COLLECTION OF PAPERS
NEW ECONOMY
Volume 3, No. 1, 2025

DECENTRALIZATION IN INTERNATIONAL PAYMENTS AND THE EVOLVING ROLE OF SWIFT

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Received 25.03.2025. | Send to review 05.04.2025. | Accepted 07.07.2025.

Original Article

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JEL Classification:
E42, F36, G21, O33, L17

Doi: 10.61432/CPNE0301001t

UDK: 336.71: 339.732

Article Classification:
Original scientific paper

ABSTRACT

The decentralization of international payments is emerging as a transformative trend in the global financial system, driven by blockchain technology, decentralized finance (DeFi), cryptocurrencies, and central bank digital currencies (CBDCs). This paper explores the shift from traditional, centralized payment infrastructures toward decentralized alternatives, assessing their impact on transaction efficiency, cost reduction, financial inclusion, and financial stability. A special focus is placed on the evolving role of the Society for Worldwide Interbank Financial Telecommunication (SWIFT), historically the backbone of international cross-border payments. Through a combination of theoretical review and empirical time series analysis based on SWIFT message data from 2014 to 2022, the study evaluates SWIFT's resilience and adaptation in the face of decentralization pressures. The findings reveal a permanent upward trend in SWIFT traffic, coupled with seasonal fluctuations, suggesting that while decentralization is expanding, SWIFT remains a central actor by innovating its infrastructure. The study also discusses the regulatory challenges posed by decentralized systems and the need for balanced frameworks to foster innovation while safeguarding stability. This research concludes that international payments, where traditional and decentralized models seem to coexist.

Keywords: *Decentralization, International Payments, Blockchain, SWIFT, Cross-Border Transactions*

1. INTRODUCTION

Decentralization in international finance and payments is the process of reducing or eliminating central authority in managing financial resources and operations, which allows participants to interact directly with each other. Traditional financial systems rely on intermediaries such as banks, regulators and government institutions to guarantee the validity and security of transaction (Zhukevych and Zhuk, 2023). Decentralization mainly changes this dynamics, minimizing the need for such intermediaries, thus expanding access to financial resources and information (Schär, 2021). By accepting decentralized mechanisms, consumers can get a greater control and transparency in their financial activities, while traditional goalkeepers lose their monopoly on financial transactions.

The key elements of decentralization in international finance include decentralized financing technologies (DeFi), digital currencies and declining reliance on traditional reserve currencies (Petkova, 2025). Defi Platforms use Blockchain technology to allow automated intelligent contracts and partner transactions without centralized management, leading to lower costs and faster transfers (Wer-

ner et al., 2021). In addition, cryptocurrencies such as Bitcoin and Ethereum have introduced decentralized funds for conducting international payments managed by consumer communities instead of governments or banks (Catalini and Gans, 2020). Moreover, decentralization encourages nations and corporations to explore alternative transactions and reserves, striving to reduce its dependence on dominant reserve currencies such as the US dollar (Nabyl and Berg, 2023).

Despite its advantages, decentralization poses significant regulatory challenges (Suherman et al., 2024). The lack of centralized supervision masters the ability of the authorities to monitor and control cash flows, increasing the risks of financial violations, money laundering and illegal activities (Ganne, 2022). Nevertheless, decentralized systems also improve transparency and security, as transaction data stored in distributed networks are highly resistant to seasoning or compromise. Overall, the decentralization of international finance and payments brings the promise of democratization of the global financial system by increasing the autonomy of participants, reducing transaction costs and improving efficiency - providing that adequate regulatory frameworks are developing to deal with the risks.

The subject of the present research is the process of decentralization in international payments and its impact on the traditional role of SWIFT (Society for Worldwide Interbank Financial Telecommunication). The purpose of this research paper is to examine the extent to which decentralized financial technologies influence transaction efficiency, cost reduction, financial inclusion, and the regulatory landscape, while also evaluating how SWIFT is adapting to these new developments. The research seeks to assess whether decentralized alternatives threaten SWIFT's established position or whether SWIFT is capable of evolving to remain a key player in the international payment ecosystem.

To achieve these goals, the paper provides a theoretical analysis of decentralization trends, conducts an empirical analysis of SWIFT's market share and performance (measured through the average number of messages per day), and examine the technological and regulatory developments affecting the future of international payments. The methodology involves time series analysis, forecasting models based on IBM SPSS and R software, and the decomposition of seasonal and trend components of SWIFT message data from 2014 to 2022.

2. LITERATURE REVIEW

The international payments landscape is in the midst of significant change, spurred by the development of decentralised technologies and the continued need for more efficient, transparent and inclusive financial systems (Scott and Zachariadis, 2013). While traditional systems such as SWIFT have been the default choice for cross-border transactions for many years, their limitations in terms of speed, cost and inclusiveness are now becoming increasingly apparent (Sheela et al., 2023). This has prompted the rise of alternative payment systems, some of which make use of distributed ledger technology, among other novel features, to remedy the limitations of current infrastructure (He, 2017). Banking's capacity to deliver both diversified and secured as well as convertibility-based two-way solutions for dealing with the rest of the world is a crucial ingredient in international currency attractiveness (Narlikar 2005). If access to US dollar becomes more unstable, e.g. because of bank crises, the need for more diversified payment and a desire to use local currencies will increase, with a particular focus on Asia (Narlikar 2005). This change represents both a threat and a possibility for SWIFT, the Society for Worldwide Interbank Financial Telecommunication; that is, the organization that traditionally has been the core of international financial messaging (Scott and Zachariadis, 2013).

SWIFT has established itself as an international payments powerhouse by being not only a network, but also a standardized messaging mechanism and an established brand of security and stability (Barbosa, 2020). But the emergence of decentralized finance and other alternatives for the movement of money are driving a reckoning inside SWIFT about where it adds value and whether it is capable of keeping up with the demands of the changing global financial ecosystem. The cost of the initial investment in SWIFT adoption (hardware, software, services, and IT-literate human resource) can be substantial, but medium-to long- term running costs are expected to fall as banks converge towards the use of newer, more flexible development technologies and maintenance costs of obsolete systems are reduced (Liu, 2021). SWIFT enables financial institutions to exchange pay-

ment instructions, but does not process any of these payments itself, in place using correspondent banking relationships and even other platforms to the settle the transactions (Jereni and Sundire, 2023). This dependence on intermediaries results in inefficiencies, delays, increased cost, and the resulting slower and more expensive nature of cross-border payments when compared with domestic payments. SWIFT's constraints have been exposed in the digital economy, where enterprises and consumers demand faster, cheaper, and more transparent payment services.

SWIFT's architecture, while robust, can be seen as a centralized system, subject to geopolitical influences and potential vulnerabilities (Köppel, 2011). The network facilitates financial institutions to securely exchange messages regarding financial transactions (Boz et al., 2020). The US dollar and the Euro have a strong market share in global trade (Narlikar, 2005). Logically, China's currency, which is still subject to relatively stringent exchange controls, notably on non-trade transactions, has a share of world payments significantly lower than its share in world trade (Narlikar, 2005). The increasing use of sanctions and other politically motivated restrictions on access to the SWIFT network has further fuelled the search for alternative payment systems that are less susceptible to external interference. Also, local currency financing and pricing have many advantages in a commercially- integrated zone (Narlikar, 2005). The current systems have inefficiencies originally designed for retail banking and is based on rules and risks (Hamza et al., 2023). Some commentators have argued that part of the reason could be the limited incentives for banks to use it as opposed to their own correspondent banking channels as well as the lack of awareness of its existence among households and corporates (Drakopoulos, 2024).

Decentralized payment systems, particularly those based on blockchain technology, offer a potential alternative to SWIFT by eliminating intermediaries, reducing transaction costs, and enhancing transparency (Owolabi et al., 2024). The introduction of the Euro led to a relatively stable duopoly in currency use over the past decade - albeit there is no market barrier-to-entry preventing another large currency from being supplied and actually having success (Narlikar, 2005). The creation of the euro increased the hierarchy between the main two currencies, and other currencies, in respect of these standards. The main driver of RMB international development is hence for the time being of regulatory nature. By leveraging distributed ledger technology, these systems can facilitate peer-to-peer transactions without the need for a central authority, thereby reducing the risk of censorship and control (Sussangkarn, 2020).

New empirical literature has started to evaluate real-world operational and technological efficiency of DeFi applications. For instance, Adamyk et al. (2025) introduce a utility-based methodology for comparing DeFi transaction tracking platforms using 3 key performance indicators: the ability to perform real-time monitoring, system risk reduction and user trust help. According to their research, although DeFi platforms can outperform traditional systems in transaction transparency and auditability, they still have a problem with fragmentation and the lack of standardized compliance. Including these metrics offers a comparative baseline to indicate the advantages and disadvantages of centralized (SWIFT) vs. decentralized infrastructures.

Digital currencies also diminish reliance on the U.S. dollar-dominated financial system (Pocher and Veneris 2021). The disrupt for global payments isn't simply replacing SWIFT, it's about building a broader and more distributed architecture that includes both traditional systems and open systems like Ripple. It is the worlds' central banks that are driving development and evolution of these digital forms of payment (Prodan et al., 2024).

Advances in distributed ledger technology and digital assets are opening up new possibilities for cross-border payments, but they are also new challenges for regulators and policy makers. Such alternative payment systems could work easily alongside SWIFT, and offer users more choice, as well as ramping up competition in the international payments space. Around the world, central banks are looking at the possibility of issuing a central bank digital currency and some are already experimenting with one (Tan, 2023). Though the development of digital currencies is in an early phase, a well-designed system would lower the cost of domestic and cross-border transactions, improve settlement of payments enabling real time payments, increase access to central bank money, add programmable payments and encourage innovation (Yanagawa and Yamaoka, 2019; Broby, 2021).

CBDCs may also mitigate counterparty credit risk, liquidity risk, and settlement risk. A number of central banks are in the process of conducting work on the possibilities and implications of issuing digital currency and the extent to which these virtual currencies would help in address current challenges of payment systems and improving the degree of financial inclusion (Aysan and Kayani, 2022). The benefits of central bank digital currency are numerous such as ability to provide lower cost transaction fee in comparison to that charged by banks/companies, enhanced cross-border remittances, improved financial inclusion (Ozili, 2022).

3.THE TREND OF DECENTRALIZATION IN INTERNATIONAL PAYMENTS

International finance and payment decentralization is an act of reduction or removal of central authority control on management of financial resources and operations. Individual participants can directly interact without permission of authority. By removing the need for banks, regulators, and other government agencies to act as trusted intermediaries, decentralization enhances participants' access to resources and information. Their autonomy expands by lowering costs and increasing the speed of transactions.

The main drivers of decentralization of the international finance are:

- Decentralized financial technology (DeFi), created with the ability to allow the implementation of automated contracts and transaction networks without any central control. This enables end-to-end user transactions excluding state and bank systems.
- Digital currencies and cryptocurrencies, like Bitcoin and Ethereum, that has introduced new possibilities for conducting international payments. These currencies are decentralized and are managed by the communities who use them, rather than by governments or banks.

3.1. DECENTRALIZED FINANCIAL TECHNOLOGIES (DEFI)

Decentralized finance (DeFi) is not a formal legal or technical term but is widely used to describe the evolving ecosystem of financial services that operate without traditional intermediaries. It typically involves decentralization, distributed ledger technologies (DLT), smart contracts, disintermediation, and open banking (Zetzsche, Arner and Buckley, 2020).

Although DeFi projects like Bitcoin are based on DLT and blockchain, decentralization can be attained in other ways. A lot of banks rely on distributed ledgers which are still centrally controlled. Thus, decentralization does not necessarily imply distribution, and disintermedation is sometimes a consequence, rather than a precondition. DeFi ultimately encompasses the delivery of financial services over decentralized infrastructures, technologies, and counter-parties (Walch, 2019).

DeFi, which operates on permissionless blockchains, differs from traditional finance (TradFi), in which there are intermediaries, slower and more expensive settlements, and no public transparency. Through smart contracts, direct peer-to-peer interaction is enabled and since the code is immutable, no one has the ability to change any transactions that were implemented. These attributes build confidence by openness and not by a single controlling source of authority.

DeFi provides lending, saving, trading, insurance, and payment services via Decentralized Applications (dApps) that are built on top of blockchain networks. dApps turn cryptic protocols into easy-to-use financial instruments. Unlike centralized software, they run on censorship-resistant networks and most are open-source, which allows for public auditability and trust.

These blockchains are secured by consensus mechanisms like Proof-of-Work (PoW) and Proof-of-Stake (PoS). dApps reward users with tokens to promote operational quality and transparency. Their global nature means anyone with internet can access DeFi services, transcending obstacles encountered in traditional banking systems.

DeFi platforms serve as user interfaces for decentralized finance, offering exchanges (DEXs), lending, insurance, derivatives, and asset management. One milestone is the development of the Automated Market Makers, which replaced centralized order books with algorithms that adjust prices and execute trades based on liquidity. Decentralized autonomous organizations (DAOs) additionally decentralise governance as they permit communities to govern projects through the use of smart contracts.

This approach improves the efficiency and accessibility of financial services (Schär, 2021). DAOs and open-source protocols promote community-led innovation and governance (Jensen and Ross, 2021). Programmable blockchains such as Ethereum and Solana support diverse services like token swaps, margin trading, and ownership verification of real or digital assets.

The primary benefits of DeFi include accessibility, faster transaction rates, reduced costs, transparency, and faster innovation cycles. Services are international, lowcost, and not bordered by traditional financial systems. Users can see past transactions and join in on influencing platforms through governance by tokens. Furthermore, DeFi allows to quickly launch new financial products. If dissatisfied, communities can fork code to launch their own competing platforms.

DeFi also presents serious risks and challenges. First, the open-source code and the high value of funds involved mean that DeFi protocols are at risk of getting hacked. Second, the lack of regulation can lead to abuse and high market volatility. Third, even for technically proficient users, DeFi services can be complex and difficult to use. Fourth, as an emerging financial concept, DeFi naturally carries risk. A key question concerns responsibility: who is accountable for a user's mistake during a transaction, especially given that blockchain-based actions are irreversible. The technology executes the user's intention, and if incorrect, that will be encoded and automatically enforced by the smart contract embedded in the dApp. Even though many DeFi tokens have already provided high returns, they come with considerable risk and price volatility, often exceeding that of well-established digital assets like Bitcoin and Ethereum. They are also relatively less liquid and therefore more vulnerable to dramatic price movements. The anonymity of DeFi participants makes transactions vulnerable to cyberattacks, hacks, and fraud. This may result in the loss or theft of funds without access to remedial recourse. However, regulatory environments are beginning to mature.

3.2. DIGITAL CURRENCIES AND CRYPTOCURRENCIES

One big aspect of decentralization of international payments is the advent of digital currencies, and cryptocurrencies – e-money that exists solely in digital form, something that is not physical, and in many cases, not controlled by a central body. Though both are digital, digital currencies all can be centralized or decentralized, while cryptocurrencies are based exclusively on decentralized systems and cryptographic security.

These digital currencies are a combination of government-issued Central Bank Digital Currencies (CBDCs) such as China's digital yuan (e-CNY) and decentralized assets. CBDCs represent the value of traditional money, but they only exist in electronic, not physical, form and are accessed through digital wallets and apps. They are used for e-commerce and online payments, and are controlled by institutions such as central banks.

Cryptocurrencies operate independently of state control. They leverage blockchain to record and verify transactions, providing more privacy, lower fees and global accessibility. Transacted over the internet, stored in a specialized type of software called a crypto wallet, the assets are transparent yet anonymous in many cases, which makes them attractive but also vulnerable to cyberattacks, steep price fluctuations and uncertain regulatory status.

Regulatory advancements and a more widespread adoption of CBDCs will define the future of digital currencies. The move towards digital asset management and transactions can also be seen in cryptocurrencies extending into DeFi, NFTs and virtual worlds.

Decentralization can also help nations and companies in reducing reliance on dominant reserve currencies such as the US dollar or euro. Now more than ever this is crucial for developing countries seeking greater independence in the world trading and financial system.

The pace of this trend is likely to accelerate with technological innovations in FinTech (Rutendo Magwedere and Marozva, 2025; Abdo et al., 2025). Innovations such as blockchain-based payments, digital wallets, neobanks, and P2P platforms threaten the domination of centralized systems such as SWIFT by allowing for faster, cheaper, and more secure transfers (Statista, 2023). Recent trends in the worldwide financial services market indicate a radical transformation towards decentralization and digitization. Aquilina, Frost and Schrimpf (2023) explain that the DeFi growth is driving forward the demands for instant settlement, user-driven interfaces, and automation through smart

contracts. These developments reflect broader technological innovations, such as mobile-first platforms, AI-based fraud detection, and embedded finance, which are disrupting traditional financial infrastructure. This trend is a major move toward decentralization that reduces the dependency on traditional, central clearing and settlement systems.

While SWIFT remains a critical backbone for global financial messaging, the growing preference for instant, decentralized payment networks forces it to innovate. For example, SWIFT has been transforming itself through programmes such as its Global Payments Innovation (gpi) initiative, which it is also anchoring within ISO 20022, an effort to increase the speed, transparency and interoperability of payments. These all prove the increasing institution-demand for real-time financial infrastructure, and bring pressure to legacy systems like SWIFT to evolve beyond the traditional batch-processing approach. These technological expectations are coherent with the decentralisation spirit, where speed, automation and user access are the basics.

Central banks around the world are also adjusting their strategies to the decentralization. Distributed ledger technology (DLT), stablecoins, and central bank digital currencies (CBDCs) are among the technological innovations embraced by many central banks to extend financial inclusion and upgrade settlement systems. Tan (2023) observes that CBDCs have the potential to reduce transaction costs, facilitate programmable payments, and increase central bank money in the digital era. Aysan and Kayani (2022) point out the strategic and financial motivations for digital currency issuance, especially when emerging markets are aiming to lower reliance on dominant reserve currencies. These institutional changes signal that CBDC creation is not just about a monetary innovation but also an attempt by central banks to react to the overall decentralization in global payments.

This institutional change indicates a reconstitution of central banks' roles: from being the sole keepers of monetary infrastructure towards becoming collaborative agents in programmable and interoperable payment ecologies. The trial of CBDCs could marginalize SWIFT or push it to serve as a backbone for regulated digital payments. SWIFT's development is one of strategic evolution – SWIFT is already exploring a range of potential solutions for CBDC interoperability and updating its messaging standards to accommodate the decentralised architectures in development. So, while that decentralization is disrupting the world of international payments, SWIFT is also transforming and demonstrating further hybridization where traditional infrastructures coexist and adapt alongside new decentralized systems.

4.METHODOLOGY OF THE STUDY

Stage 1: In the statistical literature, there are several methods for checking the presence of a development trend in each dynamic series. It was used Autocorrelation coefficient. „It is usually considered that time series that have a development trend are autocorrelated, each member of the series depends on the previous one" (Atanasov, 2018). The coefficient has the form:

$$r_1 = \frac{\sum_{t=2}^{N} Y_t Y_{t-1} - \frac{1}{N-1}\sum_{t=1}^{N-1} Y \sum_{t=2}^{N} Y_t}{\sqrt{\left[\sum_{t=1}^{N-1} Y^2 - \frac{1}{N-1}\left(\sum_{t=1}^{N-1} Y_t\right)^2\right]\left[\sum_{t=2}^{N} Y_t^2 - \frac{1}{N-1}\left(\sum_{t=2}^{N} Y_t\right)^2\right]}} \quad (1)$$

r_1 - autocorrelation coefficient;

Yi - average number of SWIFT messages per day in year t;

N- number of general population.

Stage 2: The seasonal component was examined using the actual to smoothed values method. This was done for the 12-month periodicity, as in the "12-months moving average" (Macauley, 1931). The formula has the form:

$$\widehat{Y}_7 = \frac{\frac{Y_1}{2} + Y_2 + Y_3 + \ldots + Y_{12} + \frac{Y_{13}}{2}}{12} \quad (2)$$

Y_i - average number of SWIFT messages per day in year t;

$\hat{Y}_i$ - estimated amounts of average number of SWIFT messages per day in year t.

Stage 3: For the purposes of the analysis, the dynamic series of the indicator "Average number of SWIFT messages per day" was studied. When model the time series, trends, seasonal and random components were included due to the presence of the trend and the nature of the monthly data. The components of the studied series are represented by the function:

$$Y = f(T, S, \varepsilon) \quad (3)$$

The model following multiplicative form:

$$ANT_t = T_t * S_t * \varepsilon_t \quad (4)$$

ANT_t is average number of transactions per day (in millions);

S_t is the seasonal index;

ε_t is random component;

T_t is tend component, where ($T_t = \beta_o + \beta_1 * t$);

β_o is constant;

β_1 is the regression coefficient;

t is time.

Stage 4: Considering the specificity of the data, the exponential smoothing method was used in the forecasting. The estimated amount is presented in the following form:

$$\hat{Y}_{t+1} = \alpha Y_t + \alpha(1-\alpha)Y_{t-1} + \alpha(1-\alpha)^2 Y_{t-2} + \ldots + \alpha(1-\alpha)^k Y_{t-k} \quad (5)$$

Y_t - average number of transactions per day (in millions) for t-period;

Y_{t-k} - lag amounts of the studied order average number of transactions per day;

- parameter . The larger the amount, the more weight is given to the last members of the time series.

Limitations of the present research:

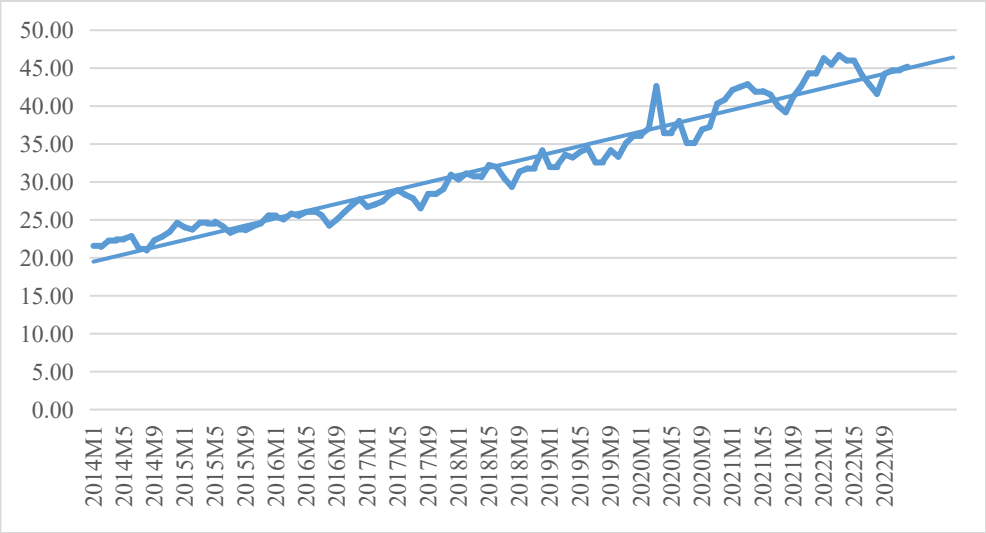
- The analysis is restricted to monthly global data on the average number of SWIFT messages per day between January 2014 and December 2022. Additionally, the research focuses on SWIFT as the central institution of analysis and does not cover every alternative decentralized payment platform in the empirical section.
- Another limitation is that the study forecasts future trends based only on historical data patterns without incorporating disruptive geopolitical, technological, or regulatory shifts beyond the models' assumptions.
- Due to the limitation of the length of the time series, namely 9 years. The forecast is prepared for approximately 20% of the time series. The article presents a forecast for the period from January 2023 to December 2024. The available data for "Average number of SWIFT messages per day" (Statista, 2025) in Statista are for the period January 2014 to December 2022 for the worldwide, therefore the study and analysis is limited to the study of this period. The analysis of the dynamics of Average number of SWIFT messages per day in the article is limited to the study of the permanent development trend and forecasting the future development through an appropriate forecast.
- The specialized statistical software IBM SPSS was used in this study.

The objective of the forecasting exercise is to evaluate whether SWIFT's message volume trends reflect institutional inertia or an active strategic response to decentralization pressures. By modelling future usage, we aim to assess whether SWIFT remains robust amid emerging alternatives.

5. EMPIRICAL ANALYSIS

The data for the variable "Average number of SWIFT messages per day" (Statista, 2025) are presented by months. This is a sufficient indicator to examine development trend and seasonality. The trend is presented in Figure 1.

Figure 1. Average number of SWIFT messages per day – trend line



Source: Authors' contribution based on data by Statista, 2025

The data for "Average number of SWIFT messages per day" are monthly, which defines the dynamic series as periodic. The same recurrence is observed in it. In the same month of August in each year, decreases are observed. In the same months, increases are observed, namely December. This is an indicator of the presence of seasonality. Seasonality is examined in more detail at a later stage, and in addition to a practical approach, it is also studied through an analytical approach. Over time it exhibits an upward development trend. The shapes of the seasonal fluctuations on the graph are not completely identical, which suggests that there is a random component. "The mode of coupling is determined by the amplitude of the seasonality of the phenomenon during the period under consideration" (Bozev, 2014). Undoubtedly, in the current dynamic series, an increase in amplitude is observed at the end of the period, which is why the relationship is defined as multiplicative.

The analytical approach was used to determine the main components. The results of the analysis show that there is a development trend in the dynamic series. In ACF plot the first autocorrelation coefficient (the first pillar) goes beyond the limits of the confidence interval. The average number of SWIFT messages have a periodicity of 12, because the presented data are for each 12 months. This coefficient number also goes beyond the limits of the confidence interval. This shows that there is a clearly expressed seasonality in the average number of SWIFT messages. It can be stated that in the analysed time series there is a permanent development trend, a seasonal and a random component.

Table 1. Trend modelling results

Coefficients	B	Std. error	t	Sig
(Constant)	19,21	0,227	84,63	0,000
t	0,239	0,004	66,76	0,000
F(4376,7)				0,000
R - 0,988				
R Square - 0,976				

Source: Authors' contribution based on data by Statista, 2025

In Table 1 the results of the trend modelling are presented. In studying the trend of the average number of SWIFT messages per day, the linear model was chosen as the best model. Table 1 presents the results of the

analysed model, the estimated model parameters and their statistical significance. 97.6% of the variation in the time series can be explained by the presence of a linear trend in its dynamics. There is a reason to believe that the model is adequate F (4376.7) Sig=0.000<α=0.05. The results of the model show that there is an average growth in the average number of SWIFT messages per day monthly to the amount of 0.239 million. After performing diagnostics of the studied model, it can be stated that the distribution of the residuals is close to normal. The presence of autocorrelation has been established. As noted earlier, this is an indicator of the presence of a trend in the time series. Therefore, in the study of this series, one of the most common measures has been taken, namely "introducing time as an independent variable in the regression model" (Atanasov, 2018).

Due to the linear form of the model, it has the form:

$$\hat{Y}_t = \beta_0 + \beta_1 t_1 \quad (6)$$

In the study of the seasonal component of the average number of SWIFT messages per day, seasonality indices were established. They are presented in Table 2.

Table 2. Results of the study of the seasonal component (Seasonal Factors)

Period	Seasonal Factor (%)	Index (%)
January	101,7	1,7
February	101,4	1,4
March	103,2	3,2
April	101,3	1,3
May	102,5	2,5
June	101,0	1,0
July	96,2	-3,8
August	93,3	-6,7
September	97,2	-2,8
October	98,0	-2,0
November	100,5	0,5
December	103,5	3,5

Source: Authors' contribution based on data by Statista, 2025

The largest increases in the index were observed in March and December. In March, the average number of SWIFT messages per day was 3.2% higher than the average amount for the period under review. In December, the average number of SWIFT messages per day was 3.5% higher than the average amount for the period under review, which is due to the seasonal nature of the phenomenon. In August, the largest decrease in the index was observed. In August, the average number of SWIFT messages was 6.7% lower than the average.

The seasonal fluctuations, particularly the consistent December peak and August low point, can be linked to the institutional and operational rhythms in the global banking system. The December peak corresponds to an increased financial activity tied to year-end settlements, corporate reporting, and fiscal closures. The August decline reflects widespread holiday periods and reduced institutional throughput in key financial centres. Structurally, the upward trend in SWIFT messages aligns with the network's ongoing modernization, including the Global Payments Innovation initiative and gradual implementation of ISO 20022 standards. These innovations aim to address competition from decentralized systems by improving speed, traceability, and interoperability. As such, the seasonal and structural components of the data do not merely reflect operational patterns but are indicative of SWIFT's adaptive strategies in a shifting financial landscape.

Table 3. Predicted amounts

Time	Forecast	UCL	LCL
Jan 2023	46,22	48,13	44,32
Feb 2023	46,09	48,11	44,08
Mar 2023	47,63	49,75	45,50
Apr 2023	46,29	48,49	44,09
May 2023	46,95	49,25	44,65
Jun 2023	46,75	49,13	44,36
Jul 2023	44,73	47,15	42,31
Aug 2023	43,81	46,29	41,33
Sep 2023	45,92	48,53	43,31
Oct 2023	46,35	49,05	43,66
Nov 2023	47,72	50,54	44,91
Dec 2023	49,08	52,00	46,15
Jan 2024	49,13	52,19	46,06
Feb 2024	48,98	52,09	45,86
Mar 2024	50,59	53,83	47,35
Apr 2024	49,16	52,39	45,92
May 2024	49,84	53,16	46,52
Jun 2024	49,61	52,97	46,24
Jul 2024	47,46	50,78	44,13
Aug 2024	46,47	49,80	43,14
Sep 2024	48,69	52,18	45,20
Oct 2024	49,14	52,70	45,57
Nov 2024	50,57	54,26	46,89
Dec 2024	51,99	55,80	48,19

Source: Authors' contribution based on data by Statista, 2025

Table 3 and Figure 2 present the monthly forecasted values and their respective confidence intervals (UCL and LCL) for the years 2023 and 2024. A clear upward trend is observed: the predicted values for each month in 2024 are consistently higher than those for the same month in 2023. In both years, the month of August shows the lowest forecasted value within the respective year, indicating a seasonal dip.

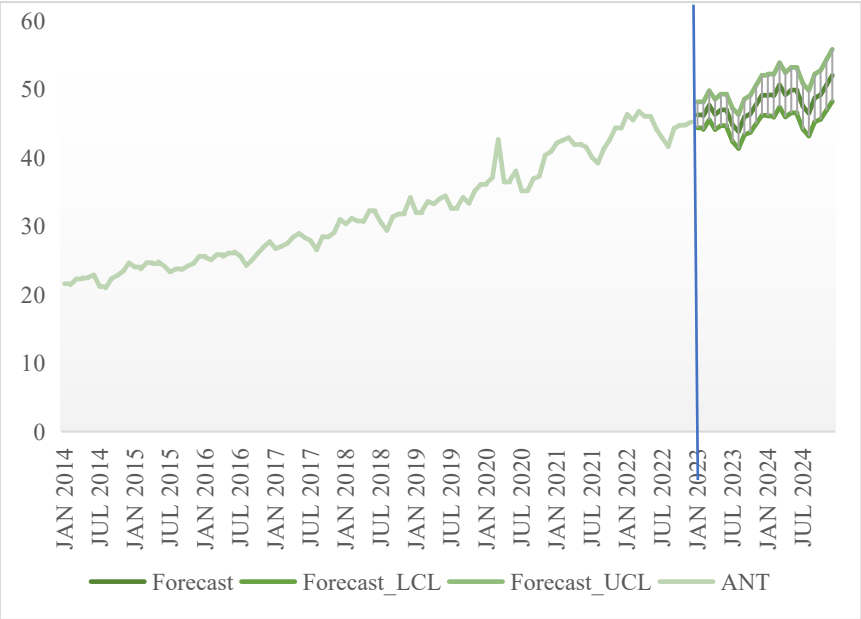
For August 2023, the model predicts that the average number of SWIFT messages per day will be 43.81 million. With a 95% confidence level, the actual amount for August 2023 will be between 41.33 and 46.29 million.

For December 2023, the model predicts that the average number of SWIFT messages per day will be 49.08 million. With a 95% confidence level, the actual amount for December 2023 will be between 46.15 and 52.00 million.

For August 2024, the model predicts that the average number of SWIFT messages per day will be 46.47 million. With a 95% confidence level, the actual amount for August 2024 will be between 43.14 and 49.80 million.

For December 2024 the model predicts that the average number of SWIFT messages per day will be 51.99 million. With a 95% confidence level, the actual amount for December 2024 will be between 48.19 and 55.80 million.

Figure 2. Forecast of average number of SWIFT messages per day



Source: Authors' contribution based on data by Statista, 2025

In the considered dynamic series of average number of SWIFT messages per day, an upward trend of development is observed, as average growth of average number of SWIFT messages per day monthly in the amount of 0.239 million is observed. In addition to the trend, a seasonal component is observed in the analysed dynamic series. In August, the largest decreases in the SWIFT indicator are observed, as the average number of SWIFT messages was 6.7% lower than the average amount. This decrease is expected due to the nature of the summer month of August. In December, the largest increases in the SWIFT indicator are observed, as the average number of SWIFT messages per day was 3.5% higher than the average amount for the period. From the forecast made, for 2023 and 2024, an upward trend is expected to preserve. Depending on which of the limits of the interval the actual number of SWIFT messages per day will be, lower average growth rates may be expected.

The empirical analysis of the average number of SWIFT messages per day between 2014 and 2022 reveals a consistent upward trend, indicating a steady growth in the use of SWIFT's services despite the rise of decentralized alternatives. The time series decomposition confirms the presence of both a significant linear trend and seasonal fluctuations, with peak activity typically occurring in March and December, and notable declines in August. The trend modelling shows that SWIFT's traffic increases by approximately 0.239 million messages per month on average, reflecting its continuing central role in international payments. Forecasting results for 2023 and 2024 project further growth, reinforcing SWIFT's resilience and adaptability amid the broader shift toward decentralization. These findings suggest that while decentralized payment systems are gaining ground, SWIFT remains a critical and evolving infrastructure in the global financial ecosystem.

6. DISCUSSION

6.1. IN TERMS OF REGULATORY FRAMEWORKS

In terms of regulations, there are deep regulatory challenges with decentralized finance and cryptocurrencies. Such financial innovations frequently work outside conventional legal rules and supervisory systems. The decentralized nature of these platforms as well as the anonymity of users deviate the discourse from the usual one-size-fits-all narrative that typically applies to centralized intermediaries (Rangapriya and Lokhande, 2022). As a peer to peer intermediary-free technology, block chain makes it quite impractical to enforce KYC and AML rules (Saleh, 2024). This makes it more difficult to trace transactions, the parties involved and irregular activities such as money laundering and terrorist financing (Zhuk, 2024).

Another level of complexity arises due to the worldwide reach of blockchain networks. Unclear jurisdictions As borders blur, the application of legal frameworks is not clearcut, in particular when service users cannot be limited by borders to the same platform (Coelho, Fishman and Ocampo, 2021). This legal ambiguity gives room to regulatory arbitrage, the practice of gaming the different legal setup of countries (Kayani and Hasan, 2024). Therefore, international regulatory cooperation is of great importance to homogenize standards and to fill any gaps (Xiong, and Luo 2024).

Also, jurisdictions on what cryptocurrency is vary: some see it as a property, while others see it as a security or a commodity. The lack of uniformity in standards impedes the emergence of a set of world-wide standards. The fast pace of development in the space adds a sense of urgency - new forms are consistently developed and paternalistic legal systems must adapt (Grennan, 2022; Blandin et al., 2019). With the exponential increase of influence of the crypto sector on traditional finance markets (Coindesk, 2023), the downfall of large platforms such as FTX makes it clear the need for strong regulation (Frediani, 2024), especially in a financial services oversight endeavor (Vidal-Tomás, Briola and Aste, 2023).

6.2. IN TERMS OF INSTITUTIONAL RESPONSES

Institutions have begun to adapt their regulatory strategies to meet the challenges posed by DeFi and cryptocurrencies. A shift is underway from entity-based regulation (focused on institutions) to activity-based regulation, which targets financial functions regardless of who performs them (Alam, Gupta and Zameni, 2019). This model better suits decentralized systems, where algorithms, not entities, execute transactions. Regulatory sandboxes, which allow controlled testing of new financial innovations, offer a flexible way for authorities to experiment with tailored oversight mechanisms (AllahRakha, 2023).

Financial regulators must balance innovation and stability (Topić – Pavković, 2024). Overly strict rules may drive innovation abroad, while lax regulation can lead to systemic risks and consumer harm (Yadav and Brummer, 2019). A flexible regulatory approach is needed, which evolves alongside the technology and ensures market integrity without impeding growth (Koker, Morris and Jaffer, 2020). Moreover, harmonizing regulations internationally remains a strategic priority to prevent fragmentation and arbitrage.

While SWIFT relies on standardized, institutionally mediated messaging protocols, DeFi ecosystems utilize radically different transaction-tracking mechanisms such as public block explorers (e.g., Etherscan), on-chain analytics tools (e.g., Nansen, DeFi Llama), and protocol-specific dashboards. These tools allow for near-instantaneous visibility into asset flows, contract activity, and user behavior - capabilities largely absent in traditional finance. Including such decentralized tracking technologies in the comparative analysis underscores the distinct paradigms at play, while also hinting at a potential convergence where institutional systems like SWIFT may incorporate or adapt similar transparency-enhancing mechanisms in future iterations.

In line with these institutional challenges, Adamyk et al. (2025) propose that future oversight mechanisms may benefit from adopting DeFi-native metrics (f.e. protocol-level transparency, user-driven governance models, and automated auditing tools) as part of cross-jurisdictional supervisory strategies. Such empirical insights can inform how centralized institutions like SWIFT might integrate decentralized monitoring architectures into their evolving systems.

The forecasting results project a continued upward trend in SWIFT message volumes through 2024, suggesting that despite the emergence of decentralized payment alternatives, institutions remain deeply integrated with SWIFT's infrastructure. This upward trend, confirmed by robust time series modelling, supports the paper's main conclusion that the SWIFT is not in decline but rather it is actively evolving. The network's strategic adaptations - such as its Global Payments Innovation (gpi) program and ISO 20022 compliance - position it not merely as a legacy institution but as a competitive player responding to the pressures from decentralization through a structural modernization. This resilience implies that decentralization does not automatically lead to disintermediation of legacy infrastructures. Instead, SWIFT's adaptability suggests a hybrid path where institutional systems absorb or align with decentralized innovations rather than being displaced.

The results of the forecast, which indicate a sustained upward trend in SWIFT traffic, reinforce the argument that traditional infrastructures are not being displaced but are instead adapting. Rather than showing decline, the data support the view that SWIFT is absorbing pressure from decentralization through innovation and modernization. These projections substantiate the study's thesis that SWIFT's resilience is not incidental but structurally embedded, reflecting the network's capacity to coexist with and even complement decentralized systems.

6.3. IN TERMS OF CONSUMER PROTECTION

The rapid proliferation of DeFi and crypto platforms has exposed consumers to novel and often severe risks. Users face fraud, scams, market manipulation, and technical vulnerabilities. Many lack the financial literacy required to understand these risks, making them especially vulnerable (Ahlström, Chang and Cheung, 2019). Existing consumer protection laws, designed for traditional markets, may not be directly applicable in the digital finance space (Frediani, 2024).

Regulatory bodies frequently lag behind technological change. A more proactive stance, such as funding academic research and hosting international symposia, could help close this gap (Walton, 2014). Additionally, public education campaigns and effective grievance redressal mechanisms must be developed to ensure that retail participants are informed and protected (Momčilović and Ninković, 2024).

Ultimately, consumer protection must be a cornerstone of crypto regulation. As financial technology continues to evolve, safeguarding retail users will be essential for building trust and fostering sustainable growth in digital finance (Aquilina, Frost and Schrimpf, 2023; Smoleńska, Ganderson and Héritier, 2020).

7. CONCLUSION

Decentralization in international finance and payments has the potential to democratize the financial system by granting greater autonomy to participants, reducing costs, and increasing transaction efficiency. Decentralized financial technologies may reshape the financial system by offering users more control and independence while managing risks and challenges.

At the same time, digital currencies and cryptocurrencies are already offering alternatives to traditional financial infrastructure, transforming how people make payments and manage their assets. Reducing dependence on reserve currencies may also lead to fundamental changes in the global financial system, opening new opportunities for economic development and innovation, especially for emerging economies seeking greater independence and resilience.

Decentralizing of global payments, advancing blockchain technology, DeFi, cryptocurrencies, and CBDCs are fundamentally transforming the world financial system. Such changes bring about improved transactional utility, cost reductions, and broadens financial inclusivity in contrast to conventional centralized architectures. However, the empirical analysis of SWIFT's message volumes from 2014 to 2022 indicates a consistent upward trend, with notable seasonal fluctuations. The projected growth in SWIFT message volume underscores the network's continued centrality in international payments. This empirical resilience supports the argument that SWIFT is not being displaced by decentralised platforms but is instead evolving. Thus, the modelling results substantiate the broader claim that hybridization - rather than a full displacement of centralized systems - is defining the future of international payments infrastructure.

This suggests a financial ecosystem in transition, where emerging decentralized platforms coexist with established centralized infrastructures. While decentralized systems address specific inefficiencies and cater to evolving user demands, SWIFT's adaptability – evident in initiatives like the Global Payments Innovation (gpi) and alignment with ISO 20022 standards - demonstrates its commitment to modernization. The future of international payments is likely to be characterized by a hybrid model, integrating the strengths of both centralized and decentralized systems.

ACKNOWLEDGMENT

This research paper has been conducted within the framework of project NID NI-11-2023, titled "Payments in International Trade – Trends and Perspectives," funded by the University of National and World Economy.

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