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Financial Technology and Global Supply Chains Integration towards a more Efficient and Cost-Effective Trade System

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Abstract

Technological innovation serves as both a driver and beacon for adaptability, promising to alleviate some of the challenges posed by geopolitical tensions and macroeconomic pressures. In this research, we aim to explore the advantages and disadvantages of using financial technology. Ultimately, we conclude that fintech is a comprehensive tool for enhancing financial transactions. By utilizing fintech, consumers and businesses can accelerate and simplify financial transactions without delving into complexities, making the process more secure, trustworthy, and private. The adoption of technology across global supply chains makes the regulation of trade technology a crucial element in its widespread implementation. Mechanisms for safeguarding trade-related data, ensuring fair competition, and providing security and privacy for consumers require development and testing, alongside solidifying legal clarity to resolve potential disputes between trading partners. As new fintech applications have not yet been subjected to the same security laws, caution is needed when dealing with them. However, the benefits of working with a fintech company far outweigh the perceived risks.

Keywords: Fintech, Digital Transformation, Financial Inclusion, Foreign Trade, Supply Chains.

INTRODUCTION

Financial technology (fintech) has witnessed rapid growth in recent years, driven by multiple factors such as technological advancements, increasing demand for financing, shifting customer expectations, rising supportive fintech legislation, and growing conviction in fintech's financial and investment roles. Fintech has demonstrated its added value for individuals, organizations, small businesses, and society at large. According to a report by CB Insights, global investment in fintech companies reached $31 billion in 2019 alone, a significant increase from $1.8 billion in 2010. The fintech market is expected to grow even faster, with projections reaching $460 billion by 2025. Fintech companies offer a variety of services, including digital payments, online lending, investment management, and insurance. Given this context, the central question arises: How can fintech and international trade contribute to creating a more efficient, secure, sustainable, inclusive, and cost-effective global trade system?

Study Objectives

This research paper aims to:

- Highlight the role of fintech in providing innovative services to financial and banking institutions.
- Examine the impact of digitization and its applications in the field of foreign trade.
- Explore the concept of supply chains, their characteristics, and types.
- Assess the prospects of supply chains in light of technological advancements.

Study Importance

The importance of this study lies in shedding light on the key advantages that digital financing provides in supporting global supply chains and value, which represent the new face of international trade.

Methodology

The study adopts a descriptive approach, relying on books, articles, studies, and websites related to the topic to form the theoretical framework. An analytical approach is also employed to examine available data on the effects of fintech on supply chain management (SCM), international trade technologies, and their mutual impact.

1. Financial Technology – An Overview of Its Nature and Concepts

Fintech has brought about significant transformations in both Arab and global financial systems, enabling the fulfillment of many financial needs, services, and operations through advanced methods that increasingly compete with traditional financial services in terms of speed and cost. Emerging fintech institutions have succeeded in offering a wide range of financial services, including digital payments, cryptocurrencies, money transfers, lending, crowdfunding, wealth management, and insurance services. These innovations have a profound impact on the future of traditional financial services, leading to competition between conventional financial institutions and fintech companies. This, in turn, presents administrative and regulatory challenges for banking sectors and regulatory authorities, highlighting the growing need for adequate administrative, legal, financial, and technological requirements to cope with these developments. Electronic money holds significant importance in the operations and processes of the fintech industry, serving as a foundational component in many of its transactions.

1.1 The Emergence and Evolution of Fintech

While the term "fintech" may appear modern, its roots can be traced back to the issuance of the first credit cards in the 1950s, as well as the advent of ATMs, electronic exchanges, and online trading platforms. In the 21st century, the term was used to describe computing devices and banking systems that facilitate data exchange between different branches. Thus, the use of technology in financial transactions began in a rudimentary form long ago, as seen with the introduction of ATM services in 1967. Today, the application of technology in financial domains has expanded considerably, particularly with the emergence of smartphones and the widespread availability of the internet after 2010. With advancements in software and applications, people can now perform activities that were once only possible through banks and financial institutions. Fintech now presents a clear challenge to traditional financial and banking systems, with new fintech companies providing alternative methods for transactions. It is worth noting that the term "fintech" was first used in the early 1990s as part of a Citigroup project aimed at accelerating technological collaboration between various sectors, especially the financial and technological industries. Fintech is one of the most recent technological advancements in the world of finance and business, and it has brought about noticeable changes in financial sectors across many countries worldwide (Oqasim & Hamdi, 2019, p. 404).

1.2 The Nature of Financial Technology (FinTech)

Fintech refers to the early stages of the digital economy, a period marked by technological innovations such as computers that enabled individuals to buy and sell products and services online. The early digital economy was characterized by several new technologies, including the internet, email, and text messaging, which allowed people to engage in online banking, shopping, and other tasks that had previously been impossible to perform on paper (Harfoush, 2019, p. 731).

1.2.1 Definition of Financial Technology

Fintech is a combination of the words "financial" and "technology" and refers to financial technologies. This term is used to describe the innovations that have revolutionized financial transactions in recent years (Ben Alqamah & Saihi, 2018, p. 104). Fintech can be defined as follows:

- A combination of financial services and information technology, encompassing a mix of technological tools, electronic platforms, and economic systems that provide financial services with high efficiency, affordability, and easy, rapid access (Harfoush, 2019, p. 731).
- Any technological innovation employed in financial services with the goal of impacting financial markets and institutions, and delivering financial services. Fintech is a natural result of the intersection of financial processes and modern technology (Bouafia & Boualaqa, 2019, p. 05).

- Innovative ideas aimed at improving the management of financial services by proposing technological solutions for various business scenarios. These innovative ideas may also lead to new business models (Harfoush, 2019, p. 730).

- Any financial innovation that may result in new business models, applications, processes, or products (Oqasim & Hamdi, 2019, p. 401).

1.2.2 Goals and Motivations for Using Financial Technology

Banks aim to achieve two seemingly contradictory goals through the use of fintech: continuously attracting new customers while simultaneously reducing the costs of banking services. Additionally, the use of centralized database systems plays a fundamental role in solving the high-density issues related to managing large numbers of customer accounts, employee loans, and other retail loans. As a result, it is expected that competition among banks will intensify, as they will be better equipped to provide improved services to their clients. This leads to several challenges, including the following (Zawawid & Hajjaj, 2018, p. 77):

- **Retaining Current Customers and Attracting New Ones:** This largely depends on the image the bank projects to its customers. By using technology, banks can offer a wide range of banking services around the clock, eliminating the need for customers to wait in long lines. In other words, banks must strive to provide greater convenience to their current and prospective customers compared to their competitors, which offer similar services.
- **Diversifying the Service Mix and Expanding Service Offerings:** Technology provides solutions to this issue in two key areas:
  - Offering a broader range of services to current and potential customers, enhancing customer satisfaction.
  - Increasing the number of services that can be sold to customers, thereby boosting bank revenue (Oqasim & Hamdi, 2019, p. 405).
- **Reducing Routine Work and Administrative Burdens:** The use of technology reduces routine tasks and administrative burdens for bank employees, allowing them to focus on work that requires specialized skills. This leads to improved profitability for the bank by freeing up employees' time to process financial transactions that typically take longer to complete.
- **Introducing and Promoting New Services:** Technology plays a key role in introducing new services and promoting them. It also provides specialized employees, such as those managing investment portfolios in investment banks and institutional sectors, with better information sources to support decision-making processes.

1.2.3 Importance of Financial Technology

Among the most significant points regarding the importance of fintech are the following (Bouafia & Boualaqa, 2019, p. 06):

- **Financial Inclusion:** Fintech applications have facilitated the financial inclusion of millions of customers by providing easier access to financial services.
- **Boosting GDP Growth:** Fintech enhances GDP growth by improving individuals' and companies' access to a wide range of financial products, services, and credit facilities.
- **Enhancing Compliance with International Laws and Interbank Cooperation:** Fintech supports efforts to combat terrorism financing and money laundering while also increasing cooperation among banks in terms of compliance with global banking regulations.
- **Reducing Costs and Time for Banking Operations:** Fintech reduces the costs and time associated with various banking operations by automating processes and minimizing human intervention. This allows banks to provide low-cost, convenient, secure, and easily accessible services to their customers, in contrast to traditional financial transactions.

1.2.4 The Importance of Financial Technological Innovation for Banks

Technological innovation can be defined as the adoption of new technology that is integrated into operations or products, enabling long-term success in the market by achieving highly competitive advantages. Since technology evolves at an incredibly fast pace, technological innovation becomes the most effective way to meet market and customer demands (Waheeba & Ben Qaddour, 2018, p. 20).

A. Concept of Financial Technological Innovation

The Organization for Economic Co-operation and Development (OECD) defines innovation as the implementation of a new or significantly improved product (good or service), a new marketing method, or a new organizational method in the practices of the organization, workplace arrangements, or external relations. In financial terms, innovation and creativity have the same meaning in the financial and banking industry. FRAME & WHITE define financial innovation as an organizational product or innovation that reduces cost or risk for the bank or enhances services within the financial system (Bass & Vali, 2020, p. 50).

B. Motivations for Banks to Adopt Financial Innovation

One widely accepted theory regarding the motivations for banks to adopt financial innovation posits that the primary driving force is achieving efficiency, reducing costs, and minimizing regulatory constraints, including taxes and accounting agreements. There are several other key drivers that push banks to focus on financial innovations (Waheeba & Ben Qaddour, 2018, p. 25):

- **Transition from Financial Liberalization to Financial Innovation:** This transition helps lift financial restrictions on banks, allowing them to enter new markets.
- **Innovations in Financial Technology:** These include ATMs, online banking, mobile banking, personal computers, and mobile banking services. These technologies enable banks to serve customers more cost-effectively and make banking services more beneficial.
- **Growing and Evolving Financial Desires of Customers:** This demand is inevitable, as it results from improved living standards and increased cultural awareness within society. Consequently, banks must track these changes and respond quickly by improving current products and introducing new financial services that align with modern developments.

C. The Financial Sector in the Era of Financial Technology

The Financial Stability Board (FSB) views fintech as financial innovations that use technology to create new business models, applications, processes, or products that significantly impact financial markets and institutions. These innovations aim to find creative solutions in areas such as banking finance, lending, and innovative financial instruments to satisfy customers and attract more clients while improving financial services, enhancing the efficiency of financial institutions, and achieving customer satisfaction. Additionally, fintech can help achieve other goals such as financial stability, economic diversification, and increased growth (Sami, 2022, p. 124).

One of the main objectives achieved by IT applications in banking sector innovation is the provision of new services, increased productivity, and improved flexibility and services. These include developing financial and banking services, such as introducing existing market services that are new to the bank, such as financial planning services and revolving loans for small businesses. The development of banking services is a comprehensive and integrated process aimed at enhancing the bank's competitive strength and, in turn, increasing its long-term profitability. Marketing activities are also a vital component for sustaining and enhancing the bank’s business, utilizing modern technology and information techniques to meet the needs of current customers and attract new ones. This approach helps deepen the bank's business relationships and strengthen its interaction with customers (Waheeba & Ben Qaddour, 2018, p. 82).

D. Innovation as a Mechanism for Developing Banking Services

Innovation in banking services refers to the development of new financial services or the modification of existing ones to meet the needs of users and the external market. This can involve introducing new financial services, such as insurance, or modifying existing services, such as extending service hours. Key areas where innovation plays a fundamental role in the development of banking services include e-commerce, financial derivatives, and syndicated loans (Harfoush, 2019, p. 736).

The development of a financial service generally follows two main pathways (Waheeba & Ben Qaddour, 2018, p. 89):

- **First Path**: The bank develops and innovates new services entirely on its own, utilizing its physical, intellectual, and human resources.
- **Second Path**: The institution commissions specialized agencies in the field of service development, tasking them with finding the most successful ways to develop new services.

1.2.5 General Risks of Financial Technology for Banks

There are several risks associated with the use of fintech in the banking sector, including:

A. Information Security Risks

The reliance on modern technologies can increase the interconnection between commercial banks and various external entities that may not have the same level of electronic security protections as those available in banks. This can raise the likelihood of sensitive customer data being exposed to potential breaches. As a result, banks and fintech companies must prioritize the need for effective management and monitoring of potential cybersecurity risks (Ben Alqamah & Saihi, 2018, p. 54).

B. Risks of Outsourcing

Banking IT systems may not be sufficiently adaptable to evolving fintech technologies, leading banks to rely more heavily on external companies. This increased reliance on third-party services can elevate risks related to data security and privacy. The main challenge for banks lies in their ability to monitor and manage risk activities conducted by third parties outside their own institutions.

In conclusion, fintech has emerged as an inevitable result of the information revolution, and several factors have contributed to the rapid spread of these advanced financial services, the most significant of which is the growing customer acceptance of such services. Fintech services have developed through three major stages, each defined by the type of services offered at that time. Several foundational elements are required to fully capitalize on these financial services, the most important being a sufficient demand for these services. However, the technological applications of financial services are not without risks, the most critical being information security risks and the risks of outsourcing. Therefore, banks must take the necessary measures to mitigate these risks, in coordination with fintech companies (Ben Amara, 2004, p. 16).

1.3 Types of Financial Technology Companies

There are many different types of fintech companies, as the fintech industry encompasses a wide range of rapidly growing firms that use technology to disrupt traditional financial practices. From online payment processing to personal finance management and investment solutions, these companies offer new and improved ways to manage finances. Fintech companies focus on areas such as app development, venture capital, and digital currencies. Today, various types of fintech companies exist. Some focus on developing applications that allow users to perform tasks like banking or shopping, which were once difficult or impossible on paper. Another type, known as venture capital, enables companies to raise funds from investors to develop new products or services (Basyouni, 2004, p. 58).

1.3.1 Payment Processing

Digital payment processing companies provide solutions that eliminate the need for physical cash or traditional credit/debit cards. Instead, they offer secure and convenient methods like mobile wallets, contactless payments, and peer-to-peer (P2P) payments. In addition to P2P transactions, B2B payment solutions simplify business transactions by offering enhanced security and cost savings. These tools include invoicing software, supply chain financing platforms, and virtual credit cards (Hamed, 2003, p. 55).

1.3.2 Lending

Online lending companies have revolutionized traditional lending by using algorithms and data analytics to make loan processes faster and hassle-free. They connect borrowers directly with lenders without involving financial institutions like banks or credit unions. These companies have also automated traditional lending processes, including credit scoring, risk assessment, loan origination, underwriting, and servicing (Raafat, 2003, p. 54).

1.3.3 Personal Finance Management (PFM)

Personal finance management apps have gained significant popularity as people become more aware of their financial matters. PFM companies provide solutions that allow users to categorize their expenses and track where their money goes, from budgeting to bill reminders and investment tips. Users gain a comprehensive view of their financial situation, helping them improve financial planning and decision-making. This helps individuals identify areas where they can cut unnecessary spending and provides insights into saving or investment opportunities (Hamad, 2005, p. 68).

1.3.4 Banking

Traditional banks face stiff competition from fintech startups offering banking technology solutions, such as Neobanks (digital-only banks) and core banking systems. Neobanks are known for being highly user-friendly, offering low fees, and providing a range of services such as savings accounts, loans, and investments. Their core banking systems also use AI-powered chatbots to automate customer service and streamline processes like account opening and loan approvals. In addition to traditional banking services, Neobanks offer innovative features like international bank transfers, accounting, and wealth management (Basyouni, 2004, p. 09).

1.3.5 Trading

Fintech is also transforming the investment landscape through platforms that provide easy access to financial markets for individual investors. These companies use technology to improve the efficiency and accessibility of trading through online brokerage platforms, allowing individuals to buy and sell financial assets on the go. These platforms utilize algorithms and AI to execute trades, directly connecting buyers and sellers without intermediaries, and automating back-office settlements for faster and lower-cost execution (Raheem, 2004).

1.3.6 Blockchain and Cryptocurrencies

One of the most common applications of blockchain technology is the creation of cryptocurrencies that operate on a peer-to-peer network supported by blockchain. In addition to creating alternative currencies, blockchain technology has helped fintech companies enhance security and efficiency in various processes, such as supply chain management, identity verification, and data storage (Raheem, 2004, p. 45).

1.3.7 InsurTech

Insurance technology companies, or InsurTech, use technological innovation to improve and simplify the insurance sector. These companies employ advanced technologies like AI, machine learning, and big data analytics to offer customized insurance products and services. By leveraging these tools, they can ensure instant claims processing, determine eligibility for reimbursement, and collect vast amounts of customer data to provide tailored insurance plans (Sami, 2022, p. 74).

1.3.8 Regulatory Technology (RegTech)

Regulatory technology companies, or RegTech, help businesses navigate complex regulations more efficiently and effectively while minimizing the risk of non-compliance. By automating compliance processes through digital technologies, RegTech companies save time and resources while ensuring accuracy in meeting regulatory requirements. Additionally, RegTech firms provide real-time monitoring and reporting, enabling regulators to better understand the industry and identify any potential risks or compliance issues (Omani, Hamdoush, & Kihli, 2020, p. 31).

1.4 Leading Fintech Companies in 2024

The world has witnessed a technological revolution impacting all sectors, including the financial industry. Below, we explore the success of the top 9 fintech companies in 2024 and what sets them apart in this ever-evolving industry.

- **Square:** Founded by Jack Dorsey and Jim McKelvey in 2009, Square went public in New York in 2015 and reached a market capitalization of over $100 billion. The company has expanded internationally into markets like Canada, Japan, Australia, and the UK (Ben Alqamah & Saihi, 2018, p. 25).
- **Visa:** Visa was founded in 1958 as BankAmericard, a credit card program created by Bank of America. Visa is now one of the leading players in global payments (Brish, 2023, p. 69).
- **Intuit:** Founded in 1983 by Scott Cook and Tom Proulx, Intuit has become one of the top fintech companies, known for providing financial management software (Ben Alqamah & Saihi, 2018, p. 89).
- **Fiserv:** Founded in 1984 by Leslie Muma and George Dalton to revolutionize financial services through technology, Fiserv has formed strategic alliances with major players such as Google, PayPal, and Microsoft to expand its global reach (Brish, 2023, p. 90).
- **Ant Financial:** Originally founded as Alipay in 2004, Ant Financial started as an online payment platform for Alibaba Group's e-commerce platforms. As of 2021, Ant Financial is valued at over $200 billion (Brish, 2023, p. 96).
- **Wise:** Formerly known as TransferWise, Wise was founded in 2011 by Kristo Käärmann and Taavet Hinrikus. In addition to offering business banking solutions, Wise provides "borderless accounts" that allow customers to hold and manage multiple currencies in a single account. Wise has raised over $1 billion from investors, including Valar Ventures (founded by Peter Thiel) and Virgin Group (owned by Sir Richard Branson) (Zawawid & Hajjaj, 2018, p. 46).
- **PayPal:** Founded in 1998 by Peter Thiel and Max Levchin, PayPal aimed to create a seamless way to conduct online payments. It merged with X.com, an online banking company founded by Elon Musk, in 1999. PayPal's main products include a customizable payment button for websites, a developer-friendly platform for accepting payments, and a peer-to-peer payment app called Venmo, among other services (Zawawid & Hajjaj, 2018, p. 46).
- **Coinbase:** Founded in June 2012 by Brian Armstrong and Fred Ehrsam, Coinbase is a leading platform for cryptocurrency and digital asset exchanges. The company reported $1.14 billion in revenue in just the first quarter of 2021 (Brish, 2023, p. 117).
- **Chime:** Founded in 2013 by Chris Britt and Ryan King, Chime is a digital bank that provides financial services through its mobile app and website. Chime offers a user-friendly platform for daily banking needs without any hidden fees. It has also partnered with Visa, enabling its customers to access fee-free ATMs across the country (Brish, 2023, p. 165).

2. Supply Chains – An Overview of Nature and Concepts

Global supply chains play a significant role in reducing the costs borne by companies in production. These systems help companies lower the prices of their final products or services.

2.1 Concept and Origin of Supply Chains

2.1.1 The Origin of Supply Chains

Supply chains have existed since ancient times, beginning with the first product or service created and sold. With the advent of manufacturing, supply chain management systems became more sophisticated, enabling companies to produce and deliver goods and services more efficiently. For example, Henry Ford's standardization of car parts was revolutionary, allowing for mass production that could meet the growing demands of a larger customer base. Over time, further innovations, such as the invention of computers, added more complexity and advancements to supply chain management systems. However, for many generations, supply chain management (SCM) remained a linear and isolated function, handled solely by supply chain specialists (Syed, 2021, p. 159).

2.1.2 The Concept of Supply Chains

Global supply chains are systems that companies use to produce products or services, involving numerous synchronized aspects that help businesses comply with various regulations. These systems provide the necessary tools and allow company employees to access the information they need to keep the system running, as well as the resources they use. A supply chain consists of many interconnected links, each dependent on the one before it, ultimately connecting the entire chain. The chain involves all goods and services required to assemble raw materials for the manufacture of a product or the delivery of a service. All of these activities and links are coordinated through the use of the internet and specialized computer applications, referred to as global supply chain systems (Al-Rifai, 2016, p. 58).

Thus, global supply chains consist of a set of interdependent links, which collectively form the entire chain. Naturally, all these links need to be coordinated, a task managed by supply chain management systems. These systems coordinate all activities and links within the global supply chain through the use of the internet and specialized computer applications, known as supply chain systems. Therefore, we can define the system as follows:

- It is a mechanism through which goods and services are distributed globally, maximizing profit and minimizing resource wastage, thus reducing potential losses (Hamed, 2003, p. 65).
- Supply Chain Management (SCM) is the management of the flow of goods, data, and finances related to products or services, starting from the procurement of raw materials to the delivery of the product to its final destination (Hamed, 2003, p. 66).

2.2 Supply Chains in the Age of the Internet, Technological Innovation, and Global Economic Expansion

The internet, technological innovation, and the explosion of the global demand-driven economy have transformed traditional supply chain concepts. Today, supply chains are no longer linear entities; instead, they have evolved into intricate networks accessible 24/7. At the center of these networks are consumers, who expect their orders to be fulfilled precisely when and how they desire.

We are now witnessing an unprecedented era of global business and commerce, characterized by constant technological innovation and rapidly shifting customer expectations. The best supply chain strategies today advocate for a demand-driven operating model that successfully brings together people, processes, and technologies, integrating them to deliver goods and services with unmatched speed and accuracy (Syed, 2021, p. 147).

Although supply chain management (SCM) systems have always been foundational, today’s supply chains play an even more critical role as indicators of business success. Companies that can effectively manage their supply chains to adapt to the volatile, technology-based business environment are the ones that maintain continuity and thrive (Hassan, 2020, p. 105).

2.3 The Importance of Flexibility in Improving Supply Chain Performance and Effectiveness

The challenges faced by supply chains extend beyond efficiency and cost management. Changing conditions can also impact regulatory compliance, meaning that SCM systems must be flexible enough to mitigate the effects of any shifts

within the supply chain, including evolving and diverse regulatory requirements, as outlined below (Al-Shater, 2019, p. 133):

- One of the most critical factors supply chains need to resolve their challenges is flexibility, as global supply chains currently lack sufficient flexibility.
- Global supply chains are vast and constantly evolving, making flexibility essential for enhancing their effectiveness.
- While global supply chains face numerous challenges, which extend beyond just costs and efficiency, the issue of flexibility is the most impactful.
- By adopting flexibility, global supply chains will be better equipped to handle various challenges, enabling them to adapt to evolving circumstances.
- Flexible global supply chains can mitigate the negative effects of changes, including compliance with diverse and shifting regulatory requirements.
- The smarter and more flexible a supply chain management system is, the lower the costs and the higher the efficiency, as well as improved compliance with constantly changing legal regulations and mandates.

2.4 Prospects and Future of Supply Chain Management (SCM)

The future of supply chains will be centered around rapid responsiveness and enhancing customer experience, focusing on understanding and managing both within a network rather than relying on linear models. Each node in the network must be flexible and adaptable to consumer needs while also managing factors such as sourcing, trade policies, and shipping patterns. Advanced technology will increasingly be used to improve transparency and visibility across the entire network and to enhance communication and the capabilities of SCM systems. The planning functions of future SCM systems will become smarter, taking consumer demand into account, with adaptability being essential (Al-Rifai, 2016, p. 69).

In the past, supply chain planning was a routine business function, and this cyclical nature will continue in the future. However, future SCM systems will achieve a more precise alignment between planning and execution, which is currently lacking in most companies. The need for speed and accuracy in SCM systems will increase. Therefore, it is crucial to prepare supply chains for the future by equipping them with intelligent SCM systems that can ensure the necessary agility and efficiency.

3. Technological Innovation and the Global Trade System – Mutual Impact

Technology has the potential to make trade more resilient, align it with societal values, create jobs, boost economic growth, and improve living standards. The rapid development of technology makes regulating trade technology crucial for its widespread adoption. Mechanisms for protecting trade-related data, ensuring fair competition, and providing security and privacy for consumers require continuous development and testing, alongside establishing legal clarity to resolve potential disputes between trade partners. Once these issues are addressed, aligning international policies and systems and ensuring equitable access to technology will present vast opportunities for inclusive development and economic growth. Research by the OECD has shown that digitizing trade alone could increase trade for small and medium-sized enterprises (SMEs) by 4.5%, a figure that rises even higher when digitization is coupled with regional trade agreements. In this section, we will discuss technological innovation, the restructuring of supply chains, and their mutual impact (Ould Muammar & Mansouri, 2020, p. 174).

3.1 Technological Innovation and Restructuring Supply Chains

Technology plays an increasingly important role in enabling businesses to respond to the challenges of the global trading environment. Optimism about technology among business leaders—often fueled by breakthroughs in artificial intelligence—has led to a paradigm shift. While technology was once seen as a complementary tool, it is now

increasingly recognized as the backbone of supply chain restructuring. The conclusion is clear: technologies that improve the efficiency and resilience of supply chains are, by far, the primary source of optimism among business leaders when asked about the future of global trade.

However, this optimism is tempered by the challenges that come with adopting new technologies. One of the key issues, as noted by Mr. Groz Winske, is the "rapid pace of technological change." Businesses face the ongoing challenge of keeping up with the fast-paced advancements in new technologies, which requires flexibility and foresight to maintain competitiveness and effectively leverage digital innovations (Syed, 2021, p. 156).

3.1.1 Blockchain Technology: Trust in the Digital Realm

Blockchain technology offers a range of benefits that align with the emerging demands for transparency and accuracy in modern supply chain management. In 2023, 58.9% of businesses had adopted blockchain technology, with an additional 27.5% planning to implement it in 2024. The use of blockchain in supply chain management helps reduce or eliminate fraud and errors, streamlines operations by minimizing delays associated with paperwork, and reduces shipping costs to a minimum. However, the most valuable result of these improvements is intangible: an increase in trust among consumers and partners, which is a crucial step toward greater supplier unification (Al-Shater, 2019, p. 139).

3.1.2 3D Printing: The Path to Specialization

In the realm of product customization and decentralized production, 3D printing is emerging as a key technology. Approximately 58.5% of businesses were either using or had begun using 3D printing by 2023, particularly in the automotive sector. Suleiman Balak, General Manager at General Motors (GM), confirmed the integration of 3D printing into GM's supply chain strategy for the automotive industry. He revealed that GM has widely adopted this technology across its facilities in the U.S., China, and Europe. Balak emphasized its significance, stating, "In our development and production of newer models, such as the electric Hummer, we are increasingly relying on 3D printing for the design of key components. This shift is central to advancing our manufacturing technology." He further explained the impact on supply chains, stating, "By integrating 3D printing, we not only enhance our design capabilities but also significantly improve the efficiency of our supply chain operations" (Abdel Nour, 2023, p. 88).

3.1.3 AI and Big Data Transforming Supply Chains

Artificial intelligence (AI) and big data analytics are seen as game-changers in supply chain management. By 2023, AI had extended into various fields, with 39.6% of business leaders using it to improve customer experiences, 34.8% for demand forecasting, 34.6% to optimize inventory levels, and 34.5% to identify potential disruptions in supply chains. The tangible benefits of integrating AI are evident, as businesses have seen reductions in overall operational costs and a 32% improvement in resource planning. The scale of these improvements highlights AI's transformative impact on current supply chain operations for many businesses. For instance, in the National Health Service (NHS) blood and organ donation system, advanced automation significantly improved platelet supply chains, reducing platelet expiration by 54% and eliminating specialized transportation costs while maintaining reliable deliveries (Abdel Moneim & Ismail, 2022, pp. 36-37).

3.2 The Interrelationship between Foreign Trade Technologies and Technological Development

Technological advancement has had a positive impact on the development of international trade technologies, yet some negative aspects of this progress may hinder growth and development. These key points summarize the mutual effects:

- **Technology and International Trade**: When technological development meets international trade, the impact can be significant, accelerating innovation, the adoption of technology, and economic growth. However, this combination can also lead to polarization within and between countries, often exacerbated by geopolitical tensions. As nations compete to secure a place in technological advancements, trade becomes a crucial intermediary for transferring these innovations, driving global change. While international trade accelerates global growth alongside technology dissemination, it also carries the risk of sharing trade secrets with foreign competitors (Abdel Nour, 2023, p. 88).

- **Slowed Technological Dissemination**: In a fragmented world where the pace of technological dissemination slows, governments face new policy challenges to stimulate trade, innovation, and growth. Although innovators aim to "move fast and break things," policymakers must still protect existing institutions and maintain predictability for investors.

- **New Products and Processes**: Technological advancements lead to new products (e.g., electric vehicles), new processes (e.g., automation and 3D printing), and new modes of transport (e.g., digital containerization and instant data transfer over the internet), all of which impact trade and typically promote development.

- **Displacement of Older Products**: The introduction of new goods, such as smartphones and flat-screen TVs, allows innovative countries to outcompete producers of outdated goods, such as older mobile phones and bulky CRT TVs. This generally increases overall trade volumes as new products stimulate higher demand.

- **Increased Production Efficiency**: Adopting new processes can enhance production efficiency, lowering real prices and boosting production and exports from innovative countries. However, a concern for developing economies—often specializing in simpler production stages that can be automated—is the potential decline in demand for their exports. Nonetheless, research shows that the scale effects of automation often increase the demand for imported parts, even when some components are eventually produced locally. For example, the shift toward robotics in advanced economies has been accompanied by an increase in imported parts from low-income countries, especially in sectors like automotive manufacturing (Abu Bakr, 2023, p. 36).

- **Role of Communication Innovations**: Alongside transportation advances, communication innovations have played a crucial role in facilitating trade. The internet, for example, enables businesses to find suppliers and partners in distant locations and opens new avenues for trade, particularly in digital services (Mohamed Hassan, 2023, p. 24).

- **Competition and Technological Change**: Trade creates larger markets where competition intensifies. Leading firms with access to global markets can boost their profits and invest in research and development, leading to faster innovation. Simultaneously, competition from other global leaders drives companies to stay at the forefront of technological advancement (Khalil & Alwani, 2023, p. 36).

- **Overall Positive Impact**: The general effect of trade and technology on development is positive, as new technologies enhance productivity and expand trade. Moreover, trade enables faster dissemination of new technologies across the globe, further promoting growth (Basyouni, 2004, p. 44).

- **Winners and Losers**: However, technological progress and trade inevitably create winners and losers. Those who remain reliant on outdated technologies may fall behind, causing some industries in certain countries to decline. Supporting workers who lose their jobs due to these shifts will be essential as technology and trade continue to evolve. Similarly, countries largely excluded from global markets—whether due to political, geographic, or infrastructural factors—will face further delays in reaching global productivity standards (Oqasim & Hamdi, 2019, p. 411).

- **Trade Barriers**: Trade barriers have often been used to protect industries losing competitiveness to foreign counterparts. For example, in the 1970s and 1980s, technological advancements in Japan led to the production of better and cheaper cars and semiconductors, prompting the U.S. to manage trade by imposing import restrictions and encouraging exports. Wealthy countries have also sought to protect intellectual property to safeguard proprietary technology and corporate profits, rather than for national security reasons (Ben Alqamah & Saihi, 2018, p. 98).

- **Export Controls**: Export controls on scarce materials used in advanced technology products and machinery, as well as on the high-tech goods themselves, have become powerful tools aimed at slowing technological advancement in other countries. Such government interventions slow global growth and innovation as trade and technology transfer diminish. A decline in high-tech product exports also means slower profit growth and a

shortage of funds for high-tech industries to invest in research and development (Zawawid & Hajjaj, 2018, p. 86).

- **Environmental Impact**: New trade restrictions could harm environmental goods and green innovations. A faster transition to renewable energy could be achieved if innovation is global and prices drop quickly. Easier access to products like solar panels and batteries at lower costs would result in less coal, gas, and oil consumption.

- **Addressing Global Threats**: Moving forward, using trade and technology to address existential threats—without jeopardizing domestic security—will be crucial. From surviving pandemics and natural disasters to adapting to and mitigating climate change, innovation and global collaboration in sharing solutions are vital tools for reducing the impact of such events. However, they also carry security risks (Waheeba & Ben Qaddour, 2018, p. 78).

- **Recent Experiences with Trade and Technology**: Recent experiences underscore the importance of trade and technology. COVID-19 vaccines were produced and distributed worldwide (albeit unevenly) at record speeds, thanks to global research and production partnerships. Semiconductors, essential for all electronic devices and machinery, are mostly designed in the U.S. and manufactured primarily in Asia. Electric vehicle batteries cannot be produced without cobalt, lithium, and nickel, which are primarily sourced from Africa and South America (Hammad, 2005, p. 47).

- **Implications of Technological Innovation and Trade**: The innovation and dissemination of new technologies have serious implications for development and climate action. The U.S., for instance, has imposed tariffs on most Chinese imports and regulates a growing percentage of exports. China has responded in kind. These tariffs slow the growth of the world's two largest economies and harm global innovation (Ben Alqamah & Saihi, 2018, p. 91).

CONCLUSION

Financial technology (fintech) has brought about a significant transformation in the world of financial transactions, drastically changing the traditional financial system. Not long ago, conducting financial or commercial operations required visiting institutions or banks in person. For instance, purchasing insurance required visiting an insurance company, and transferring money required a trip to the bank. Today, with the help of mobile applications, we can easily perform all these operations. Fintech has disrupted the traditional financial system, which relied heavily on intermediaries, and has ushered in a decentralized system. This shift has democratized financial processes across various sectors, reducing the time and costs associated with conducting these operations. At the conclusion of this research, we reached the following findings and recommendations:

Findings

- Technological innovation is the process of developing and using technology in an innovative way to improve products, services, production processes, or marketing. It focuses on applying modern, innovative technology in the most effective ways to achieve improvements, meet customer needs, increase efficiency and productivity, and reduce costs.

- Fintech has fundamentally transformed financial systems, enabling them to meet many financial needs, services, and operations in advanced ways that compete significantly with traditional financial services in terms of speed and cost.

- The use of fintech leads to reduced costs for financial services and their prices, such as electronic money transfers and other fintech-based services.

- Electronic money plays a crucial role in fintech activities and operations, as the industry relies heavily on it in its transactions.

- Fintech is influencing the future of traditional financial services, creating competition between conventional financial institutions and fintech companies. This leads to administrative and regulatory challenges for banking sectors and regulatory bodies, requiring the development of administrative, legal, financial, and technological frameworks to address these changes.

Recommendations

- Embrace modern innovation and creativity techniques, especially in digital technology and information, as these are essential in building modern economies and achieving sustainable economic development. Adopting these technologies in banking and financial institutions helps improve services, reduce costs, and increase efficiency, giving them a competitive edge in the global financial and business market.

- Banks should adopt electronic payment technologies and mobile applications to allow customers to conduct banking transactions conveniently and securely, thereby increasing customer satisfaction and attracting new clients. Moreover, digital technologies and information systems improve bank efficiency, reduce operational costs, and contribute to profitability and financial success.

- Develop banking regulations to better align with the comprehensive banking philosophy by enacting laws that regulate the growing liquidity of these banks.

- Continuously monitor and evaluate the effectiveness of blockchain technology to ensure continuous improvement and make necessary adjustments to maximize expected benefits.

- Ensure blockchain implementation is user-friendly, and provide adequate training and support to guarantee effective use, keeping up with technological advancements in the field.

- Establish strategies to address challenges and risks related to blockchain usage, particularly regarding risk disclosure within the context of enhancing supply chain transparency. This would allow for better transparency and compliance with market supervisory directives.

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