which appears insulated from global heating impact could look for short-term gains, skimming off traditional bank revenues and blithely passing around cashless credits. However, a sense of responsibility amongst innovators suggests that this is not how things will eventually pan out.

Innovative pressure, lending, and deposit taking, is being exerted on traditional banks from the fintech outside. Banks still dominate: they manage liabilities of 133% of GDP in relation to their lending of 66% - basically accepting deposits and making loans in relation to one another. The central sticking point is deposit taking. Fintechs have had to build their businesses round referrals, charge for a service, or lower interest rates. Such indirect methods tend to raise questions of long-term effect sustainability. There is hope: Fintech could be an important contributor in helping banks reduce their costs by the automation of back-office and customer service, allowing them to charge lower fees, broaden their customer base, and ride the higher deposits push by declaring ESG and sustainability goals. In turn, banks could make the transition less financially demanding by giving fintech companies a share of income.

1.9. Challenges Facing the Fintech Industry

Fintech has brought major changes to computing, socializing, traveling, studying, and shopping. It has disrupted traditional financial service models and enabled billions of unbanked consumers to gain access to services. It creates a social impact that enables higher purchases and lowers investment and transaction costs. Fintech has also brought a new level of convenience, security, and confidentiality in the conduct of financial transactions. However, the companies in this sphere are to confront a whole range of new forces and challenges that could impede growth. As the fintech industry matures, both the start-ups and the investors are facing headwinds in the form of an uncertain economic climate, rising interest rates, attacks by larger rivals, consumer reluctance to switch to digital-only banks, and disruptions from shifting regulatory priorities. A loss of enthusiasm for digital banking is already apparent in the public markets, making it difficult for fintechs to raise new equity capital and fully take advantage of their growth opportunities. Change is also in the air for investors, who must reassess their expectations about when and how much the market will charge for new initial public offerings of digital banks. Among nascent fintech companies, talk is already surfacing that challenges could lead to a wave of consolidation, with stronger fintechs acquiring struggling peers. In such an environment, the prospects for fintech innovation may dim. Investment dollars are drying up, and trying to manage profitable growth expectations is clearly the order of the day. Fintechs that can demonstrate profitability and core product stickiness will be in a position to attract capital.

1.9.1. Market Saturation

The current ecosystem of fintech is relatively saturated. There are thousands of companies already providing value-added services in consumer and B2B financials. As time progresses, it has become increasingly difficult for a startup to differentiate its product or service and attempt to fill an existing gap. Within fintech, there are a few categories that young firms typically focus on. For consumer finance, online banking solutions, savings tools, investment apps, and credit services are very common. Within B2B services, vertical-specific payments, employee expense management systems, insurance tools, and cross-border payment systems are present. Though there have been innovations in decentralized finance, they are still far from mainstream adoption.

Most startups entering the fintech ecosystem are generally looking to replicate the success of existing, well-funded companies. Others are looking to build B2B tools that are used by fintechs for services that are facing market saturation. For example, while there are already a dozen companies assisting businesses for payment processing, there exist 2–3 firms specifically focusing on providing payment processing solutions that these payment giants use. The fintechs processing payments are able to charge a lower

fee than their larger competitors. As competition increases, these firms are beginning to move out of their core target businesses and enter other B2B segments of industries to gain transaction volume and business value. In essence, we are still where we were almost a decade ago, just with more players on the field. The fintech sector is trying to create new, innovative versions of existing tools rather than new products.

Within a very common product group fintechs compete by launching different variations of essentially the same existing concept, hoping to create the best execution of it. For example, investment applications, savings tools, credit companies, and neobanks have long existed and have been successful. However, there are also poorly executed firms in most sectors who have not created value for either users or the broader financial landscape. Consequently, the capital allocation market must be careful not to provide funding indiscriminately to a diverse set of companies in a saturated environment, or risk falling prey to moral hazard.

1.9.2. Technological Risks

Cyberattack, crimes, data leaks, and security problems are one of the main concerns for many fintech start-ups. Unlike traditional technologies, which can slow down in the event of a security problem and have additional manual inspections, fintech operations need to act in real-time and additional checks can be too expensive. Moreover, in addition to traditional cyber companies, violations coming from organized crime and states need to be addressed. Recruitment of top-level cybersecurity talent is complicated and expensive. Entrepreneurial firms may find themselves an easy target for more capable players who can afford an aggressive attack. New fintech operations need to ensure that small operational problems, which might be insignificant for a mega-player, can have dire consequences for a fintech with limited resources. Addressing cybersecurity problems will require core innovations in the area. However, cyberattacks are not the only area of technological risks. Fintech may disrupt problems in the operation. Policy disruption draws the attention of the fintech sector to the easier and more profitable problems, which may be saturated for a long time, ensuring only limited technological problem-solving efforts.

Moreover, inadequate testing of systems. The technological development speed of financial technology is fast. Fintech drives the potential of short-term, partial, and even reverse selection of projects and the inadequate system testing. To comply with rapid technology testing and verification capacities, the fintech startup activity weakens the primary laws of technology. The users' experience will distort the product feedback information and both users and product suppliers with limited experience in technology and user testing that limits possible product development. Actualized difficulty of early project increments compared to graduated product extensions. Technology prediction

presents advantages and odds of technology pollution and unexposed technology risk. Individuals in a small guide investment consortium undertake uncovering.

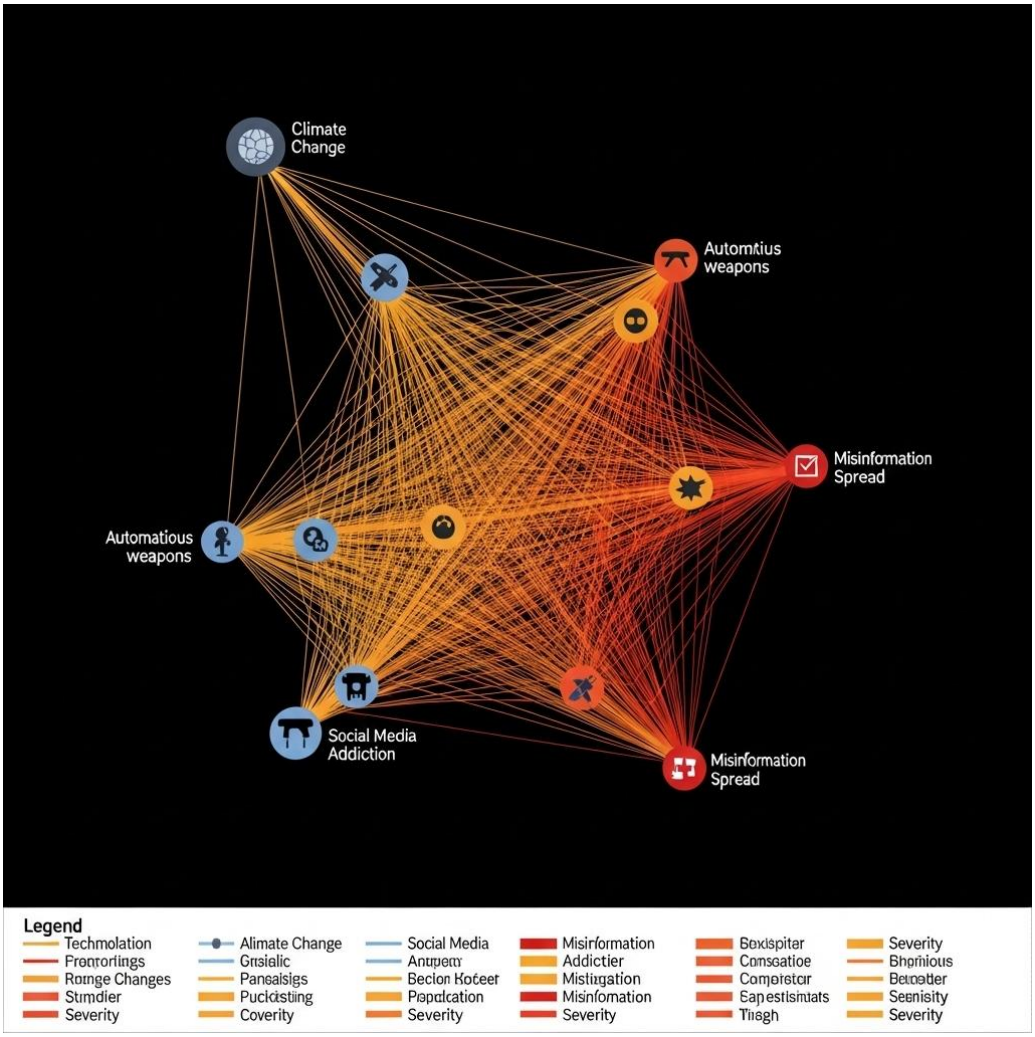

Fig : This graph presents an intricately designed, professional illustration of interconnected technological risks

1.10. Global Perspectives on Fintech

A unique contribution of this volume is its discussion of fintech in global terms, presenting perspectives from the Middle East, China, and Africa. Groups of fintech applications explored in detail include payments, blockchain-based solutions, equity

investment, and banking. Global disparities in the concentration of fintech are highlighted and its functions of promoting inclusion, rewarding loyalty, and creating regulatory dilemmas are emphasized.

The majority of fintech investments, financing startups in sectors from payments to blockchain-based remittance solutions, are being focused into developing markets. In these regions, concentrated investment into solutions suitable for local economies is seeing quick uptake, driven by local need. In these markets of poorer populations, finance is being embedded in wide-ranging applications, from movement between informal and formal banking via mobile payments to automated AI-based prediction systems for ecommerce companies requiring advance verification of customers' ability to conduct business on credit. Examining solutions from Thailand to Ukraine, companies ranging from the Thai company able to raise sizeable funds to expand into blockchain-based cross-border payments, to local players in emerging markets, such as a fintech startup which in 2017 raised funds for a remittance-based gift card to be used only with specified merchants, we explore the divergence between needs-driven solutions in emerging markets and the investment of capital, motivated by the prospect for financial returns, into potential unicorns in advanced markets.

Interest in fintech innovation for solving the economic problems of speed, cost, and transparency of cross-border payments has grown. In emerging markets fintech companies offer local payment solutions able to link quickly to global payment systems. Elsewhere established fintech players have been bootstrapping, forging global alliances to gain entry into Asia, to penetrate new markets, to expand services, and to lower costs. Such expansion efforts illustrate that such fintech companies are competing, eying the larger pie by charging lower fees, against banking, which has long exploited high fees to solve the problems of its captive users.

1.10.1. Fintech in Emerging Markets

Fintech-enabled disruption and innovation in financial services is especially relevant to the large unbanked and underbanked populations of emerging markets. The unbanked include those without any bank account capability, while the underbanked utilize physical cash and cut-off financial services and products, and are subject to higher transaction costs due to the use of alternative services such as remittance, currency exchange, and micro-loan shops. The majority of these target populations of hundreds of millions, if not billions, are found in developing geographies of Asia, Latin America, Africa, and Eastern Europe. The importance of fintech in these markets revolves around the supply of offering capabilities and demand for products and services, often at extremely low costs compared to traditional banking institutions.

The provision of products and services, for example, payments, credit, investing, and insurance, is primarily driven by internet and mobile penetration, as well as the widespread proliferation in the use of smartphones with increasingly more computation power and capabilities. The advent of the app economy, and accompanying software development kits by technology firms, has allowed the rapid development and implementation of robust solutions at low operational and distribution costs. Technology firms also leverage the unique identifiers, biometric authentication, and deep-learning and machine-learning algorithms made possible by mobile devices and software capabilities to assess credit risks in lieu of traditional credit scoring agencies. Thus, the oft-cited lack of alternative data in emerging markets is being overcome by centralized alternative credit scorers, and localized fintech firms offering analytics capabilities as service providers. Through demand aggregation, the fintech firms are also able to provide lower pricing for financial products and services for the unbanked and underbanked population segments.

1.10.2. Cross-Border Payments

Cross-border payment methods have proven to be of great importance and increasing in relevance since their inception. Traditional cross-border payment flows relied primarily on financial institutions, such as correspondent banks and financial institutions that process international payments through traditional payment networks. Due to increasing costs and slow processing times, the traditional cross-border payment solutions have increasingly faced competition from specialized businesses that leverage their unique assets. For instance, several firms adding unique value and seeking to serve an underserved segment of the market preferred to provide services only to specific segments, such as freighter and business travelers with adjustable foreign currency exchange rates for transfers on the foreign currency market or international money transfer services for unbanked workers.

This selection of solution providers has kept inflating fees, contributing to facilitate forex transactions to send money tracking the effect of foreign currency conversion on the overall attrition of lower-income workers. If done through traditional financial institutions, these transactions will have to pass through dozens of intermediaries and come along with several lines of fees, at each one of the entities involved, increasing eventually the foreign exchange margin down the pipeline. From an outward perspective of analysis of the overall local market, this could be a simple remittance. However, from the perspective of intentional cross-border payment, there is a degree of complexity in terms of its internationalization that must be explored in order to understand how the value proposition of fintech innovation focuses on financial inclusion regarding lower-

income workers and how it disrupts the market for international money transfers for unbanked workers sending remittance money back.

1.11. Conclusion

Much has been said and written about fintech. However, what happens when discussing fintech disruption becomes a roadmap to the future of traditional financial institutions? Why the overpriced mantra about how much profit banks' activities would give way to the new fintech companies that would displace perfectly risk-calibrated old players? The quantity of capital that this new kind of intermediaries is able to collect and the capacity to unlock networks seem to be the straightforward answer. The disruption is not the disaggregation of banking-related businesses that traditional players often delegate to partners. The disruption in the financial services arena is represented by the wish to take it all with the power of the mobile only and the new technologies. Old banks compete with the power of the same trust that keeps their doors open and stationary in holding customers' funds. The consolidation of these entities' balance sheets with fintech partners shuts the door to any formidable competitive advantage. The superior risk analysis achieved through big data and quantitative evaluation is still leveraged by agents. It is time to cut out the middleman.

Let us conclude with the fact that, regardless of the kind of institution we are talking about our statements apply to whatsoever entity provides financial services of any nature, private or public and has a laminated entity, the level of service for retailers vs. corporations is equitable, if you are an SME or an entrepreneur you probably suffer from similar problems and that neither directors' nor regulatory bodies should disregard these considerations. The fintech are here to stay due to a willpower to take certain businesses of any institution be them banks, retailers, payment processors, asset managers, credit brokers, that is, whatever is able to interact with the consumer and create the necessary trust to collect his or her disposable income and assume any risk on his or her behalf or propose the right guidance at the right time. The amount of unmet demand within the consumers and corporates is enough to allow this disparate ecosystem to coexist with all actors and fill the space with their service offering.

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